ISSN 2395-4396 (Online)
www.ijariie.com

NATIONAL CONFERENCE on VLSI, COMMUNICATION AND SIGNAL PROCESSING (NCVCS-2023)

Publication Partner: IJARIIE

ORGANISED BY: Rajarajeswari College of Engineering, Bengaluru, Karnataka **(Affiliated to VTU)**

Conference Date: 05-05-2023

Volume-7, Issue-1, 2023

International Journal of Advance Research and Innovative Ideas in Education

RECOGNITION OF ADHD SYNDROME IN CHILDREN

Dr. Sunitha R[1] Monika M K[2], Nayana S R[3], Sushma G S[4], Supritha S[5]

[1]*Associate professor, ECE, RajaRajeswari college of Engineering, Karnataka, India*
[2]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*
[3]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*
[4]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*
[5]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*

ABSTRACT

Attention Deficit Hyperactivity Disorder (ADHD) is a Disruptive Behavior Disorder characterized by the presence of a set of chronic and impairing behavior patterns that display abnormal levels of inattention, hyperactivity, or their combination. Since most individuals especially children display these behaviors from time to time, it is be difficult to differentiate behaviors that reflect ADHD from those that are a normal part of growing up which makes the diagnosis a tricky job. Electroencephalogram (EEG) is a best method for monitoring, recording and measuring spontaneous voltage fluctuations of the brain that caused due to the ionic current associated with the neurons. Due to having many advantages of using EEG over MRI, PET and MEG in the detection and diagnosis of ADHD, in this proposed system a well-known artificial intelligence technique, the SVM algorithm, is used for the diagnosis of the disorder. The major advantage of using SVM is that it helps in controlling the complexity of the problem of diagnosing. The proposed methodology improves on the overall identification accuracy; SVM algorithms are known to give good solution to very complex problems. The proposed system extracts the features which are responsible for ADHD syndrome by SVM, method using the python language provides 99% of efficiency it helps in early detection of abnormalities and starts the exact treatment.

Keyword--- *ADHD, SVM, EEG,*

1. INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is one of the most common childhood disorders and can continue through adolescence and adulthood. ADHD is a disorder in which a person has a difficulty to learn effectively, caused by an unknown factor or factors. The unknown factor is the disorder that affects the brain's ability to receive and process information. It typically first shows up when a person has difficulty speaking, reading, writing, figuring out a math problem, communicating with a parent, or paying attention in class [4].

1.1 Classification of ADHD

ADHD is characterized by [4].

- Hyperactivity, Impulsivity, Inattention
- Difficulty staying seated
- Fidgeting and bouncing while seated
- Talking excessively
- Seeming to be in constant motion
- Climbing on things and jumping off things inappropriately
- Running inappropriately.
- Having great difficulty waiting for turns Interrupting children's play activities Interrupting conversations
- Blurting out answers to questions not directed at them
- Acting recklessly without thinking of the consequences

These are just ways of identifying if a child is suffering from ADHD or not. They are just an estimate and not the correct way to predict the advent of ADHD. Since there is no correct method or proposed method to identify ADHD we plan to do that based on the algorithm. These points just give us an idea of how a child with ADHD may react; it might also be possible that a child may not suffer from ADHD in spite of having the above problems. In this paper we attempt to develop a tool based on SVM algorithm in order to increase efficiency the of ADHD diagnosis [4].

1.2 CAUSES

All possible causes for the ADHD is still on research and it is mainly focused on finding the genes that cause a person to be likely to get ADHD. Some of the causes are listed as below [1].

- Exposing to toxic lead.
- Brain injuries in the early stage.
- Premature birth.
- Smoke, alcohol or harmful drug addiction during pregnancy period.
- Many parents claimed that, after injecting vaccination their child started to show ADHD Symptoms.
- Chemical imbalance in brain.

2. LITERATURE SUREVY

Electrophysiological measures[1] were among the first to be used to study brain processes in children with attention deficit hyperactivity disorder (ADHD). Early reviews of studies of electrophysiological measures collected on hyperactive or ADHD children concluded that the disorder was most likely associated with problems of under reactivity to stimulation and task demands with less evidence supporting resting under arousal in the disorder. Collectively, the EEG findings in children, adolescents, and adults with ADHD Recognition of ADHD Syndrome in Children are increased slow-wave activity in frontal regions, suggesting cortical hypo arousal, especially in the ADHD Combined subtype. Several researchers have reported that EEG measures discriminate well between children with and without ADHD [1].

Diagnosis of students with learning disability has never been an easy job. In this paper we have tried to diagnose Attention Deficit Hyperactivity Disorder (ADHD) by applying one of the techniques of artificial intelligence to the problem. According to our results this makes the diagnosing accurate, less time consuming and a less tedious job. We have taken a data-set which is verified by a doctor, it includes the results of a questionnaire used by the doctors to diagnose ADHD. This data-set is the given to the SVM module, this is called the test data. After that we introduce the data set which needs to be diagnosed and again give it to the SVM module, this time the module gives us the diagnosis. This diagnosis can be verified by any doctor. In future we can use this SVM algorithm to do diagnosis of other ADHD related problems. We can also create our own algorithm and test the results so as to not use a previously developed model or software. There is still a lot of research to be done in LD and ADHD especially in India where it is still not considered a threat [4].

According to the sample collected, our research shows that a significant percentage of children have noticeable ADHD symptoms. Given the age of children, parents, preschool teachers and teachers recognize similar levels of high ADHD probability. Future studies should be directed toward early detection and recognition of children with ADHD syndrome and clinical evaluation, as first steps toward successful treatment and prevention of additional psychological and other problems in adulthood [6].

In this paper, a portable single channel EEG signal acquisition system for the brain computer interface application is proposed. The EEG signal acquisition system has been trying to designed cost – effective due to the future use in the brain computer interfacing (BCI) system. For the development of a real time BCI application, the use of signal processing is always essential. From the experimental observation it can said that the designed system can be implement for the EEG signal acquisition and storage of data to a PC efficiently. For further use of the system in case of BCI application, the different signal processing tools like feature extraction by using FFT (Fast Fourier Transform) or Wavelet Analysis and for training of the EEG data set Neural Network or SVM (Sample Vector Machine) can be used [5].

3. PROPOSED WORK

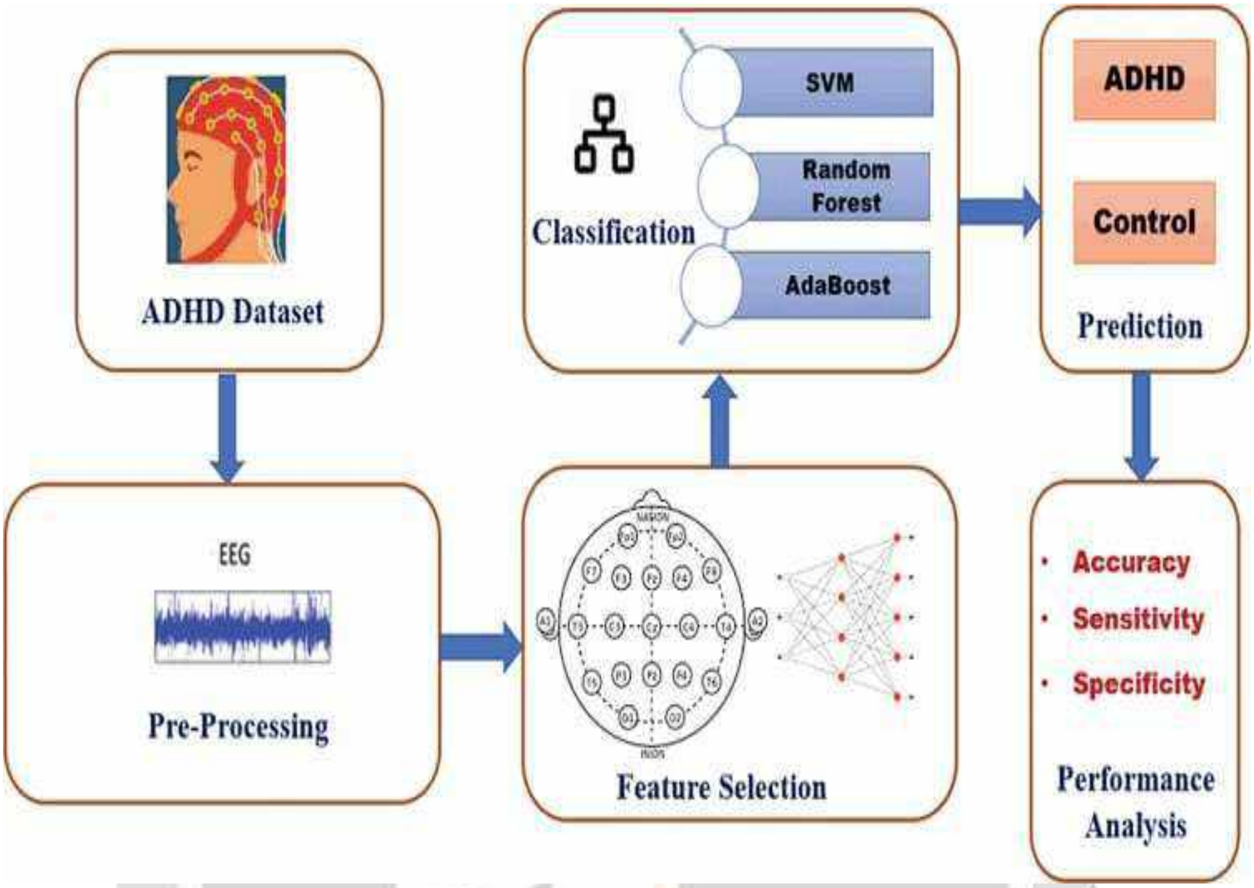


Fig 1: Detection of ADHD

In the proposed system, ADHD affected children of age 5-15 years are selected, then acquired the EEG signal from children using a portable EEG signal. And get the required data segmentation, extraction of main features.Using this method, the different parameter calculation, helps to detect abnormalities of children with ADHD syndrome. Pre-processing is the term for the adjustments we make to our data before sending it to the algorithm, as seen in figure. Data Preprocessing is a method for transforming messy data into a tidy collection. To put it another way, when data is collected from several sources, it is done so in a raw form that prevents analysis. Feature Extraction is the process of converting raw data into numerical traits that may be used while keeping the specifics of the original data set. Compared to just applying machine learning to raw data, it produces superior outcomes. As a consequence, when training a dataset, it is possible to quantify how much each feature lowers impurity. The greater an attribute's ability to eliminate impurity, the more significant it is. Train and Test dataset. It's time to fit the first machine learning model into your data once you've cleaned it up, visualized it, and learnt more about it. Creating two sets of data: one for training and one for testing. Training Dataset: A portion of the data was used to fit the model. The test dataset is used to objectively assess the final model's fit to the training dataset. Prediction and Accuracy Stated machine learning algorithms are taught to forecast the customer's smart phone decision. The ability to forecast the customer's choice of smart phone is critical in helping smart phone makers improve their standards by observing what characteristics are important to customers when choosing a smart phone. Simply put, accuracy refers to how well your machine learning model predicts the proper class for a given observation.

3.1 Designed Algorithm

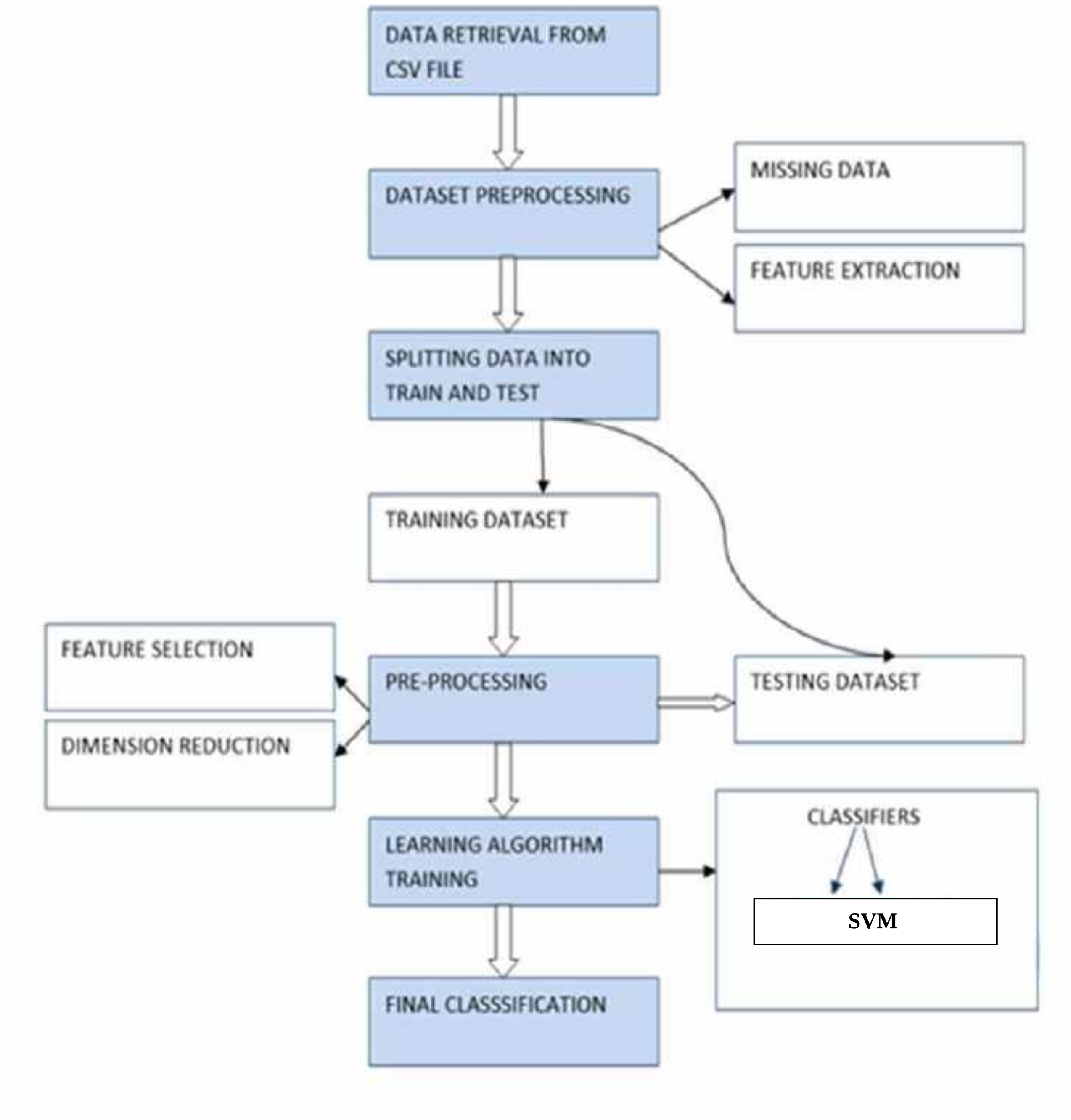


Fig 2: Block Diagram

Step 1: (Collection of Data) this step deals with the collection of data and representing the data in the form of an MS-EXCEL SHEET.

Step 2: (Test Data Processing) this step deals with using the SVM tool and processing the data through it. Thus, this step deals with the test data.

Step 3: (Diagnosing) in this step, the testing and actual diagnosing takes place. We introduce the data that needs to be diagnosed and run it through the SVM tool again.

General Algorithm

Procedure to diagnose ADHD in Childrens

Collect data set = {data set 1, data set 2….}

Split the data set into T and D

T: contains the trained data set with diagnosis,

D: contains the data set to be diagnosed

Repeat the next step for data sets T and D

Apply pre-processing to reduce the noisy data

Create a stream

Choose Radial Basis Function Kernel

Apply this stream to the trained data set | T

Now, apply the stream to both data set T and D combined

Output is the diagnosis of ADHD

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Mean	Variance	Standard [	Entropy	Skewness	Kurtosis	Contrast	Energy	ASM	Homogene	Dissimilari	Correlatio	Coarsenes	PSNR	SSIM	MSE	DC
2	23.44852	2538.986	50.38835	0.651174	1.984202	5.421042	181.4677	0.781557	0.610831	0.847033	2.765411	0.968576	########	97.97463	0.777011	0.171163	0.303989
3	4.398331	834.853	28.89382	0.953532	6.495203	43.34936	76.74589	0.97277	0.946281	0.980762	0.548605	0.959751	########	110.3466	0.977953	0.009913	0.839019
4	3.244263	642.0592	25.33889	0.966065	7.77286	61.75603	81.75241	0.980161	0.960715	0.985066	0.540411	0.944259	########	112.2663	0.985362	0.006372	0.849775
5	8.511353	1126.214	33.55911	0.868765	3.763142	15.10758	362.2912	0.921786	0.84969	0.949295	2.765725	0.859027	########	101.9558	0.881015	0.068438	0
6	21.00079	2235.317	47.27914	0.684724	1.936029	4.722343	312.4392	0.804184	0.646711	0.880301	3.00666	0.938572	########	97.63987	0.766308	0.184878	0
7	0	0	0	1			0	1	1	1	0	1	########	inf		0	
8	11.35056	998.9722	31.60652	0.761106	2.53392	7.394586	303.948	0.854277	0.729789	0.902355	3.440551	0.86648	########	99.20658	0.794881	0.128889	0
9	0.405136	68.37872	8.269143	0.994724	20.38802	416.8434	17.78916	0.996932	0.993873	0.997885	0.1144	0.886144	########	111.3712	0.985175	0.00783	0.410458
10	5.955872	937.4387	30.61762	0.926931	5.015434	26.15044	57.22681	0.956961	0.915774	0.974157	0.507706	0.973263	########	111.4391	0.981891	0.007708	0.914484
11	6.184021	895.1968	29.91984	0.917259	4.707172	23.16817	73.71412	0.951172	0.904729	0.969454	0.686158	0.963931	########	113.07	0.983963	0.005295	0.945252
12	0.26059	52.28489	7.230829	0.997061	27.72276	769.4896	18.01628	0.998292	0.996586	0.998987	0.091771	0.8492	########	67.17984	0.982749	0.012448	0.191657
13	0.121689	25.52394	5.052122	0.9985	41.50158	1723.39	18.22765	0.999128	0.998257	0.999361	0.087971	0.687473	########	63.96255	0.967416	0.026111	0.048101
14	4.741714	750.204	27.38985	0.94012	5.781048	35.14203	51.38403	0.96482	0.930878	0.976638	0.478661	0.970006	########	70.66998	0.986005	0.005573	0.922781
15	2.319977	395.2696	19.88139	0.972146	8.538835	74.27071	38.2651	0.983735	0.967734	0.988451	0.306346	0.957622	########	64.89642	0.967753	0.021059	0.593362
16	2.868698	365.294	19.11266	0.952678	6.707265	47.02435	49.72266	0.972264	0.945298	0.981362	0.535216	0.940403	########	71.42139	0.984574	0.004688	0.905462
17	17.81139	1219.681	34.92393	0.610209	1.690158	4.152791	107.2968	0.753242	0.567373	0.836566	2.35917	0.961286	########	96.57853	0.71992	0.236059	0
18	0.110107	18.71068	4.325585	0.99829	39.79174	1605.093	12.76182	0.999006	0.998014	0.999116	0.083612	0.701511	########	114.4887	0.990589	0.003819	0.105691
19	0.698532	109.4116	10.46	0.989786	14.93303	224.016	41.59383	0.994055	0.988146	0.995984	0.277964	0.833618	########	108.8067	0.97749	0.014132	0.416905
20	3.564499	493.2978	22.21031	0.947465	6.181637	39.5283	51.7333	0.969179	0.939307	0.978669	0.547873	0.95408	########	113.5833	0.985113	0.004705	0.913612
21	4.289383	544.5317	23.3352	0.930547	5.461464	31.59668	59.31144	0.95912	0.919912	0.973069	0.678766	0.952299	########	108.6857	0.967969	0.014531	0.769485
22	0.98175	133.7995	11.56717	0.98438	11.81027	141.4419	26.8894	0.9909	0.981882	0.993006	0.244944	0.912038	########	63.732	0.960088	0.027535	0.372627
23	1.201416	164.6528	12.83171	0.981786	10.68546	115.8585	18.55244	0.989383	0.978879	0.992519	0.182218	0.950681	########	63.732	0.95996	0.027535	0.419473
24	1.185303	143.0501	11.96035	0.978808	10.13876	104.981	26.67608	0.98764	0.975433	0.991299	0.271757	0.918375	########	66.2168	0.97305	0.015538	0.589638
25	0	0	0	1			0	1	1	1	0	1	########	70.93496		0.005243	0
26	11.62387	599.6097	24.48693	0.657436	1.774659	4.142207	53.43769	0.785695	0.617317	0.892227	1.185146	0.960809	########	54.9865	0.758534	0.206267	0

Fig 3: Input of the Module

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Mean	Variance	Standard E	Entropy	Skewness	Kurtosis	Contrast	Energy	ASM	Homogeni	Dissimilari	Correlatio	Coarsenes	PSNR	SSIM	MSE	DC	Target
2	23.44852	2538.986	50.38835	0.651174	1.984202	5.421042	181.4677	0.781557	0.610831	0.847033	2.765411	0.968576	########	97.97463	0.777011	0.171163	0.303989	1
3	4.398331	834.853	28.89382	0.953532	6.495203	43.34936	76.74589	0.97277	0.946281	0.980762	0.548605	0.959751	########	110.3466	0.977953	0.009913	0.839019	1
4	3.244263	642.0592	25.33889	0.966065	7.77286	61.75603	81.75241	0.980161	0.960715	0.985066	0.540411	0.944259	########	112.2663	0.985362	0.006372	0.849775	1
5	8.511353	1126.214	33.55911	0.868765	3.763142	15.10758	362.2912	0.921786	0.84969	0.949295	2.765725	0.859027	########	101.9558	0.881015	0.068438	0	0
6	21.00079	2235.317	47.27914	0.684724	1.936029	4.722343	312.4392	0.804184	0.646711	0.880301	3.00666	0.938572	########	97.63987	0.766308	0.184878	0	0
7	0	0	0	1			0	1	1	1	0	1	########	inf		0		0
8	11.35056	998.9722	31.60652	0.761106	2.53392	7.394586	303.948	0.854277	0.729789	0.902355	3.440551	0.86648	########	99.20658	0.794881	0.128889	0	0
9	0.405136	68.37872	8.269143	0.994724	20.38802	416.8434	17.78916	0.996932	0.993873	0.997885	0.1144	0.886144	########	111.3712	0.985175	0.00783	0.410458	1
10	5.955872	937.4387	30.61762	0.926931	5.015434	26.15044	57.22681	0.956961	0.915774	0.974157	0.507706	0.973263	########	111.4391	0.981891	0.007708	0.914484	1
11	6.184021	895.1968	29.91984	0.917259	4.707172	23.16817	73.71412	0.951172	0.904729	0.969454	0.686158	0.963931	########	113.07	0.983963	0.005295	0.945252	1
12	0.26059	52.28489	7.230829	0.997061	27.72276	769.4896	18.01628	0.998292	0.996586	0.998987	0.091771	0.8492	########	67.17984	0.982749	0.012448	0.191657	1
13	0.121689	25.52394	5.052122	0.9985	41.50158	1723.39	18.22765	0.999128	0.998257	0.999361	0.087971	0.687473	########	63.96255	0.967416	0.026111	0.048101	1
14	4.741714	750.204	27.38985	0.94012	5.781048	35.14203	51.38403	0.96482	0.930878	0.976638	0.478661	0.970006	########	70.66998	0.986005	0.005573	0.922781	1
15	2.319977	395.2696	19.88139	0.972146	8.538835	74.27071	38.2651	0.983735	0.967734	0.988451	0.306346	0.957622	########	64.89642	0.967753	0.021059	0.593362	1
16	2.868698	365.294	19.11266	0.952678	6.707265	47.02435	49.72266	0.972264	0.945298	0.981362	0.535216	0.940403	########	71.42139	0.984574	0.004688	0.905462	1
17	17.81139	1219.681	34.92393	0.610209	1.690158	4.152791	107.2968	0.753242	0.567373	0.836566	2.35917	0.961286	########	96.57853	0.71992	0.236059	0	0
18	0.110107	18.71068	4.325585	0.99829	39.79174	1605.093	12.76182	0.999006	0.998014	0.999116	0.083612	0.701511	########	114.4887	0.990589	0.003819	0.105691	1
19	0.698532	109.4116	10.46	0.989786	14.93303	224.016	41.59383	0.994055	0.988146	0.995984	0.277964	0.833618	########	108.8067	0.97749	0.014132	0.416905	1
20	3.564499	493.2978	22.21031	0.947465	6.181637	39.5283	51.7333	0.969179	0.939307	0.978669	0.547873	0.95408	########	113.5833	0.985113	0.004705	0.913612	1
21	4.289381	544.5317	23.3352	0.930547	5.461464	31.59568	59.31144	0.95912	0.919912	0.973069	0.678766	0.952299	########	108.6857	0.967969	0.014531	0.769485	1
22	0.98175	133.7995	11.56717	0.98438	11.81027	141.4419	26.8894	0.9909	0.981882	0.993006	0.244944	0.912038	########	63.732	0.960088	0.027535	0.372627	1
23	1.201416	164.6528	12.83171	0.981786	10.68546	115.8585	18.55244	0.989383	0.978879	0.992519	0.182218	0.950681	########	63.732	0.95996	0.027535	0.419473	1
24	1.185303	143.0501	11.96035	0.978808	10.13876	104.981	26.67608	0.98764	0.975433	0.991299	0.271757	0.918375	########	66.2168	0.97305	0.015538	0.589638	1
25	0	0	0	1			0	1	1	1	0	1	########	70.93496		0.005243	0	1
26	11.62387	599.6097	24.48693	0.657436	1.774659	4.142207	53.43769	0.785695	0.617317	0.892227	1.185146	0.960809	########	54.9865	0.758534	0.206267	0	0

Fig 4: Output of the Module

4 RESULTS

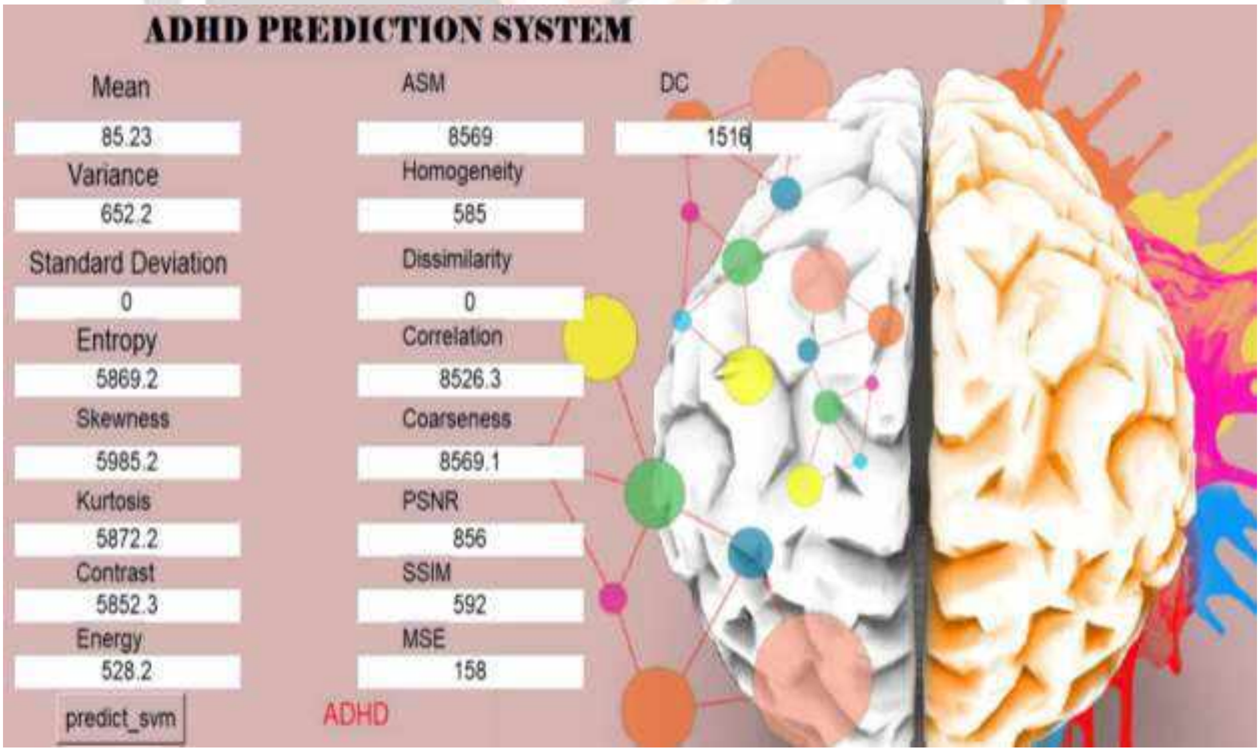


Fig 5: Output with ADHD

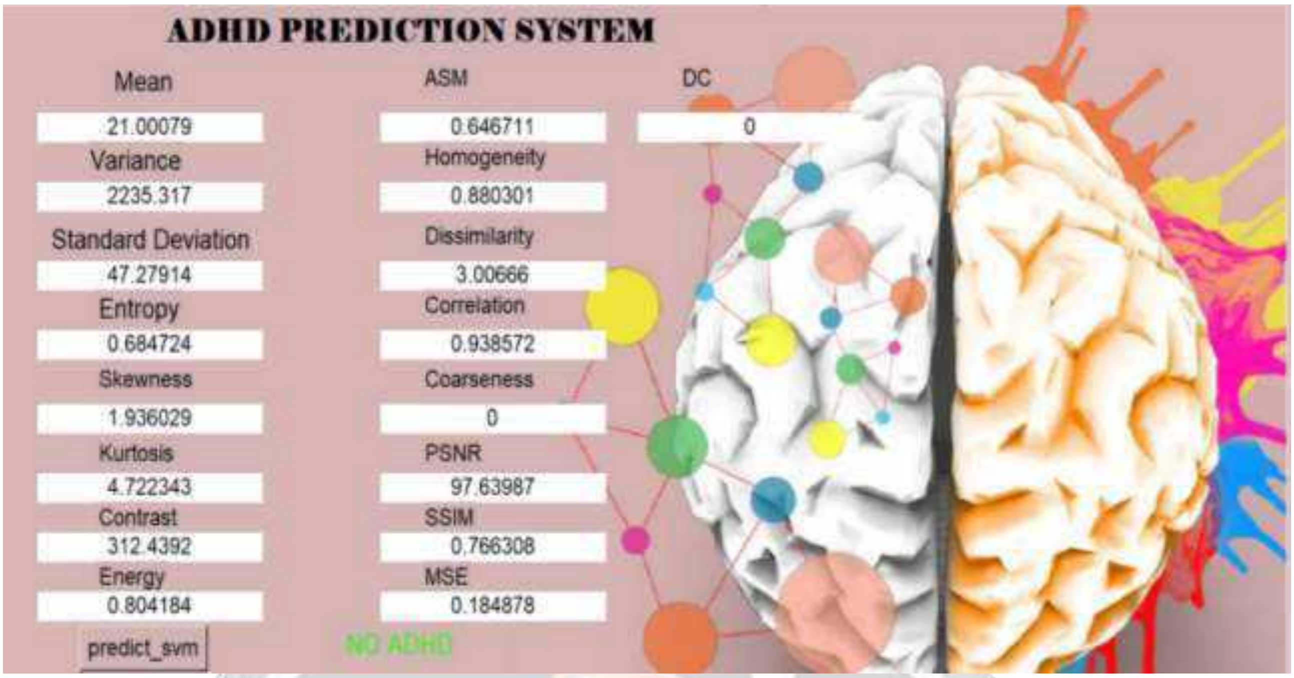


Fig : Output with No ADHD

4.1 Discussion

Diagnosis of childrens with learning disability has never been an easy job. In this paper we have tried to diagnose Attention Deficit Hyperactivity Disorder (ADHD) by applying one of the techniques of artificial intelligence to the problem. According to our results this makes the diagnosing accurate, less time consuming and a less tedious job. We have taken a data-set which is verified by a doctor, it includes the results of a questionnaire used by the doctors to diagnose ADHD. This data-set is the given to the SVM module, this is called the test data. After that we introduce the data set which needs to be diagnosed and again give it to the SVM module, this time the module gives us the diagnosis. This diagnosis can be verified by any doctor. In future we can use this SVM algorithm to do diagnosis of other ADHD related problems. We can also create our own algorithm and test the results so as to not use a previously developed model or software. There is still a lot of research to be done in RF and ADHD especially in India where it is still not considered a threat [4].

5 CONCLUSION

The proposed methodology, first will acquire the data from the ADHD affected and normal children, then algorithms used for classification of children with ADHD affected and normal groups based on various parameters. The following methods incorporate to identify affected area. The first method uses the supply vector machine algorithm, which has a classification accuracy of about 99%.

6 REFERENCE

[1] Sunitha R, Dr HB Phaniraju, Deepika, “Diagnosis of ADHD Syndrome by comparative analysis of EEG signal of brain”, journal of critical reviews 2020, ISSN – 2394 – 5125.

[2] Barbarise W, Katusic S, Colligan R, et al. How common is attentiondeficit/hyperactivity disorder? Towards resolution of the controversy: results from a population-based study. Acta Paediatr Suppl. 2004;93(445): 55–59

[3] Centers for Disease Control and Prevention (CDC). Increasing prevalence of parent reported attention-deficit/hyperactivity disorder among children— United States, 2003 and 2007. MMWR Morb Mortal Wkly Rep. 2010;59(44):1439–1443

[4] Diagnosis of ADHD using SVM algorithm, conference paper January 2010. J Anuradha Dr . K.V. Arulalan.

[5] Design of single channel portable EEG signal acquisition system for brain computer interface application by Amlan Jyoti Bhagawati and Riku Chutia. International Journal of Biomedical Engineering and Science (IJBES), Vol. 3, No 1, January 2016.

[6] Early Detection and Recognition of Children with ADHD Symptoms by Mladenka Vukojevi, Alma Dizdarevi and Delfina Novakovi.

[7] Is the ADHD Brain Wired Differently? A Review on Structural and Functional Connectivity in Attention Deficit Hyperactivity Disorder by Kerstin Konrad and Simon B. Eickhoff.

EQUIPMENT CONDITION MONITORING SYSTEM BASED ON IoT

Vani S Badiger[1], Keerthi B N[2], Megha H V[3]

[1]Assistant Professor, Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India
[2] Student, Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India
[3] Student, Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

The importance of the equipment condition monitoring system for the machining workshop is due to the rising demands on the effectiveness and dependability of the machining process. Accuracy can vary in a machine or equipment condition monitoring system. Data collection and processing from workshop equipment are necessary in order to construct the monitoring system. Consequently, a calibration interface is needed on the system's dashboard. Considering the intricate machining environment and the variety of equipment in the workplace. The suggested system calls for the development of a system for monitoring the state of equipment using heterogeneous data from several sources. The multisource acquired data from the sensors is then analyzed, stored in the Cloud and anytime an action is required, an alert signal is given to the user and an alarm is triggered to ensure that the action is taken immediately. Such that the machinery or equipment is promptly protected from changes in factors like temperature, humidity, pressure, altitude and vibrations. After analyzing the data from the sensors, an alert signal is sent through mail depending on the threshold levels that are defined for each parameter with respect to the specific pieces of equipment.

Keyword: - *Equipment, Monitoring system, Machining workshop, Cloud, Trigger and Threshold levels.*

1. INTRODUCTION

The term "Internet of Things" (IoT) describes all of the online-connected objects that are prevalent around the globe. IoT's goal is to use the Internet to connect and share data between two devices. The Internet of Things has advanced significantly over the last several years and has shown to be highly beneficial in numerous practical applications. In applications that require both hardware and software, it is highly helpful. IoT-based condition monitoring is frequently used to track the performance and operational characteristics of large machinery and equipment. The status, utilization, performance, condition, and other equipment data may be collected and analyzed in real-time using an equipment monitoring system on the Internet of Things. The answer can expedite equipment maintenance tasks and improve equipment functioning in the manufacturing, construction, healthcare, oil & gas, electrical, mining, and other industries. The importance of the equipment condition monitoring system for the machining workshop is due to the rising demands on the effectiveness and dependability of the machining process.

1.1 Motivation of the Task

Condition monitoring techniques hit upon anomalies in device before the ones turn into device-vital screw ups, permitting preservation to be scheduled earlier than the gadget absolutely breaks down. This will increase gadget uptime reduces normal protection charges. Circumstance monitoring uses sensors to offer meaningful insights into the modern-day health of numerous gadgets or objects of gadget. Those sensors gather records to display crucial operating parameters together with temperature, vibrations, humidity, sound anomalies, airflow, and present day.

Instead of technicians doing manual readings, the machine routinely collects the facts in actual-time, decreasing the room for blunders, growing data resolution, and making an allowance for real time alarming. This shall operators deal with capability issues as they stand up, in preference to addressing them in the course of scheduled renovation – wherein issues may additionally have already evolved into issues that can't be resolved.

1.2 Problem Statement

Equipment or gadget fails due to extraordinary motives like a typical warmness or stress, extraordinary sounds, excessive vibration or an extraordinary odor, are regularly signs and symptoms that something is going haywire and all screw ups are not the equal. because of this device fails or losses their usefulness once they forestall functioning inside the way they were designed for. This is where our task plays a crucial role in bringing about the solution to tackle the problem.

1.3 Proposed System

This venture is created using IFTTT (If This Then That). IFTTT integrates with Google Sheets and Google Mail. Step one is to create an account in IFTTT via ifttt.com and input electronic mail-identity to get started out. Creating an Applet for both google sheets and Google Mail by usage of webhooks service and by the way of receiving a web request. Creating an event and a trigger. For this challenge we use DHT11 sensor, BMP 280 sensor and Accelerometer sensor readings and these readings are coded using Arduino IDE tool.

1.4 Objectives of the Task

To improve reliability using a couple of sensors, prevention of harm to equipment thereby enhancing lifespan of equipment by keeping the overall performance earlier than equipment fails. A monitoring device with less cost, without much memory limitations, excessive performance, with low electricity intake and accurate parameter value.

2. LITERATURE REVIEW

In this paper [1] Hasan Alkour *et al.,* made a specialty that recent development in wireless communication and Micro Electro Mechanical Systems (MEMS) technology has made it easier to monitor rotating machinery condition by mounting compact wireless MEMS sensors directly on the machine. A cost-effective CM system is necessary to ensure that machines can work properly over long time of efficient operation with the required accuracy. In this paper, the temperature of fan was measured and sent to cloud via NODEMCU esp8266 E12 bored. To evaluate the performance of the method, data was collected under two different conditions and stored data was analyzed using MATLAB. The results shows that the proposed task can clearly indicate the fault, thus providing a reliable and economical method for machine condition monitoring and fault detection.

In this paper [2] Jaiganesh P M *et al.,* proposes an IoT based solution for industrial equipment monitoring, consisting of an ARDUINO controller, sensors, and WI-FI module. The vibration sensor measures the health condition of machines and the temperature sensor senses the heat level. The collected data is updated to the server by node-MCU. Implementation results show the usefulness of the proposed system with low cost and maintenance.

In this paper [3] Jamal Mabrouki *et al.,* proposes an automatic weather monitoring system based on the internet of things technology and embedded system, including electronic devices, sensors, and wireless technology. The main objective is to sense climate parameters such as temperature, humidity, and presence of gases, and send them to remote applications or databases. The stored data can be visualized in graphics and tables form.

In this paper [4] Jumana A *et al.,* proposes a system on the basis of a wireless sensor network (WSN) that monitors and controls a variety of electrical and environmental variables, including power consumption, weather temperature, humidity, flame, lighting, and detection cut in the cable in electrical poles. Each sensor is a node and is connected to a microcontroller board separately. The data collected by these sensors is displayed and monitored on a web page and saved in a local server's database. The system was developed using a free global domain, with a database for storing real-time sensor information.

In this paper [5] Rafizah Ab Rahman *et al.,* explored the use of Internet of Things (IoT) in monitoring the temperature and humidity of a data center in real-time. A simple monitoring system was developed and deployed at

Politeknik Muadzam Shah, where readings were recorded and sent to an IoT platform of AT&T M2X to be stored. The data was then retrieved and analyzed, showing that there was a significant difference in temperature and humidity measured at different locations. The monitoring system was also successful in detecting extreme changes in temperature and humidity and automatically sending a notification to IT personnel through e-mail, short messaging service and mobile notification for further action.

In this paper [6] Amirhossein Khademi *et al.,* discusses the potential of IoT for smart maintenance and how it can help the condition monitoring of rotating machinery using vibration analysis. A method is proposed to make rotating machinery to IoT enabled devices by adding hardware to them, such as a new generation of accelerometer sensors. A data acquisition web application is developed to evaluate the hardware, and the evaluations show the precise results of the results. Maintenance costs are a significant part of the total operating cost of all manufacturing plants, and condition monitoring is a key element of the maintenance program. To overcome these shortcomings, a method is proposed to make rotating machinery to IoT enabled devices by adding hardware.

In this paper [7] Aktham Hasan Ali *et al.,* presents a remote monitoring system of a pressure regulator developed through an internet of thinks (IOT) communication tool, using MATLAB® programming platforms. The system allows to monitor the reference of the pressure regulator and the information of the transducers machine of the plant. Advantages of this type of development are that the server is free and the development system is low cost, and it can strengthen the infrastructure of laboratory equipment in engineering to be controlled remotely.

In this paper [8] Iman Mohammed Nayy ef *et al.,* discusses a wireless sensor network (sensing node and base station) and a smart home gateway. The sensing node uses wireless sensors to measure voltage, current, and power consumption of connected appliances, which are transmitted wirelessly to a base station via Zigbee node. The base station receives all data transmitted from the sensing node and displays it through a GUI, with the possibility of controlling ON and OFF appliances according to consumer requirements. The smart home gateway connects the system with the internet to allow consumers to monitor and remote control the appliances via a smartphone application. The average error ratio between voltage, current, and power was 0.3% in voltage, 1.5% in current, and 1.8% in power.

In this paper [9] Mohd Helmy Abd Wahab *et al.,* discusses the application of Internet-of-things (IoT) in monitoring the performance of electric vehicle batteries. It is clear that an electric vehicle relies on the source of energy from a battery, but the amount of energy supplied to the vehicle is decreasing, leading to performance degradation. To address this, an IoT-based battery monitoring system is proposed, consisting of two major parts: a monitoring device and a user interface. Based on experimental results, the system is capable of detecting degraded battery performance and sending notification messages to the user for further action.

In this paper [10] Wang Xiaohua *et al.,* shows data acquisition technology is a practical electronic technology used in signal detection, signal processing, instrumentation and other fields. It is used to measure and control physical quantities such as temperature, pressure, flow, speed, displacement, light intensity, sound, etc., and convert them into electric signals. This paper describes the hardware and software system construction of a data acquisition and transmission system.

3. METHODOLOGY

Methodology is the precise approaches or techniques used to become aware of, choose, procedure, and analyze facts approximately a subject. In a research paper, the technique segment permits the reader to significantly examine an observer’s overall validity and reliability. The method section of document information how the studies become performed, the studies methods used and the motives for choosing those methods. It should define: the participants and studies techniques used, e.g. surveys/questionnaire, interviews. Discuss with different relevant research.

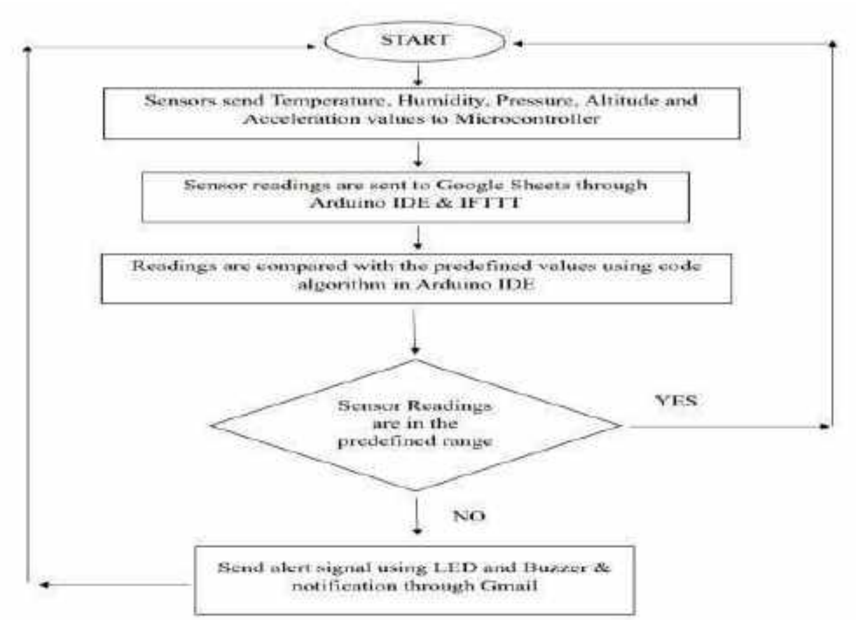


Fig -1: Steps involved in methodology

The system uses the DHT11 sensor to measure temperature and humidity, the BMP280 sensor to measure pressure and altitude, the ADXL345 sensor to measure vibration in XYZ axes based on the device position, an LED and a Buzzer for alert signals and an LCD for displaying the data via I2C. IFTTT maker for sending the data to a Google sheet and receive an alert notification from Gmail. A threshold value for the various parameters is set for the equipment. When the power is supplied, ESP32 attempts to connect to the Wi-Fi network and the data from the sensors are collected. Once the ESP32 is connected to the Wi-Fi network, ESP32 communicates with the IFTTT service that publishes the readings to a spreadsheet on Google sheets that is saved in your Google Drive's folder. If any of the parameters exceeds the range an alert signal is sent and a notification is sent to the user through Gmail.

3.1 ARCHITECTURE OF THE SYSTEM

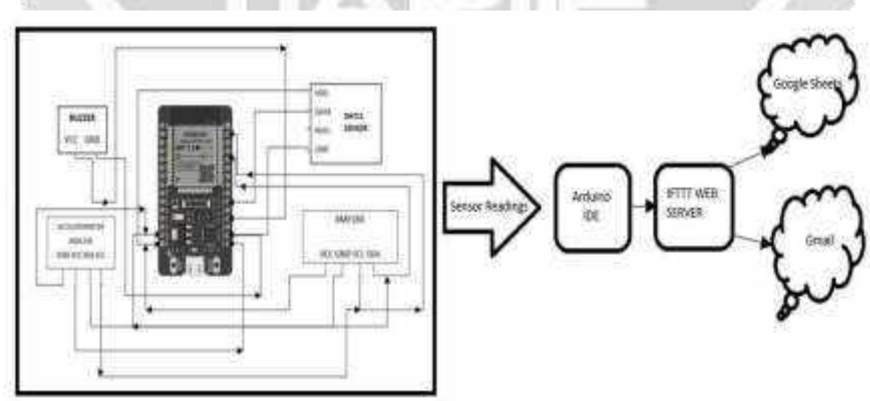


Fig -2: Architecture of proposed System

In a mechanical or electrical equipment state accuracy of monitoring system is subject to change. An industrial machine with the given sensors, which gather information on a variety of factors that affect its performance and health, such as temperature, vibration frequency, altitude and pressure. So that the system or device is included against the variations of parameters like temperature, humidity and vibrations right away. The edge values for every parameter are set with appreciate to the man or woman system, based totally on these threshold -values an alert sign is initiated after processing the facts from the sensors. A threshold value for the parameters like temperature, altitude, vibration and Humidity is set for the device. The facts from the temperature (Celsius) sensor, altitude (m) sensor, vibration (Hertz) sensor and humidity (g/kg) sensor used in the system are collected on an actual time basis and are processed in step with their variety of values mentioned inside the threshold values. If any of the parameters exceeds the range, an alert sign is sent to the user as well as an alarm is set for the immediate action. The accumulated records of the sensors are stored within the google sheets for similarly information analysis and fault circumstance prediction.

3.2 Experimental Setup

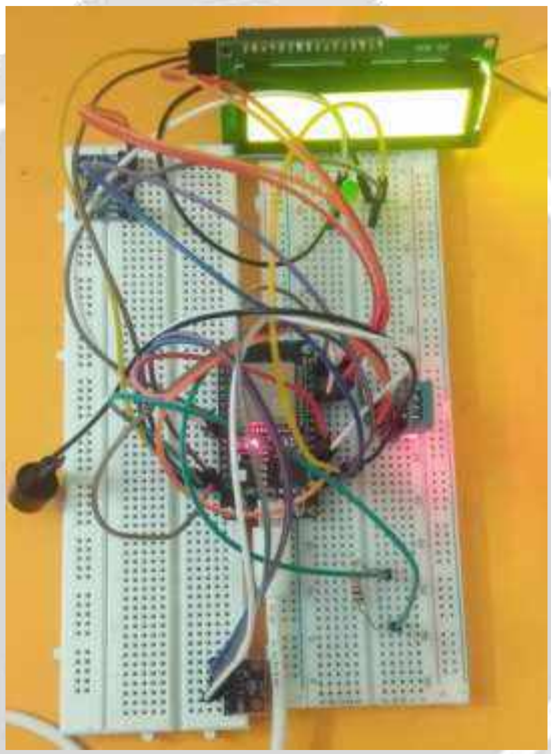


Fig - 3: Circuit

4. RESULTS AND ANALYSIS

4.1 Experiment Results

At the end of this project the proposed system uses small, low cost and easily attached wireless sensors that measure a variety of condition indicators every few minutes and transmit them to a Google sheets. Users can then access equipment condition data and insights via mobile app or web browser. These systems also send informative alerts to nominated maintenance staff when the health of a monitored equipment or machine degrades.

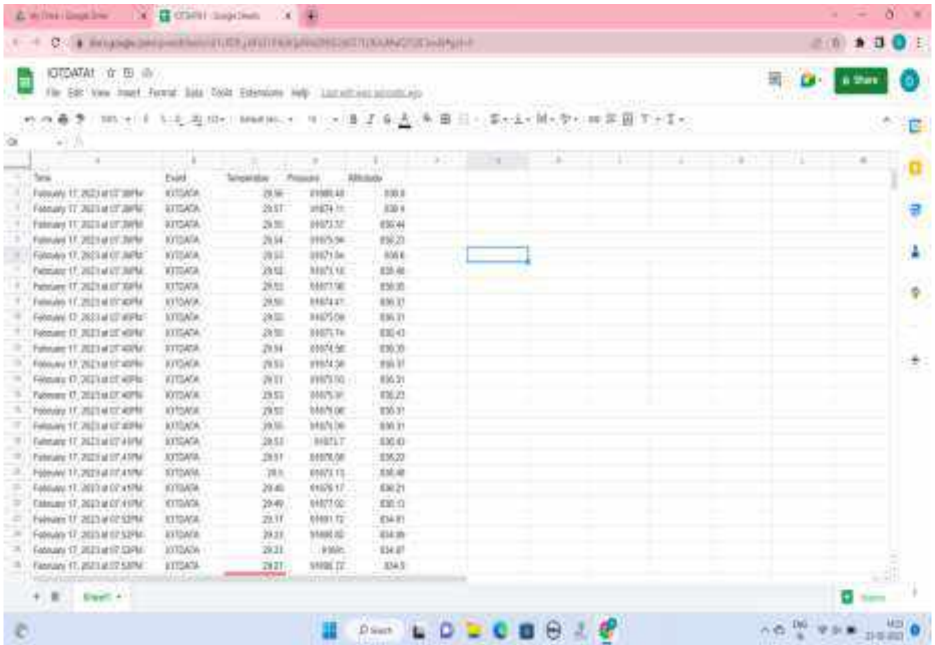


Fig - 4: Sensors Readings published to Google Sheets

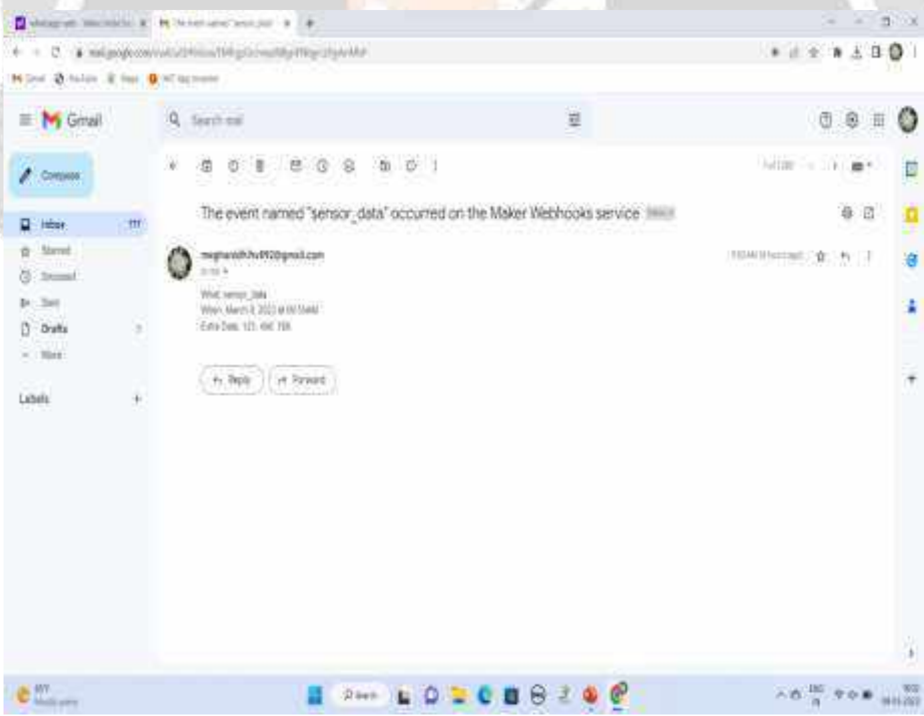


Fig - 5: G-mail notification of sensors data through IFTTT

4. CONCLUSIONS

A condition monitoring system is easy to use but it always needs someone to take care of assets. However, when work is done manually then it becomes more hectic and maintenance work becomes complicated and overdue. This software notifies the person responsible & provides early warning when an equipment is not performing.

It enables the user to provide maintenance before equipment failure and work on that issue. Condition based monitoring says that support ought to possibly be performed when certain limits are reached, or markers give indications of decreasing performance. The data that this software collects is useful for the maintenance team.

5. REFERENCES

[1]. Hasan Alkour, Zainab Mones, Naima Hamad and Hussam Alkdary, "IoT Based Condition Monitoring and Fault Detection for Rotating Machine", International Science and Technology Journal, 2022.

[2]. Jaiganesh P M and Dr B Meenakshi Sundaram, "IoT Based Power Monitoring System", International journal of Computer Science and Engineering, 2021.

[3]. Jamal Mabrouki, Mourade Azrour, Driss Dhiba, Yousef Farhaoui and Souad EI Hajjaji, “IoT Based Data Logger for Weather Monitoring using Arduino-Based wireless sensor networks with Remote Graphical Application and alerts”, Big Data Mining and Analytics ISSN, 2021.

[4]. Jumana A. Hassan, Basil H. Jasim, "Design and implementation of internet of things-based electrical monitoring system", Bulletin of Electrical Engineering and Informatics,Vol. 10, No. 6, December 2021.

[5]. Rafizah Ab Rahman, Ummi Rabaah Hashim, Sabrina Ahmad, "IoT based temperature and humidity monitoring framework", Bulletin of Electrical Engineering and Informatics, Vol. 9, No. 1, February 2020.

[6]. Amirhossein Khademi, Fatemeh Raji, Mohammadreza Sadeghi, "IoT Enabled Vibration Monitoring Toward Smart Maintenance", Third International Conference on Internet of Things and Applications, University of Isfahan, Isfahan, Iran, 2019.

[7]. Aktham Hasan Ali1, Ahmed Hussein Duhis, Nabeel Aad Lafta Alzurfi, Mohannad Jabbar Mnati,"Smart monitoring system for pressure regulator based on IoT", International Journal of Electrical and Computer Engineering (IJECE), Vol. 9, No. 5, October 2019.

[8]. Iman Mohammed Nayyef and Anas Ali Hussain, “Design and implementation of IoT Based Smart Power Monitoring and Management System using WSNs”, International Journal of Embedded Systems and Applications (IJESA), 2018.

[9]. Mohd Helmy Abd Wahab, Nur Imanina Mohamad Anuar, Radzi Ambar, Aslina Baharum, Shanoor Shanta. “IoT Based Battery Monitoring System for Electric Vehicle”, International Journal of Engineering and Technology, 2018.

[10]. WANG Xiaohua, "Design of Data Acquisition and Transmission System based on Single Chip Microcomputer", 4th International Conference on Electrical & Electronics Engineering and Computer Science (ICEEECS) 2016.

SMART STAIRLIFT FOR ELDERLY/DISABLE PEOPLE USING NODEMCU

Sumitha Manoj[1], Prashanth R S[2], Manoj Kumar S[3], Manoj M R[4], Pavan M[5]

[1] *Associate Professor, Department of Electronics and Communication Engineering, Rajarajeswari College of Engineering, Bangalore, India*
[2]*Student, Department ofElectronics and Communication Engineering, Rajarajeswari College of Engineering, Bangalore, India*
[3]*Student, Department ofElectronics and Communication Engineering, Rajarajeswari College of Engineering, Bangalore, India*
[4]*Student, Department ofElectronics and Communication Engineering, Rajarajeswari College of Engineering, Bangalore, India*
[5]*Student, Department ofElectronics and Communication Engineering, Rajarajeswari College of Engineering, Bangalore, India*

ABSTRACT

The development of an indoor and outdoor stairlift is the primary goal of this project. In comparison to average people, there are many elderly and physically disabled people who find it challenging to climb stairs. Therefore, the project is created to aid them as well as those whose small houses prevent them from affording a lift. The main goal of this project is to build a cheap mechanism that can be used to lift and lower people whenever needed.Today's high-quality lifts, which are a safe and affordable solution to overcome the specific needs and challenges that people experience on the stairs, include many features to maximize comfort, ease of use, and attractiveness in the home. While safety is still the primary concern when using the stairs, going up and down them. The topic of this paper is the construction of escalators (stair lifts) with rope and pulley mechanisms that lift and lower the platform to convey people. This aids the person who is having trouble climbing stairs. Due to the fact that this is a mechanical engineering project, we suggest equipment that a person could readily operate.The project had to be built on a budget that was lower than that of a lift, require less maintenance, and not put human lives or the power grid at risk. The elderly who are unable to climb stairs benefit from this effort.

Keyword: -*Internet of Things, The Comfort, Mobile Chair*

---

1. INTRODUCTION

Technology advancements have enabled impaired persons to live independent lives and contribute more positively to society. For people who have mobility issues, such as older people, stairways into buildings offer a substantial environmental barrier. Technology advancements have enabled impaired persons to live independent lives and contribute more positively to society. For people who have mobility issues, such as older people, stairways into buildings offer a substantial environmental barrier. A prototype that had pantographic legs operated by a computer that walked in a straight line in the lab in October 1998. It was using a stationary controller with a complicated design, but it was not transporting passengers.

Because of the legs, a person had to sit in a fixed position without moving, which is frequently not very comfortable. Even the technology itself is plagued by safety concerns. Wheeled systems do not require any control electronics or system maintenance because the wheels passively support the chair. Because of the system's intricacy, safety is a natural concern, and without it, consumers would not choose this mechanism.

We proposed our Smart Staircase System with a few smart features after outlining the relative benefits and drawbacks of various electric-powered wheelchairs, lifts and escalators for an overall comparison of the control method using user-friendly methods, cost of mechanical manufacture and structure, power consumption, and adaptability to different stairs.

In comparison to healthy individuals, there are many elderly and physically challenged people in the globe who find it challenging to climb stairs. The project is therefore created in order to assist them as well as those who cannot afford a lift because of their small homes. Making a mechanism that will hoist them up and set them down anytime they desire at a minimal cost is the main goal of this project. A stairway with an escalator is a mechanical system for raising and lowering people. A straightforward system with a rope and pulley lifts the platform.

1.1 EXISTING PROBLEM

We can observe from the literature review that the stairlift systems that are built can be operated manually.

1.2 PROPOSED SOLUTION

With the use of IOT, the suggested method enables users to manage the stairlift remotely.

1.4 OBJECTIVES OF PROJECT

The development of an indoor and outdoor stairlift is the primary goal of this project.

While safety is the main priority while using a stairlift, today's high-end models have a variety of functions to maximise comfort, usability, and aesthetic appeal in the home.

To cut down on production costs and the amount of time needed for escalators and lifts to be built, we are developing a single rail stair lift.

2. LITERATURE REVIEW

2.1 Introduction

A thorough literature review is crucial to learning about the subject of interest. Give acknowledgment to other scholars when using information from the various literatures to avoid duplication. We can spot inconsistencies like research gaps, disagreements between earlier studies, and unanswered questions from earlier studies by reviewing a variety of literatures. We provided some scholars with referrals so they could learn more about the project. Below is a list of the scholars to whom we have referred.

[1]The development of an indoor and outdoor stairlift is the primary goal of this project. A chair that moves up and down a staircase on a motorised rail is known as a stair lift. Safety is always a top priority when using the stairs, but modern, high-quality lifts come with a variety of features to maximise comfort, usability, and aesthetic appeal in the home. This makes them a secure and reasonably priced solution to the special requirements and difficulties that people face when using the stairs. With the help of the internet of things, stair lifts, a mobile chair-like mobility device mounted to one side of stairways, increase elderly access between levels in houses and enable many people with mobility issues to live freely.Due to the high production costs and lengthy building times associated with escalators and lifts, we are developing a single rail stair lift.

[2]The topic of this paper is the construction of escalators (stair lifts) with rope and pulley mechanisms that lift and lower the platform to convey people. This aids the person who is having trouble climbing stairs. Due to the fact that this is a mechanical engineering project, we suggest equipment that a person could readily operate. The project had to be built on a budget that was lower than that of a lift, require less maintenance, and not put human lives or the power grid at risk.

[3]The value and importance accorded to humans can be used to gauge a society's level of civilisation. Developed and civilised nations provide a wide range of amenities for both ordinary citizens and the aged and disabled. One of these amenities that will simplify the lives of the elderly and disabled is stairlifts. In the context of this work, a revolutionary conceptual stairlift design is investigated. The systematic design method of Pahl and Beitz serves as the foundation for this design process. The definition of the problem, the creation of the function structure, and the evaluation of design alternatives are all parts of the general design process. Future work is already underway for manufacturing prototypes and more design phases.

[4]For many people with mobility issues, stair lifts—mobile chairs that are designed to be mounted to the walls of existing stairways—have enhanced their quality of life by enabling better access between levels in private houses. Recent efforts to cut production costs and building time have resulted in the development of a stair lift that only uses one rail. However, in order to use this device, an actuator must be used to continuously control the horizontal seating surface. In this study, the overall control performance of the new stairlift is enhanced using a two-degrees-of-freedom control system controlled by a sliding mode controller. Experiments are used to confirm the controller's efficacy.

[5]This folding Similar to a lightweight lifting rectangular platform, a platform lift enables people to sit, stand, or transfer into wheelchairs on it in any appropriate position. Due to their size and inflexible construction, typical wheelchairs are difficult to manoeuvre through incline steps and are therefore unsuitable for patients who are unable to climb stairs using a wheelchair or any other means. Platform Stairlift uses members made of lightweight aluminium alloy, therefore its overall weight is only 25 kg. It differs from a regular wheelchair in that it has a rectangular platform that patients in wheelchairs can utilise to navigate stairs. As a result, individuals with walking disabilities can go across stairs with little effort. This study article uses CATIA and ANSYS® software to concentrate on the mechanical design of a model and finite element analysis (FEA) of the mechanism. In the current work, the static load condition is used to design all of the mechanism's components. The Platform Stairlift can assist individuals with walking disabilities in getting up and down stairs, according to the findings of the FEA analysis. It also meets stability and balance requirements.

3. SYSTEM DESIGN

Our interest primarily centred on the creation of an IOT-based electro-mechanical system that would allow users to connect to the smart staircase through the BLYNK App, an Android app with built-in functionality for climbing stairs. A user can automatically access this cutting-edge device thanks to a clever arrangement of the sensor over the chair.

3.1 BLOCK DIAGRAM

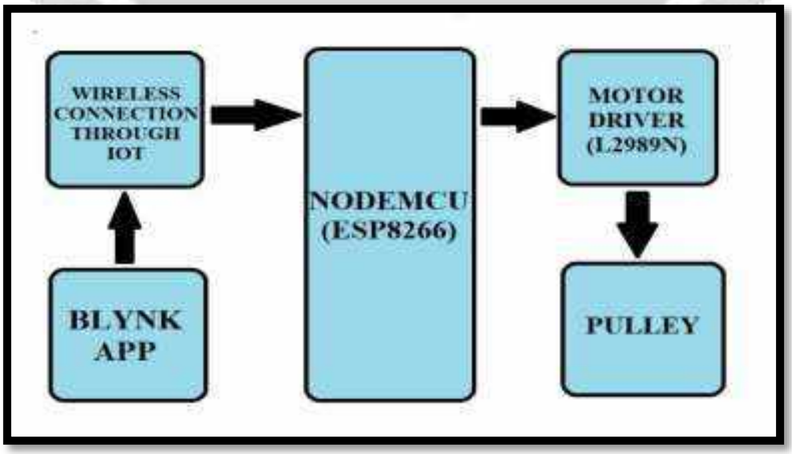


Fig. 1 Block Diagram

3.2 METHODOLOGY

The Internet of Things (IoT) is currently the most well-known and popular wireless communication model because of its broad uses and accessibility. It involves the straightforward idea of using the internet to control electronic or electromechanical devices. This clever and convenient internet of things feature is also included in our smart staircase. Node mcu, a controller with built-in Wi-Fi functionality, is employed because of its range of 15–50 metres and ease of programming. Because of its simple architecture and smaller footprint, nodemcus require less programming work. Additional digital pins that are used with the motor driver L2398N.

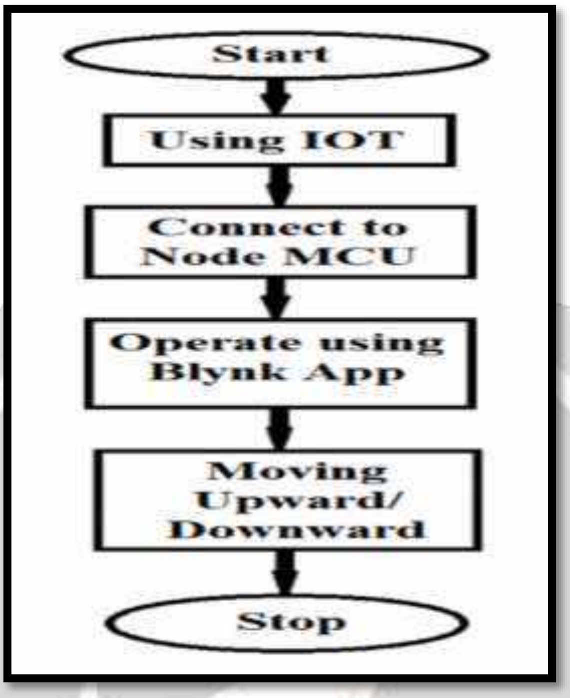


Fig. 2 Flowchart

3.3 EXPERIMENTAL SETUP

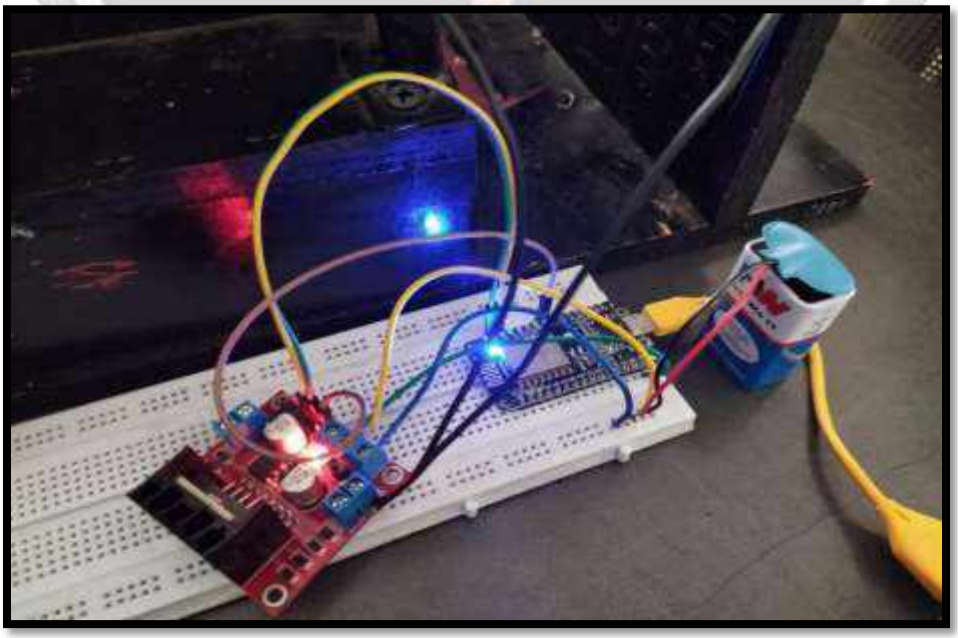


Fig 3. Experimental Setup

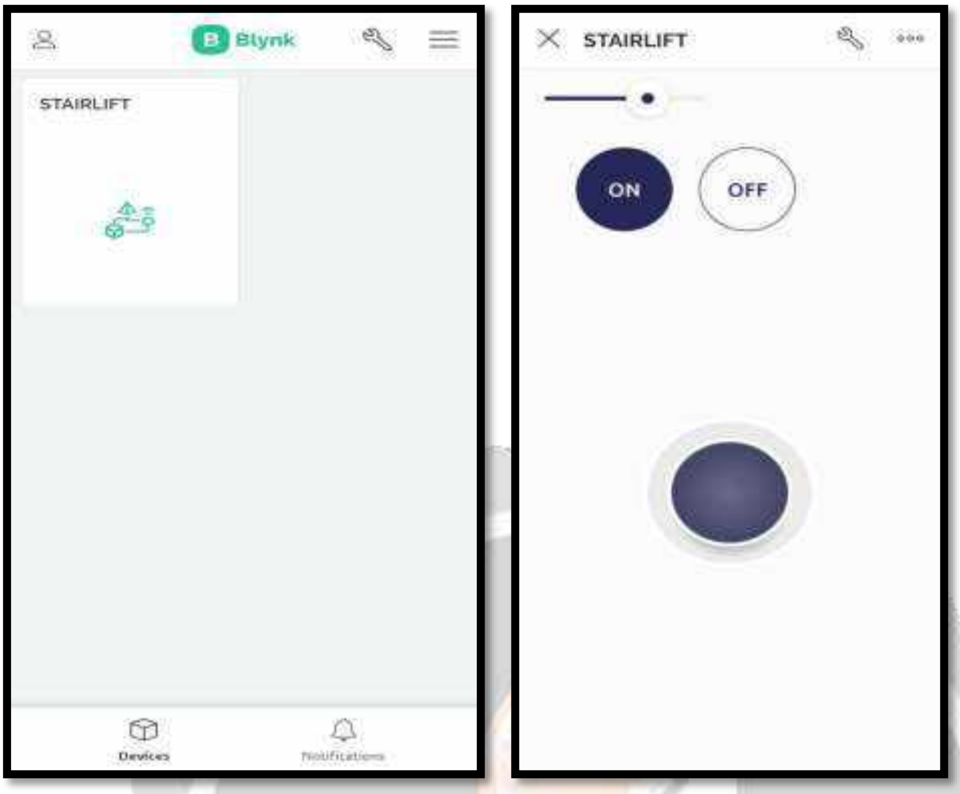


Fig 4. Blynk app Mobile

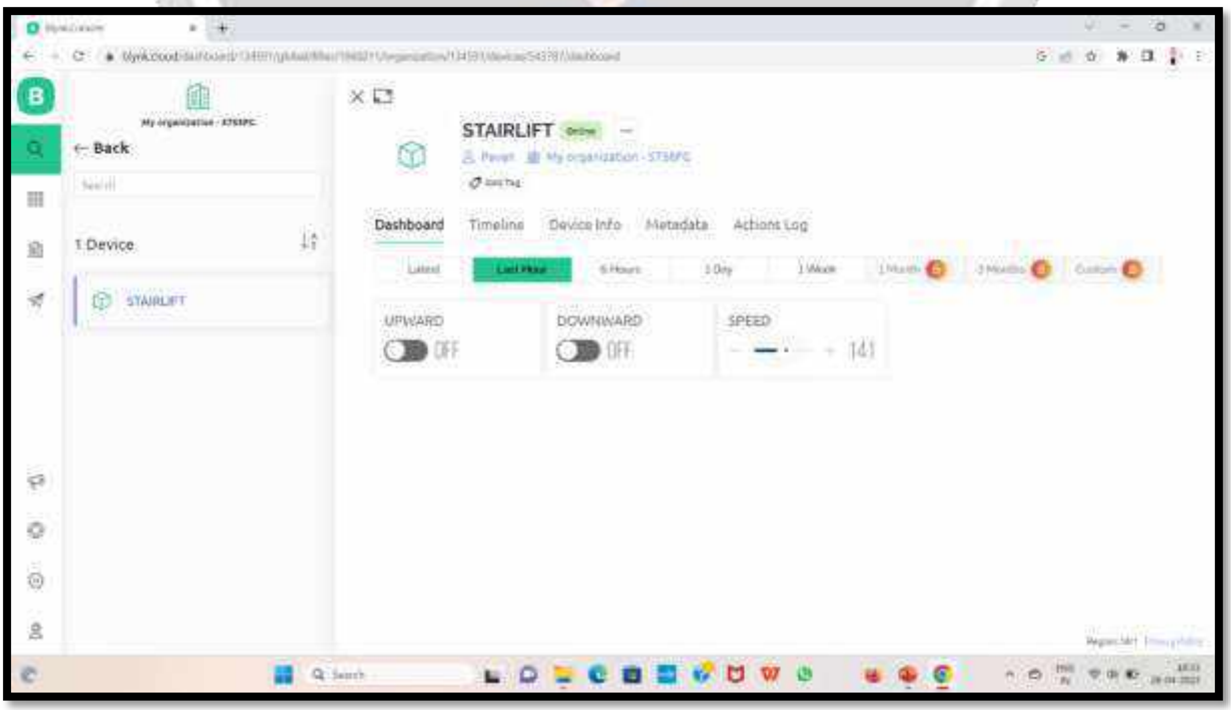


Fig 5. Blynk App Mobile

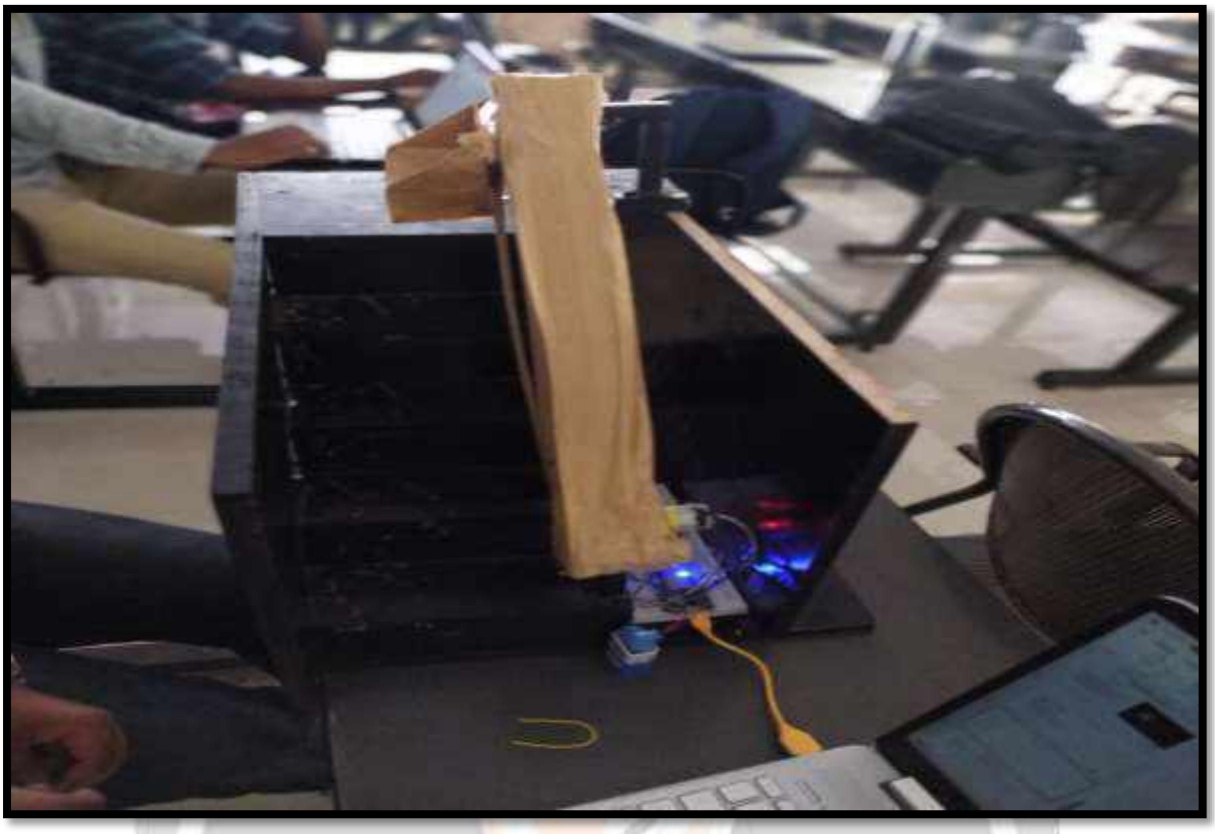


Fig 6. Stairlift Model

4. CONCLUSION

In this study, we proposed an IOT-based system that offers a simple means of stair mobility for the elderly and physically challenged. Once your phone is connected to the system, you may effortlessly climb or descend the steps using the app on your phone. In automatic mode, the sensor's clever location makes it possible to navigate stairs with the least amount of human effort. Architecture is portable and affordable, and it takes less time. A battery backup could be added to this system in the future in case of power outages.Only straight staircases can use this technique, which can also be changed to accommodate even turns. There are improvements in many areas, including software engineering, improved safety features, manually controlled devices, etc. If we want to grow our nation, we must employ stair lifts in our homes, hospitals, apartments, nursing homes, and other facilities. These lifts also need to be reasonably priced and simple to use. As a result, we discovered the ideal method for climbing stairs using stair lifts, which is more advantageous for elderly or disabled individuals in their daily lives.This design for stairs with escalators (stair lift) makes it easier to move people and objects around in different locations for a very low cost and little upkeep, and it can be installed on any kind of staircase. In terms of design, if the platform is swapped out for a seat, it is feasible to increase comfort and safety, and it can be used in place of lifts in small homes.

5. REFERENCES

[1]. K. Navya, B. Pavan Kumar, “Smart Stairlift for Disable/Elderly People”, *International Journal of Pure and Applied Mathematics* Volume 120 No. 6 2018.

[2]. Ferhat Bozbuga, Huseyin R Borklu, Huseyin K Sezer, Veysel Ozdemir, “A Novel Conceptual Design a stairlift for Elderly/Disable People”, *International Journal of Science* 2020.

[3]. Vyankatesh B. Emche, Nikhil G Lokhande, Amit S Ghade, Chetan A Samarth, “Development of Stairs with Escalator (Stair lift)”, *International Journal of Creative Research Thoughts (IJCRT)* Volume 8, Issue 4 April 2020 | ISSN: 2320-2882

[4]. Mitsuo Hirata, Akio Setoyama, Shuichi Adachi, Hiroshi Sakoniwa, “Attitude Control System Design of a Seated Stair Lift on a Single Rail using two degrees of freedom control” *International Journal for Applied Science and Engineering Laboratories* 2019

[5]. V N Chougule, B N Wadia, A S Kotecha, F A Phantaki, “Design and Structural Analysis of Platform Stair Lift Using Finite Element Method” *IOSR Journal of Engineering* 2018 | ISSN(e): 2250-3021, ISSN(p): 2278-8719

[6]. D Ding R.A Cooper ”Electric-Powered Wheelchairs: A review of current technology and insight into future directions” emIEEE Control Systems Magazine/em 2005.

[7]. www.iosrjournals.org/iosr-jmce/papers/RDME/Volume5/RDME-48.pdf

[8]. Kumar, Vijay Rahman, Tariq Krovi, Venkat. (1997). Assistive Devices For People With Motor Disabilities.

[9]. www.thehindu.com/todays-paper/tp-features/tppropertyplus/climbing-of-stairs-is-a-breezy-affair-for-seniorcitizens-now/article2640657.ece

[10]. Avinash V. Gaikwad1 Pravin S. Ghawde2 Sandip J. Kadam3, International Journal of Innovative Research in Science, Engineering and Technology Vol. 2, Issue7, July 2013.

AUTOMATIC MILK QUALITY ANALYSING WITH BILLING SYSTEM

Rangaiah L[1], Sonali Chavan S[2], Varnitha M Shet[3], Sneha G[4], Sukruthi R Gowda[5]

[1]Professor, Dept. of ECE, RajaRajeswari College of Engineering, Karnataka, India.
[2,3,4,5] Student, Dept. of ECE, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

Farmers supply the milk to the Dairies and get the payment based on the purity of milk. Late examinations detect that crude milk contains pathogenic life forms which could bring about contamination if devoured which can build the rate of infections and break down the personal satisfaction. Thus, creating apparatuses for constant and shrewd detecting is required for quality checking and to settle on reasonable and opportune choice. As the milk is kept for several days, the expansion of bacterium will get increased which ends up in undesirable smell, style and harmful substances. Hence there is a necessity for monitoring system to discover and determine the spoilage of milk and turn out into a healthy product. The work aimed to present some aspects regarding milk quality and quantity estimation. The various factors like FAT, refrigerated status of milk and Adulterated chemicals percentage in the milk are identified. Generating the desired rate for the amount of fat in the milk. So, the system calculates these parameters.

KEYWORD: *Internet of Things (IoT), Arduino Billing System, fat, Milk and Adulteration*

1. INTRODUCTION

Depending upon the time and situation there is a need to change the working system of the old modules like dairy farming. Now a days this process is done manually that can results to mistakes which is biggest loss to farmers. Therefore, to decrease the many manual work and to get better result there is a need to replace the existing system with a new system using the system where milk sample can be measured automatically and in low cost. Firstly, it is required to calculate the amount of fat present in milk. Manually testing of fat and quantity is time consuming.

Secondly, some Dairies in villages do not have good milk Testing equipment's. In such condition the milk sample can be tested once the milk is free from fat which can take one to two hours. By that time the milk packed in a plastic bags or bottles leads to unhealthy. Another reason is since the process is done manually that can results to mistakes which is biggest loss to farmers. Therefore, to decrease the many manual work and to get better result there is a need to replace the existing system with a new system using the system where milk sample can be measured automatically. User will also know different information about milk with help of temperature, fat sensor. This is an efficient tool to detect adulteration of the milk.

2. METHODOLOGY

Milk tester is a method, which gives the result that is fat based on the light scattered by the milk. A device called photo resistor whose resistance decreases when the incident light gets increases. It’s a semiconductor material having high resistance. It works on the principle of photo conductivity. When the light is fallen, the greater number of electrons are released, which leads to increase in charge carrier those are holes. Thus, the results can be analyzed by the change caused in resistance, that is fat content in milk. Gas sensor is used for detecting parameter of milk and DHT11 sensor is proving information of Humidity status of milk. Finally, the obtained data are displayed on LCD monitor and updated on Blynk cloud IOT platform, where data can be monitored through internet itself

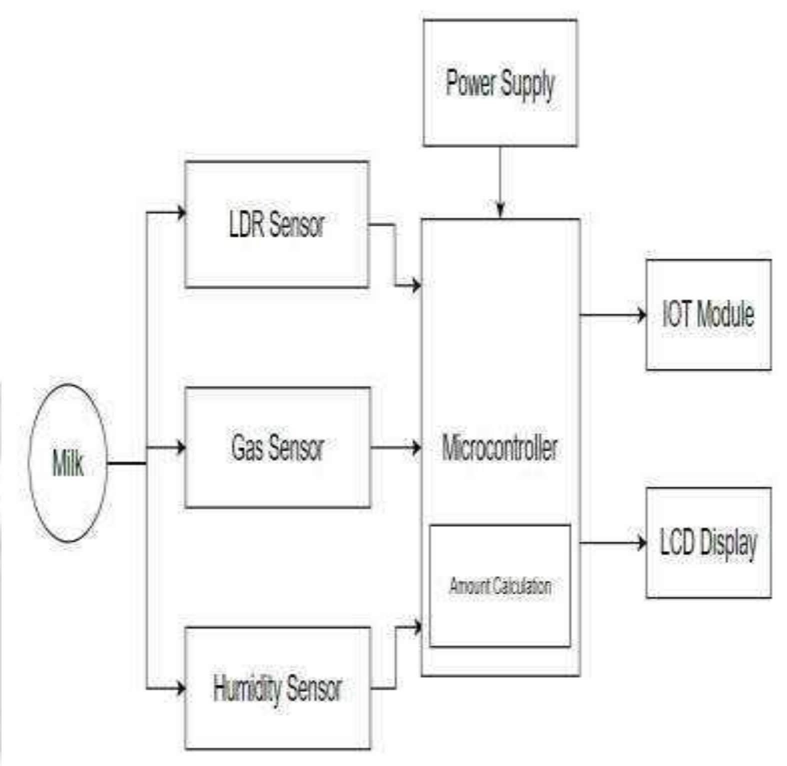


Fig-1 Block diagram of our proposed System

3. RESULT & DISCUSSION

This section briefs about the various tests performed on the variety of cow milk and their corresponding results. To uphold the proper functionality of the system, each component had to be tested individually. The below are the validation results of the milk.

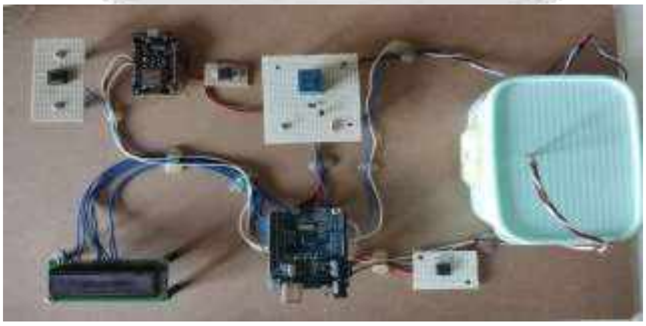


Fig-2 Proposed Prototype

The process starts to read all sensors Data, Microcontroller reads data and process as per instruction given (Code). If the sensor data is greater than threshold value Fat content is measured using LDR sensor. Humidity sensor measures temperature for refrigerated milk. Gas sensor measures if any adulteration is present. All Data are sent to IOT server via wi-fi module. The same data is printed on LCD display. The process repeats and stops.

3.1 THINGSPEAK

ThingSpeak is an open -source software written in Ruby which allows users to communicate with internet enabled devices. It facilitates data access, retrieval and logging of data by providing an API to both the devices and social network websites. Thing Speak was originally launched by Io Bridge in 2010 as a service in support of IoT applications. Thing Speak has integrated support from the numerical computing software. MATLAB from MathWorks, allowing Thing speak users to analyze and visualize uploaded data using MATLAB without requiring the purchase of a MATLAB license from MathWorks.

IOT Database Pure Milk

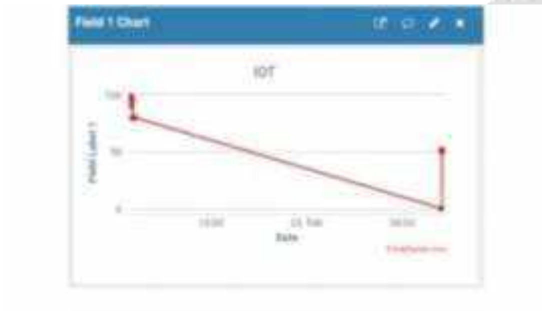
Fat percentage of pure milk

IOT Database of humidity

Humidity percentage of pure milk

IOT Database of gas

Gas percentage of pure milk



IOT Database of price

Liter price of pure milk

Fig-3 Output of Pure Milk

Below are the pictures obtained during the testing of adulterated milk by adding the water to the pure milk .

Fat percentage of adulterated milk

Humidity percentage of adulterated milk

Gas Level percentage of adulterated milk

Fig-4 Output of Adulterated Milk

Fig 9 and 10 shows the pure milk and adultered milk validation.Since the gas level present in the adulterated milk is more than that of pure milk,the quality of milk can be fouund out easily and automatically,Our proposed system aims at the automatic analysing and billing system.The data can be retrived anywhere using thingspeak.

4. CONCLUSION

The exact values of FAT, refrigerated status of milk, are displayed on LCD and simultaneously these values are sent over the internet and anybody can retrieve the values over the internet. Thus, with these accurate values the farmers would get proper sale value of milk. The technology implanted in this system will definitely improve the system by giving fair price to farmers and also will minimize the corruption in the delivery system. All the sensors will read status from the milk and that status will pass to microcontroller analog pin and digital pin. Based on the parameter amount will be calculated and this all information will be updated on LCD display and IOT cloud

5. REFERENCES

[1] Real-Time Milk Condition Surveillance System, 2021 Conference on Information Communications Technology and Society, NAYEEM ABDULLAH, 978-1-7281-8081-6/20/ 2021 IEEE.

[2] Electrical Model for Lipase Immobilized PMMA Coated Sensor to Detect Fat Content in Milk, Moupali Chakraborty, Student Member, 2019 IEEE

[3] Milk Tester: Simultaneous Detection of Fat Content and Adulteration Moupali Chakraborty, Student Member, IEEE and Karabi Biswas, Member, 2019, IEEE

[4] UNB 25 June, & Unb. (2019, June 25). Detergent, antibiotics found in Pram, Milk Vita, Aarong milk. Retrieved October 26, 2020, from https://tbsnews.net/bangladesh/detergentantibiotics-found-pran-milk-vitaaarong-milk [5] Optical Sensing System for Detecting Water Adulteration in Milk, Aditya Dave, 2016 IEEE.

[6] S Priya, K Sowmiya, “Milk Quality Tester using Smart Sensors”, Internal Journel of Trend in Research and Development: Special Issue, IJTRD, 2017.

[7] M. Chakraborty and K. Biswas, “Limit of detection for five common adulterants in milk: A study with different fat percent,” IEEE Sensors Journal, vol. 18, no. 6, pp. 2395–2403, March 2018

[8] IOT based Milk monitoring system for detection of milk adulteration raja Kumar, Ananth Kumar volume 118 no 9 2018,21-32 ISSN:1311-8080

[9] Pedinti Sankaran Venkateswaran; Abhishek Sharma; Santosh Dubey; Ajay Agarwal; Sanket Goel "Rapid and Automated Measurement of Milk Adulteration Using a 3D Printed Optofluidic Micro Viscometer (OMV)" IEEE Sensors Journal, Year: 2016, Volume:16, Issue:9, DOI: 10.1109/JSEN.2016.2527921

[10] Lucas de Souza Ribeiro; Fábio Augusto Gentilin; José Alexandre de França; Ana Lúcia de Souza Madureira Felicio; Maria Bernadete de M. França "Development of a Hardware Platform for Detection of Milk Adulteration Based on Near Infrared Diffuse Reflection" IEEE Transactions on Instrumentation and Measurement, Year: 2016, Volume: 65, Issue: 7, DOI: 10.1109/TIM.2016.2540946

DEVELOPMENT OF HEALTH MONITORING ROBOTIC NURSE

Dr Vijaya S M[1], Dr A M Prasanna Kumar [2] ,Dhanush D[3], Gagan S J[4], Vivek M R[5], Hollen Loukham[6]

[1] Associate professor, Department of ECE, Rajarajeswari College of Engineerin,Bangalore,India
[2] Professor, Department of ECE, ACS College of Engineerin,Bangalore,India
[3]Student Department of ECE ,Rajarajeswari College of Engineering ,Bangalore ,India
[4]Student, Department of ECE ,Rajarajeswari College of Engineering ,Bangalore ,India
[5]Student, Department of ECE ,Rajarajeswari College of Engineering ,Bangalore ,India
[6]Student, Department of ECE ,Rajarajeswari College of Engineering ,Bangalore ,India

ABSTRACT

This paper highlights the role of robotics in health care. This Paper also describes the evolving role of robotics in healthcare and allied areas with special concerns relating to the management and control of the spread of the novel coronavirus disease 2019 (COVID-19). The prime utilization of such robots is to minimize person-to-person contact and to ensure cleaning, sterilization and support in hospitals and similar facilities such as quarantine. This will result in minimizing the life threat to medical staff and doctors taking an active role in the management of theCOVID-19 pandemic. The intention of the present research is to highlight the importance of medical robotics in general and then to connect its utilization with the perspective of COVID-19 management so that the hospital management can direct themselves to maximize the use of medical robots for various medical procedures.[8] This is despite the popularity of telemedicine, which is also effective in similar situations. In essence, the recent achievement of the Korean and Chinese health sectors in obtaining active control of the COVID-19 pandemic was not possible without the use of state of the art medical technology Keyword--- Health care follower, Delivering pills, patients, health monitor.

1. INTRODUCTION

Proposed system is a Healthcare Monitoring Robot. ATMega 2560 is used as a control processor which controls all the activities and the movements of the robot. The DC motor rotation is also controlled by Microcontroller by sending proper instructions.[1] [2] Health Monitoring Robot using ATMega 2560 it gives the instruction for every presented hardware for an operation and it send the instruction as per the given delay for efficient working of the motors and sensors to work correspondingly.[4] [6] By referring these in these paper in our proposed system we know that the World Health Organization (WHO) on January 30, 2020 publicly declared the COVID-19 pandemic as a “global emergency” because of the rapidity at which it had spread world wide.The virus has shaken worldwide economies leading to a stock market crash in many countries. Recently, clinical data confirmed that a significant portion of the COVID-19 patients show diminutive symptoms for the first four days. Which illustrates the stealthy transmission potential of this contagious disease. Scientists have deliberated that COVID-19 is far more transmittable and lethal than the ordinary flu.[5] Here robot s are designed to take care of the COVID-19 patients in hospitals. To avoid person to person contact for nurses or doctors to COVID-19 patients. Time to Time medicine dispense to the patients.[10] Emergency conditions checking for each person. If any emergency condition send message to Doctor. The main purpose of proposed system is to help doctor and nurse at the hospital. It delivers the medicine to the patient and to check the heart beat and temperature of the patient.

2. PROPOSED SYSTEM

The proposed system will consist of a microcontroller [ATMega 2560],and heart beat sensor and the temperature sensor and the motor driver also known as H bridge, DC motors, Relay, External power supply and emergency button. The system schematic is shown in the fig-2.0

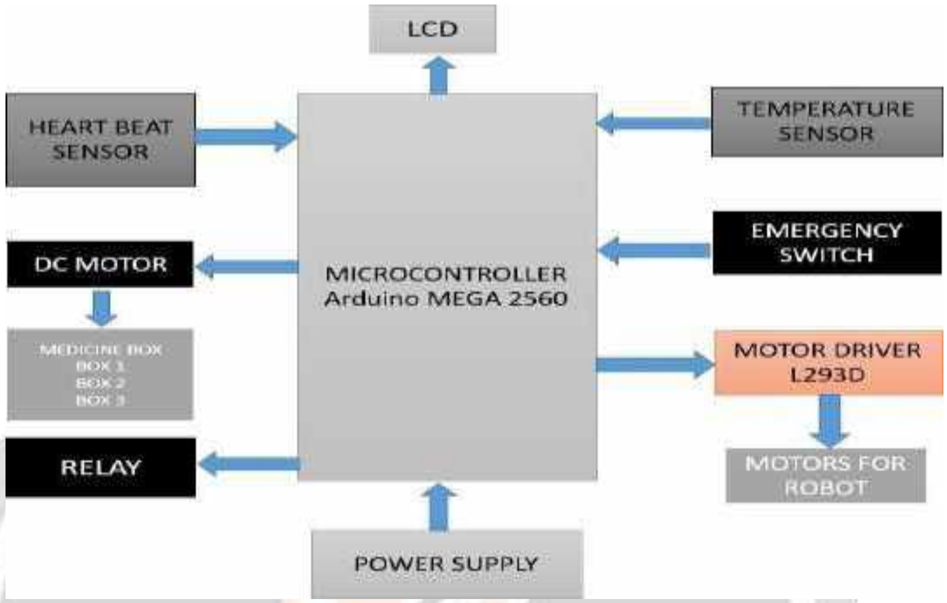


Fig – 2.0: System Schematic diagram

3. METHODOLOGY

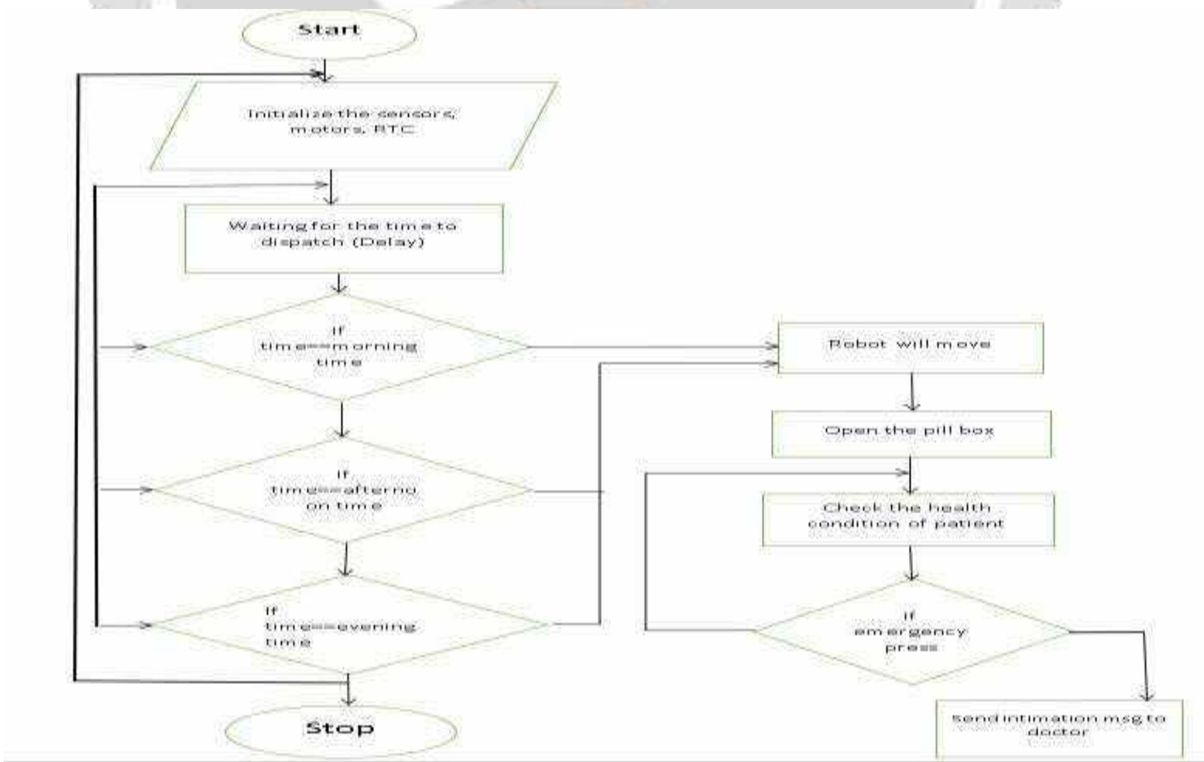


Figure shows the flow chart of the system. Once the system is activated, the sensors and the motor are starting to work as per the delay we have given in the source code and once initialization done the robot wait for the certain time delay. The robot now forward after delay it reach the patient and with the help of APR module it will announce or order the patient to take a pill and place a figure to sense the heartbeat and the temperature of the patient, once it is done it opens the pill box and deliver the pill for the patient and return back to an initial position and turn off for certain delay.

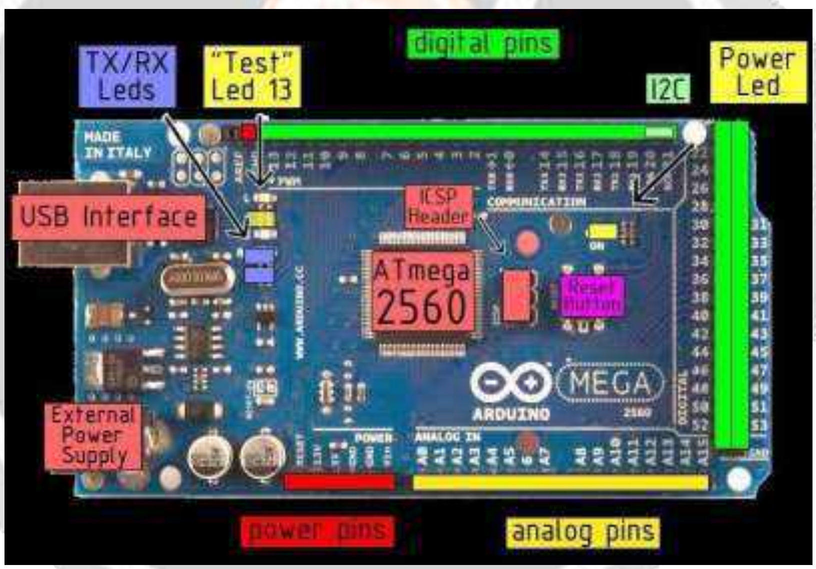
If in case of emergency the means if the patient heart beat is more or the variation in temperature the robot sends the notification to the doctor by stating [patient temperature is high please check on patient 1], so it helps the doctor or the nurse to keep an eye on the patient so they can avoid any bad things happening to the patient. The robot used to avoid the missing of pill of time to time pills.

The robot continues the same process for 3 times a day that is morning, afternoon, evening according to the delay programmed to it. If the patient goes ill in middle of the day the switch will be present on side of a bed that is integrated and it can be pressed so it will also send the notification to the doctor about the patient.

The main purpose of the proposed system is to help doctor and nurse to treat the patient without any contact between them and to deliver pill at a particular time by not missing the prescription.

4. SPECIFICATION

AT mega 2560



The Arduino Mega2560 can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm centre-positive plug into the board's power jack. Leads from a battery can be inserted in the GND and Vin pin headers of the POWER connector.
The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.

ARP Module

We are the leading suppliers for APR 33A3 Voice Recording Module. Micron offers 8 channel voice record & playback module with truly solid state technology. Module provides high quality audio record and playback up to 11 minutes with 8 Khz sampling rate and 16-bit resolution. Using on board jumpers total duration can be divided into 1,2,4,8 messages which can be triggered by onboard switches or external triggers using external microcontroller pins.

Node MCU

The ESP8266 NodeMCU has 16 GPIO pins and one analog input pin shown in the image bellow. However only 10 of these GPIO pins can be used for digital input and output operations.

Temperature and Heart beat sensors

A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes. ..... Non-contact temperature sensors are usually infrared (IR) sensors. The operating voltage is 5v.

Heartbeat sensor is an electronic device that is used to measure the heart rate i.e. speed of heartbeat …. In order to measure the body temperature, we use thermometers and sphygmomanometer to monitor the Arterial Pressure or Blood Pressure

5. SOFTWARE TOOL

Arduino IDE

The Arduino is a single-board microcontroller solution for many DIY projects, we will look at the Integrated Development Environment, or IDE, that is used to program it. Once the installer has downloaded, go ahead and install the IDE. Arduino IDE is an open source software that is mainly used for writing and compiling the code into the Arduino Module.

The Arduino IDE is incredibly minimalistic, yet it provides a near-complete environment for most Arduino-based projects. The middle section of the IDE is a simple text editor that where you can enter the program code. The bottom section of the IDE is dedicated to an output window that is used to see the status of the compilation, how much memory has been used, any errors that were found in the program, and various other useful messages.

6. RESULT

The hardware connection of the Health monitoring robot is shown in the figure 6.1 below shows the notification that the do in 6.2 and 6.3 figure.

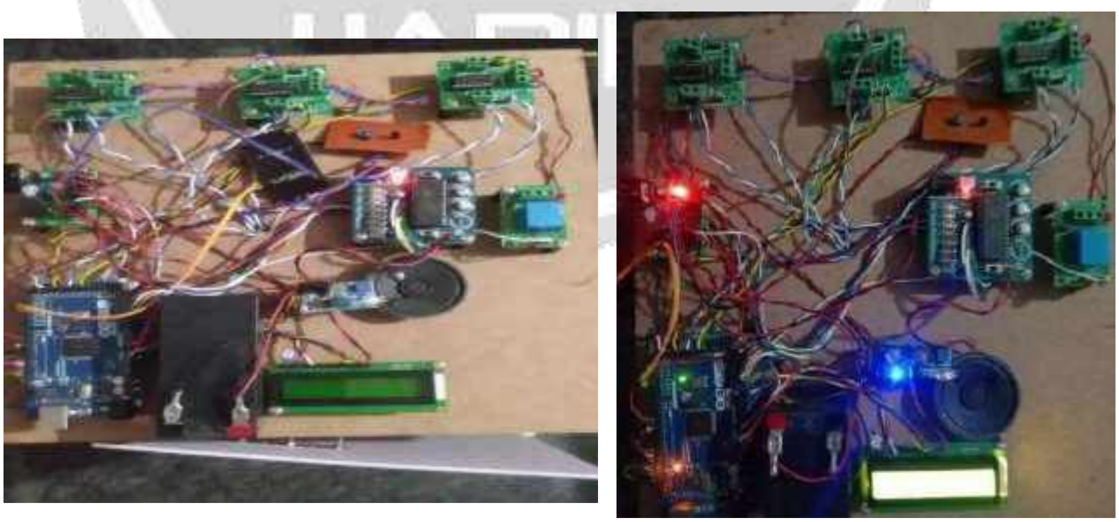


Fig. 6.1 Hardware Connection

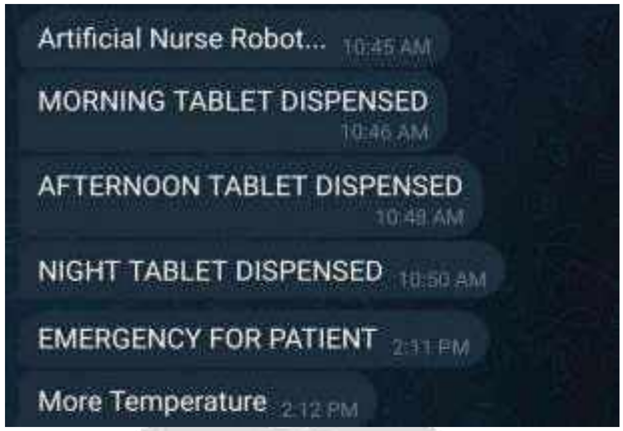


Fig. 6.2 Message Alert

Fig. 6.3 Pill Dispense and heart beat Display

7. DISCUSSION

By this paper we come to know about the Health Monitoring Robot, which helps the society and the doctor and nurse for contact less treatment, by delivering the pill for the patient time-to-time and checking the heartbeat and temperature of patient. On working of this project bot we came to know about the Arduino Programming and Embedded systems devices, and the working of it. The notification is received through the telegram with the help of Node MCU but connecting it to mobile hotspot it will stay active and sends the message and in telegram by creating the bot by the name of Nurse Robot we get the notification and updates of patients. Frist the robot will be in stationary place, in the program we can adjust the timing, route of the robot, then the robot will check patient first it will give the medicine then it will check the heart beat and temperature if any emergency there will be a emergency switch by pressing that a sudden message will go to doctor he will come check the patient. The robot will Three checkup routine i.e., morning, evening, night or it can be altered to check more patient by using ON/OFF system.

8. CONCLUSION

The system is able to efficiently deliver the pills to the patients and accurately check their heart beat and temperature by using sensors by the given algorithm and given source code. By studying concepts of learning modules includes Building a Bot, Micro-controller Programming and development of the algorithm that correctly follows the instruction that we needed as an outcome. By delivering the pill and checking patients and if in any case of emergency sending the doctor the emergency notification helps the doctors and nurse for maintain the distance and lessen the contact between the patients.

9. REFERENCE

[1] Simon Thiel ; Dagmar Häbe ; Micha Block, "Co-operative robot teams in a hospital environment in the proceedings of IEEE International Conference on Intelligent Computing and Intelligent Systems vol 2, 2009.

[2] Seohyun Jeon ; Jaeyeon Lee "Performance analysis of scheduling multiple robots for hospital logistics" in the proceedings of 14th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI) 2017.

[3] Xianqun Huang ; Qixin Cao ; Xiaoxiao Zhu, "Mixed path planning for multi-robots in structured hospital environment" in the proceedings of The Journal of Engineering, 2019.

[4] Seohyun Jeon ; Jaeyeon Lee ; Jaehong Kim Multi-robot task allocation for real-time hospital logistics, IEEE International Conference on Systems, Man, and Cybernetics (SMC), 2017.

[5] Azeta, Bolu, Abioye and Oyawale, "A review on humanoid robotics in healthcare" in the proceedings of MATEC Web of Conferences 153(5):02004, January 2018.

[6] Johnsen, Mettler and Sprenger "Service Robotics in Healthcare: A Perspective for Information Systems Researchers?" Thirty Fifth International Conference on Information Systems, Auckland 2014.

[7] Lorelei Kujat, "The Review: A Journal of Undergraduate Student Research" in the proceedings of The Review: A Journal of Undergraduate Student Research, 2010.

[8] Dahl s t, Boulos M N K "Robots in Health and Social Care: A Complementary Technology to Home Care and Telehealthcare?" in the proceedings of robotics, Vol3, pp 1-21, 2013.

[9] Tabatabaei, S.N.; Lapointe, J.; Martel, S. Shrinkable hydrogel-based magnetic microrobots for interventions in the vascular network. Adv. Robot. 2011.

[10] Abad, P., Franco, M., Castillón, R., Alonso, I., Cambra, A., Sierra, J & Murillo, A. C. (2017, November). Integrating an Autonomous Robot on a Dance and New Technologies Festival. In Iberian Robotics conference (pp. 75-87) 2010.

INTRACRANIAL BRAIN HEMORRHAGE DETECTION INCT SCANS USING DEEP LEARNING

M Suresh[1], Varshith Raj CR[2], Varun Raj CR[3], Vishwanath BS[4], Yatheesh RB[5]

[1]*Assistant professor, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, India*
[2]*Student, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, India*
[3]*Student, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, India*
[4]*Student, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, India*
[5]*Student, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

Intracranial hemorrhage is a serious medical problem that requires rapid and often intensive medical care. In intracranial hemorrhage treatment patient mortality depends on diagnosis based on a radiologist's assessment of CT scans. In this project, we propose the intracranial hemorrhage detection system using deep learning model to accelerate the time it takes to identify them. We can distinguish between the subtypes of the damage on the basis of the character of bleeding and its location in the brain region. To assist with this process, a deep learning model can used to accelerate the time it takes to identify them. This project aims to help and facilitate radiologists, medical experts in understanding the way how machine learning can be potentially used in the diagnosis of hemorrhage. We developed a convolutional neural network based on sequential for classification, and we trained and tested a sequential-based model for predicting the type of bleeding. In making the accurate multiclass prediction, our model has an accuracy of 93.4%.

Keywords: *Artificial intelligence, deep learning, convolutional neural network, intracranial hemorrhage, CT Brain.*

---

1. INTRODUCTION:

Intracranial brain hemorrhage refers to any bleeding with in the intra cranial vault, which includes the brain parenchyma and the surrounding spaces. Brain parenchyma refers to the functional tissue in the brain that is made up of brain cells. Defects in the parenchyma results in loss of consciousness or it may cause even death also.
Parenchyma controlling the body, there are many causes for this issue, which includes trauma, rupture of a blood vessel, poorly connected arteries [It is the main connecting part, where the brain receives the blood] which results in the leakage of blood in the brain.

Due to high mortality rate in brain hemorrhage, early detection of the defect is very essential in order to decrease the mortality rate of patients. Hence we choose the deep learning concept based on artificial intelligence (AI) for the early detection of the defect type.
Deep learning is the fastest and easier to interpret large amount of data and from them in to a meaningful information.
It is the type of machine learning based on artificial neural networks, in which multiple layers of processing are used to extract data progressively. There are different types of hemorrhage – Epidural hemorrhage, Subdural hemorrhage, Subarachnoid hemorrhage, intra parenchymal hemmorage.

In Epidural hemorrhage the blood clotted between the skull and the outmost protection layer. In subdural hemorrhage the blood clotted between the skull and the surface of the brain. The bursting of blood vessel in brain is refer as subarachnoid hemorrhage. In intra parenchymal hemorrhage the blood bleed inside the brain parenchyma.
The complete results of the patient are usually ready for doctor in 1 to 2 days. This is for normal Condition which means when the brain and blood vessels and bones of the skull and the face are normal in size.

CT stands for computed tomography scan, It provide X-ray image made by using a form of tomography in which a computer controls the motion of the X-ray source. Tomography is an X-ray technique in which shadows of superimposed structure are blurred out by a moving X-ray tube.

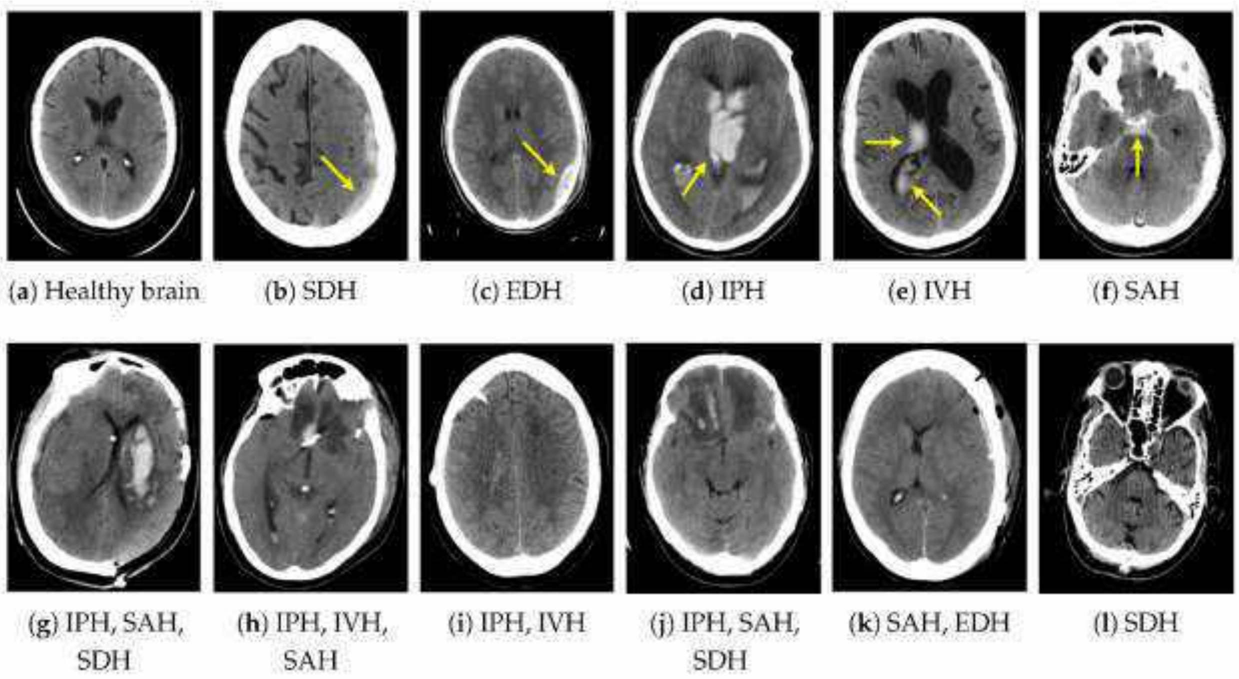


Fig 1: Subtypes of Intracranial hemorrhage, Yellow arrows points to bleeding regions.

Over the last few decades, there has been a huge increase in scientific interest in intracranial hemorrhage detection because of advances in image processing. To find and classify intracranial hemorrhage, the researchers are utilizing multiple detection and classification strategies. The proposed deep learning techniques for identifying intracranial hemorrhage and its sub types include CNN.

1. METHODOLOGY:

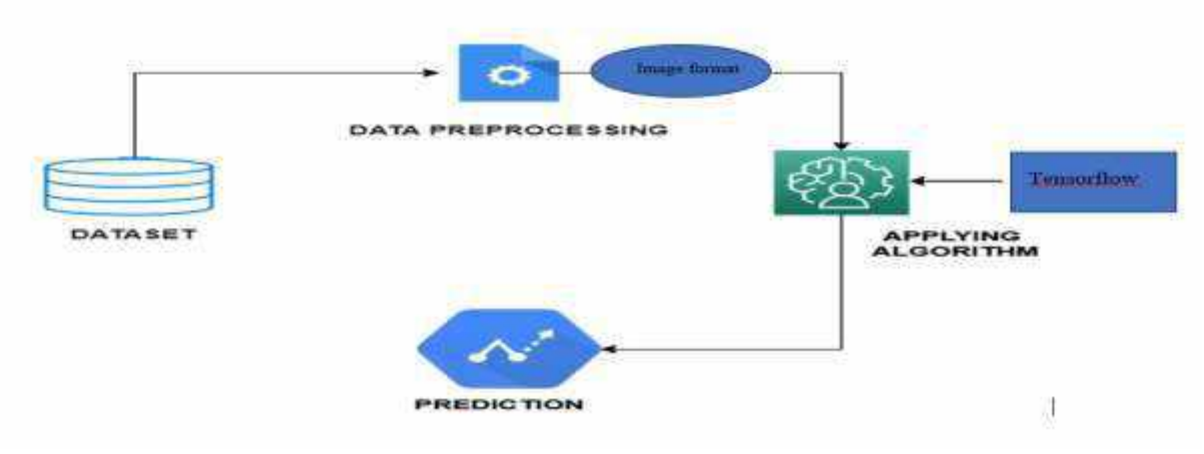


Fig 2: System Architecture

Our methodology fallows the deep learning concept. Where it is a type of machine learning based on artificial neural networks, in which multiple layers of processing are used to extract data progressively. where it is the fast and easier to interpret the large data. In order to predict the defect, it is necessary to collect the data of the patient for the training purpose where these data are collected from CT scans for analysis. When the data is collected, the training part of the project is processing to check the accuracy, in this we use the tensor flow and keras for the CNN algorithm. CNN stands for the convolutional neural network, these neural networks are build by the idea of the human neural network system, where these networks interact with each other during the prediction process or convolution process. In this we are mainly focusing on the time consuming and accuracy part. Finally when the data is passed through the algorithm the machine will detect and classify the defect, then it display the type of the hemorrhage at end.

2. Existing System:

Intracranial hemorrhage, bleeding that occurs inside the cranium, is a serious health problem requiring rapid and often intensive medical treatment. Such a condition is traditionally diagnosed by highly-trained specialists analyzing computed tomography (CT) scan of the patient and identifying the location and type of hemorrhage if one exists.

Intracranial hemorrhage (ICH) is a medical emergency that requires urgent diagnosis and treatment. The diagnosis of ICH usually involves a combination of imaging studies such as computed tomography (CT) and magnetic resonance imaging (MRI), as well as clinical evaluation and laboratory tests.

There are various systems and methods for detecting ICH, including:

1. **Computed tomography (CT) scan**: CT scan is the most commonly used imaging technique for detecting ICH. It can quickly and accurately detect the location and extent of the hemorrhage.
2. **Magnetic resonance imaging (MRI):** MRI is another imaging technique that can detect ICH. It provides better visualization of the brain tissue and can detect smaller hemorrhages that may not be visible on CT scans.
3. **Clinical evaluation**: Clinical evaluation involves assessing the patient's symptoms, neurological status, and vital signs. It can help in identifying signs of ICH, such as headache, vomiting, loss of consciousness, and neurological deficits.
4. **Laboratory tests**: Laboratory tests can help in identifying the cause of ICH, such as coagulation disorders or infections.

In recent years, artificial intelligence (AI) has been increasingly used in the detection of ICH. AI systems use machine learning algorithms to analyze medical images and provide automated diagnosis. These systems can detect and classify ICH accurately and quickly, reducing the time required for diagnosis and treatment.

3. Proposed System:

We propose a neural network approach to find and classify the condition based upon the CT scan. The model architecture implements a time distributed convolutional network. We observed accuracy above 93.4% from such an architecture, provided enough data. We propose further extensions to our approach involving the deployment of federated learning. This would be helpful in pooling learned parameters without violating the inherent privacy of the data involved.

Some of the AI systems used for ICH detection include:

1. **Deep learning algorithms**: Deep learning algorithms can analyze large amounts of medical image data and identify patterns that are difficult for humans to detect. These algorithms can accurately detect ICH and distinguish it from other types of brain lesions.
2. **Convolutional neural networks (CNNs)**: CNNs are a type of deep learning algorithm that can analyze images pixel by pixel and identify features that are relevant to the diagnosis of ICH.
3. **Computer-aided diagnosis (CAD) systems:** CAD systems use algorithms to analyze medical images and provide automated diagnosis. These systems can help radiologists to detect ICH more quickly and accurately.

Overall, the use of AI systems in ICH detection is a promising area of research that has the potential to improve the speed and accuracy of diagnosis and treatment. However, these systems are not yet widely available and require further validation and testing before they can be used in clinical practice.

4. H/W System Configuration:

Processor	Dual Core.
Speed	1.1 G Hz.
RAM	8 GB (min).
Hard Disk	20 GB.

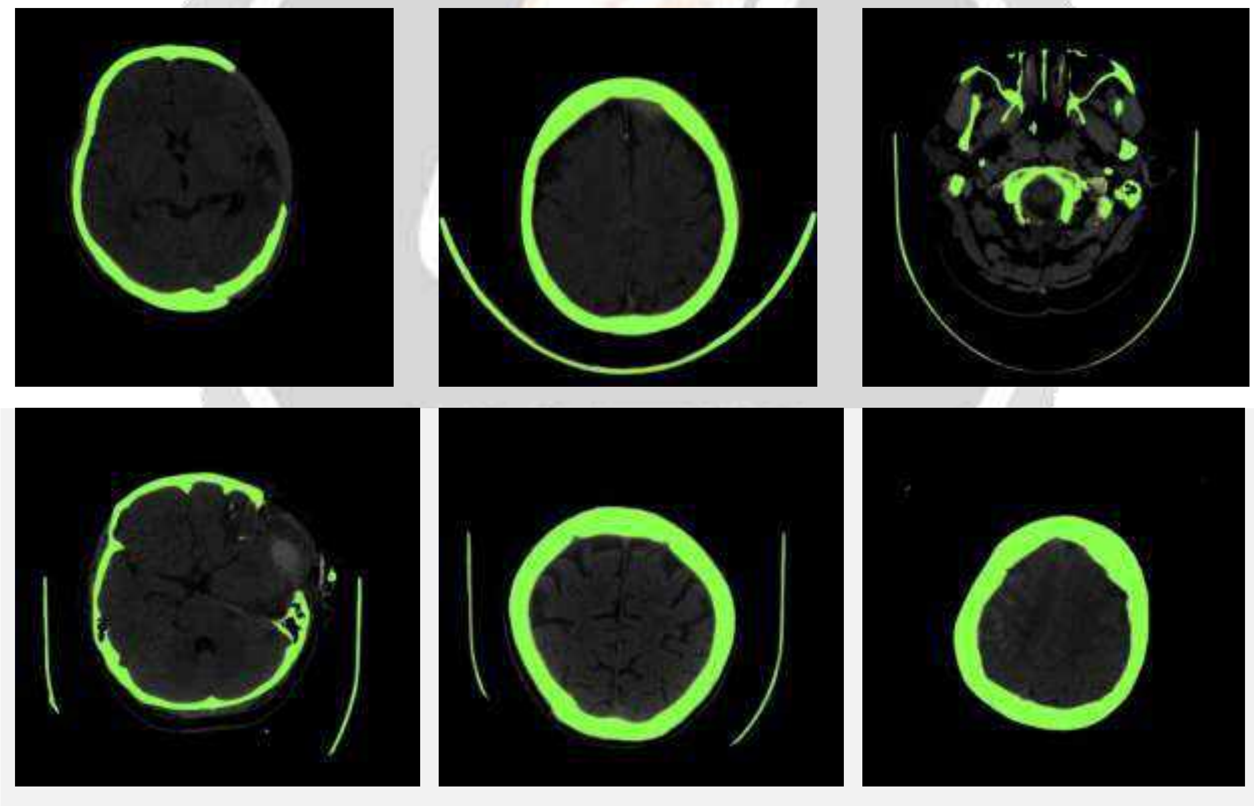
Table 1: Hardware configuration

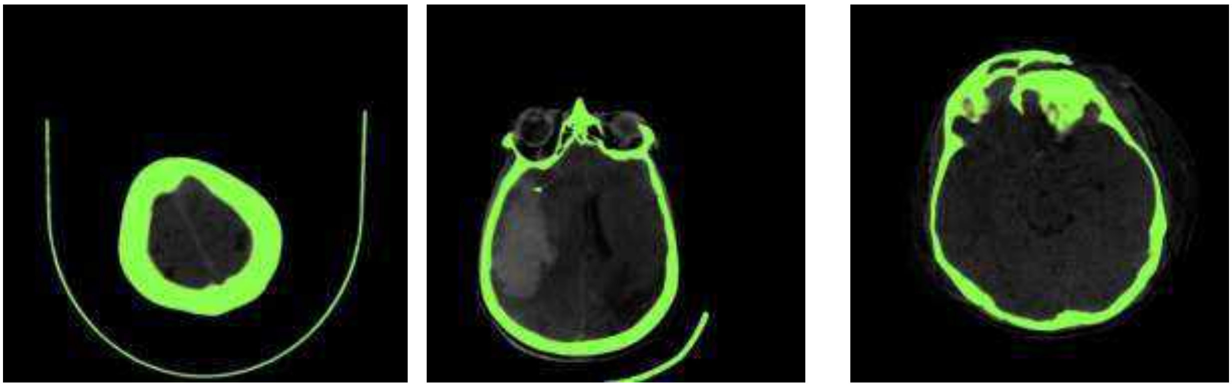
5. S/W System Configuration:

Operating System	Windows 10.
Technology	Machine Learning
Front End	GUI-tkinter
IDLE	Python 3.7 or higher

Table 2: Software configuration

6. SAMPLE INPUT:





(fig 3: Sample input images)

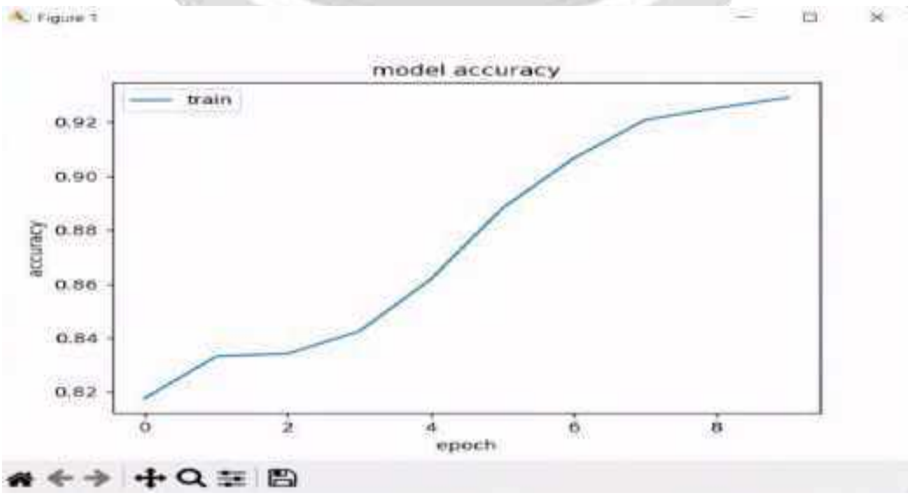
Deep learning is a type of artificial intelligence that has revolutionized the field of medical imaging analysis. One of the key applications of deep learning in medical imaging is the detection and diagnosis of brain hemorrhages, which are a potentially life-threatening condition that requires urgent medical attention. However, to train a deep learning model to accurately detect brain hemorrhages, it needs a large amount of high-quality input data.

Input data is essential for deep learning because it allows the algorithm to learn the patterns and features that are associated with different types of images. In the case of brain hemorrhage detection, input data can include magnetic resonance imaging (MRI) scans, computed tomography (CT) scans, or other types of medical images that show the brain. These images can be annotated to indicate the presence or absence of a hemorrhage, allowing the deep learning model to learn the characteristics of a hemorrhage and distinguish it from other types of brain abnormalities.

Without input data, a deep learning model cannot learn to detect brain hemorrhages accurately. The quality and quantity of input data are crucial for the success of the model. A large and diverse dataset of high-quality images is necessary to train a deep learning model that can generalize well and accurately detect brain hemorrhages in new patients. Additionally, input data can also be used to validate the accuracy of the model and monitor its performance over time.

7. OUTPUT RESULT

MODEL ACCURACY



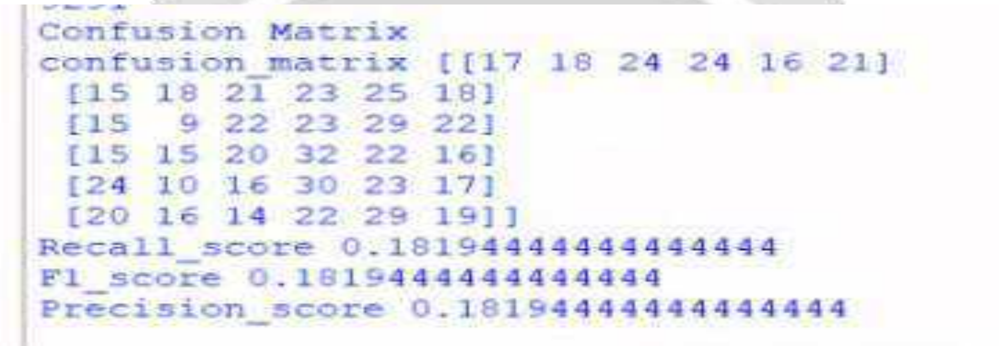
(fig 4: Traning Model Accuracy)

In deep learning, training a model involves feeding a large dataset to the algorithm to learn the patterns and features that are associated with different types of inputs. Once the model is trained, it can be tested on a separate dataset to evaluate its accuracy. The accuracy of a trained model refers to the percentage of correctly predicted outputs over the total number of inputs in the test dataset.

A high accuracy score indicates that the deep learning model has learned the features and patterns of the input data well and can generalize to new data with a high degree of accuracy. However, it is important to note that high accuracy does not always guarantee the performance of the model in the real world. There can be scenarios where the trained model fails to generalize to new data or performs poorly in situations that are different from the training data.

Therefore, it is essential to evaluate the performance of the model through various metrics, including precision, recall, F1-score, and confusion matrix, to get a more comprehensive understanding of the model's performance. Nonetheless, achieving 93% accuracy in a deep learning model is considered a good performance, and it is a strong indication that the model has learned the underlying patterns in the input data well.

CONFUSION MATRIX



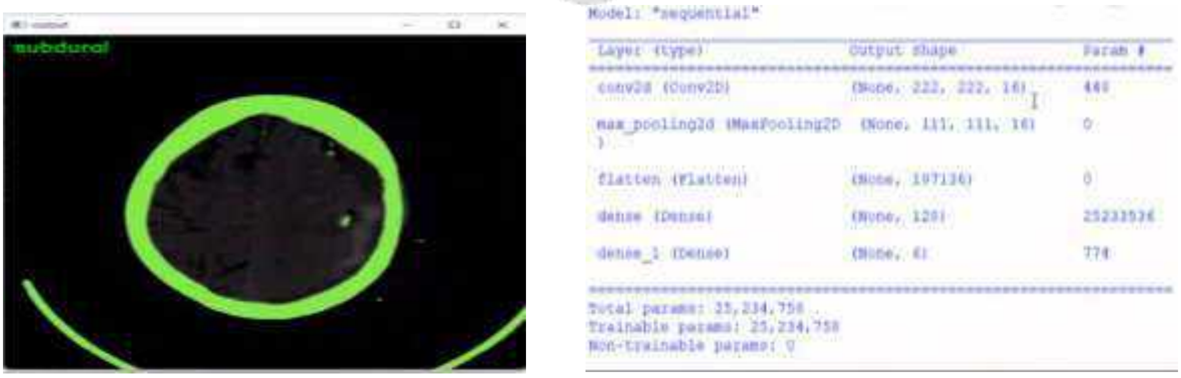
```
Confusion Matrix
confusion_matrix [[17 18 24 24 16 21]
 [15 18 21 23 25 18]
 [15  9 22 23 29 22]
 [15 15 20 32 22 16]
 [24 10 16 30 23 17]
 [20 16 14 22 29 19]]
Recall_score 0.18194444444444444
F1_score 0.181944444444444
Precision_score 0.18194444444444444
```

(fig 5: Confusion Matrix Data)

The confusion matrix can be used to calculate various performance metrics for a classification model, including accuracy, precision, recall, and F1 score. These metrics can help to evaluate the performance of the model and identify areas where it can be improved.

In deep learning, confusion matrices are often used in the evaluation of neural networks that are used for classification tasks. They can help to identify areas where the model is making mistakes, and provide insights into how the model can be improved. Confusion matrices can also be used to visualize the performance of a model, which can be helpful for communicating the results to stakeholders.

FINAL OUTPUT



(fig 6: Final Output)

The final output of brain hemorrhage detection using deep learning would depend on the specific approach and model used for the task. In general, the output would likely be a binary classification result indicating whether a brain hemorrhage is present or not.

It is important to note that the output of a deep learning model for medical diagnosis is not a substitute for a trained medical professional's diagnosis. Rather, it is a tool to assist medical professionals in making more accurate and efficient diagnoses.

8. CONCLUSIONS AND FUTURE WORK

We built a model that can analyse single frame CT scans with comparative accuracy to a radiologist. Our model was trained on the dataset. Using windowing (contrast enhancement) for pre-processing, the CT scans are converted to 16 bit images into 3 channels with matrices of floating-point numbers normalized in (0, 1) range. To train our model with limited bias for the disproportionate independent hemorrhage classes, a weighted logistic loss function was used for multiclass classification. The model has per-class accuracy of more than 93%.

Future improvements include evaluating the system with different convolutional base architectures, such as deeper versions of ResNet (ResNet-101 and ResNet-152). Another enhancement would be altering the loss function by introducing different weights for positive and negative examples. Such a doubly-weighted loss function would allow to address the precision/recall tradeoff during training, possibly with better results. Another great addition to the system would be extending it with federated learning capability, where the client nodes can perform backpropagation on edge. This way, the system could scale incrementally, and also preserve the sensitive patient's information within the medical facility.

9. REFERENCES

[1] Kaggle and RSNA, "Intracranial hemorrhage detection dataset," 2019. [Online]. Available: https://www.kaggle.com/c/rsna-intracranialhemorrhage-detection/data

[2] T. Lewicki, https://github.com/tomek-l/brain, [Online].

[3] K. He, X. Zhang, S. Ren, and J. Sun, "Delving deep into rectifiers: Surpassing human-level performance on imagenet classification," CoRR, vol. abs/1502.01852, 2015. [Online]. Available: http://arxiv.org/abs/1502.01852

[4] G. J. S. Litjens, T. Kooi, B. E. Bejnordi, A. A. A. Setio, F. Ciompi, M. Ghafoorian, J. A. W. M. van der Laak, B. van Ginneken, and C. I. Sanchez, "A survey on deep learning in medical image analysis," ´ Medical Image Analysis, vol. 42, pp. 60–88, 2017. [Online]. Available: https://doi.org/10.1016/j.media.2017.07.005

[5] P. Rajpurkar, A. Y. Hannun, M. Haghpanahi, C. Bourn, and A. Y. Ng, "Cardiologist-level arrhythmia detection with convolutional neural networks," CoRR, vol. abs/1707.01836, 2017. [Online]. Available: http://arxiv.org/abs/1707.01836

[6] S. Chilamkurthy, R. Ghosh, S. Tanamala, M. Biviji, N. Campeau, V. Venugopal, V. Mahajan, P. Rao, and P. Warier, "Deep learning algorithms for detection of critical findings in head ct scans: a retrospective study," The Lancet, vol. 392, 10 2018.

[7] X. W. Gao, R. Hui, and Z. Tian, "Classification of CT brain images based on deep learning networks," Computer Methods and Programs in Biomedicine, vol. 138, pp. 49–56, 2017. [Online]. Available: https://doi.org/10.1016/j.cmpb.2016.10.007

[8] L. V. Fulton, D. Dolezel, J. Harrop, Y. Yan, and C. P. Fulton, "Classification of alzheimer's disease with and without imagery using gradient boosted machines and resnet-50," Brain Sciences, vol. 9, no. 9, 2019. [Online]. Available: https://www.mdpi.com/2076-3425/9/9/212

[9] M. Talo, O. Yildirim, U. B. Baloglu, G. Aydin, and ¨ U. R. Acharya, "Convolutional neural networks for multiclass brain disease detection using MRI images," Comp. Med. Imag. and Graph., vol. 78, 2019. [Online]. Available: https://doi.org/10.1016/j.compmedimag.2019.101673

[10] J. E. Barnes, "Characteristics and control of contrast in ct." RadioGraphics, vol. 12, pp. 825–37, 1992.

OUTLIER DETECTION FOR DIFFERENT APPLICATIONS

Dr. A. Muruganandham[1] , Amaresh C Sarawad[2], Surya D[3], Vinay H R [4]

[1]Professor, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, ndia
[2]Student, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, India [3]Student, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, India [4]Student, Dept of ECE, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

Outlier detection is a critical task in many applications where identifying anomalies in the data is important for ensuring data quality, identifying potential problems, and making informed decisions. This paper presents a comprehensive review of outlier detection techniques in different applications, including data mining, machine learning, computer vision, network intrusion detection, fraud detection, and healthcare. We discuss various statistical, clustering, distance-based, and machine learning-based approaches for detecting outliers, highlighting their strengths and limitations. We also discuss the challenges associated with outlier detection, such as data sparsity, high dimensionality, and class imbalance, and review some of the recent advancements in the field, including deep learning-based approaches and ensemble methods. Finally, we present some open research directions and discuss potential future directions for outlier detection in different applications.

Keywords: *Outlier detection, Anomaly detection, Data mining, Machine learning, Clustering, Distance-based methods, Statistical methods, Deep learning, Ensemble methods, High dimensionality, Class imbalance, Computer vision*

---

1. INTRODUCTION :

Outlier detection, also known as anomaly detection, is the process of identifying data points that deviate from the expected patterns or behaviours within a dataset. Outliers can be caused by various factors such as measurement errors, data entry errors, or unexpected events, and can significantly impact the accuracy and reliability of statistical models and machine learning algorithms.

Outlier detection techniques are used in a wide range of applications such as fraud detection, intrusion detection, medical diagnosis, and environmental monitoring. These techniques employ statistical and machine learning algorithms to identify outliers and provide insights into the underlying causes of these anomalies.

Some common techniques used for outlier detection include statistical methods such as z-score analysis and clustering-based approaches such as k-means clustering and DBSCAN. Machine learning algorithms such as isolation forest, one-class SVM, and autoencoders are also commonly used for outlier detection.

Effective outlier detection is critical in many industries, as it can help to identify potential issues early and prevent costly errors or damage. As datasets continue to grow in size and complexity, outlier detection techniques are becoming increasingly important in data analysis and decision-making processes.

2. METHODOLOGY:

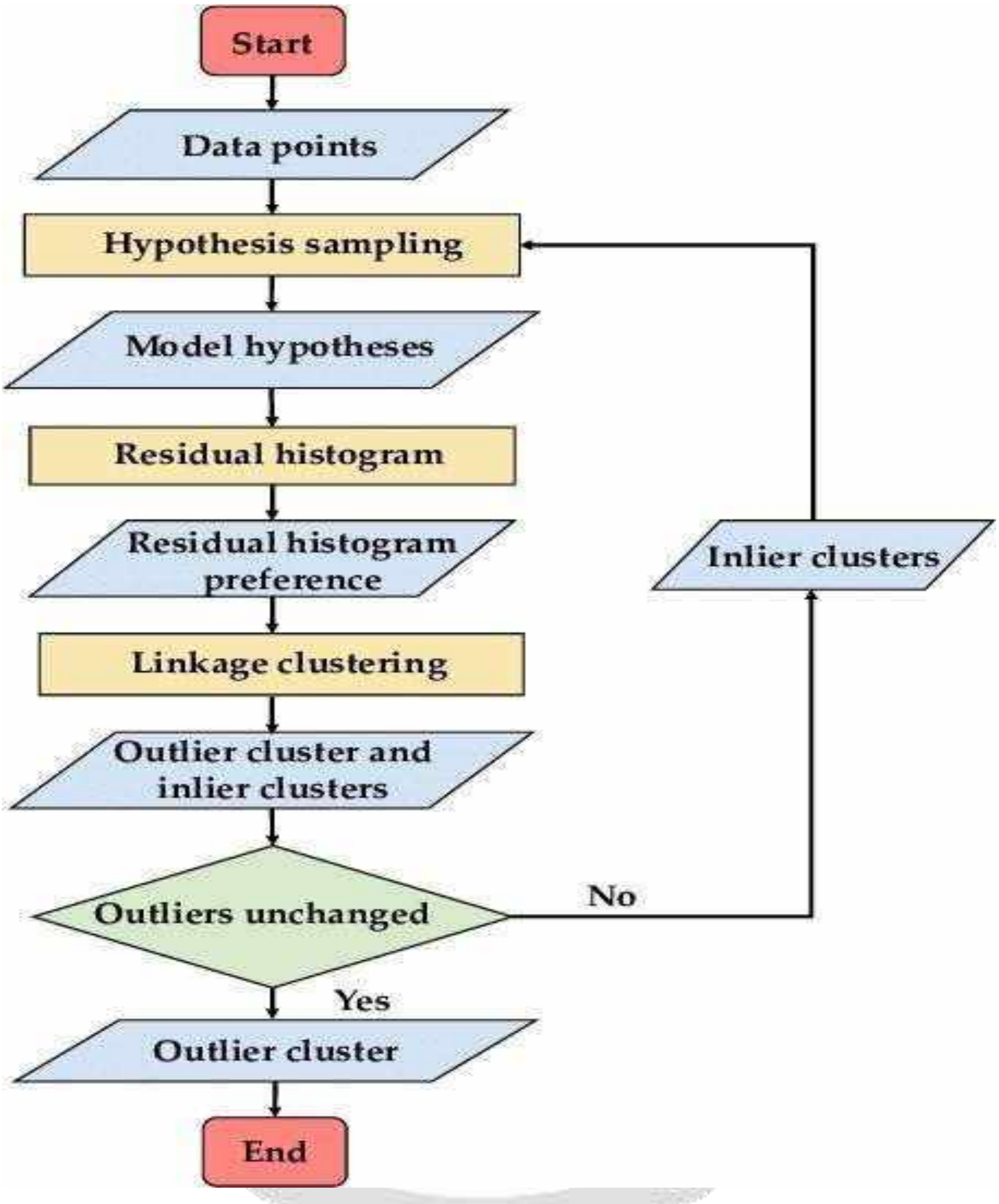


Fig 2. Flow Chart

Data points are essential in outlier detection as they form the basis of the analysis. Outliers are defined as data points that deviate significantly from the rest of the dataset, and detecting them requires examining the values of individual data points.

Hypothesis sampling is a statistical method that can be used in outlier detection to test whether a data point is significantly different from the rest of the dataset. The process involves formulating a hypothesis that assumes the data point is not an outlier and then testing whether the observed data supports or refutes the hypothesis.

Model hypothesis in outlier detection involves creating a model that represents the normal behavior of the dataset and using it to identify outliers. The process typically involves training a model on a subset of the data that is assumed to be representative of the normal behavior of the dataset, and then using the model to predict the behavior of the remaining data points. Data points that deviate significantly from the predicted behavior are identified as outliers.

Residual histogram is a technique that can be used for outlier detection by examining the distribution of residuals, which are the differences between the predicted and actual values of a model. The technique is commonly used in linear regression analysis, where the residuals represent the unexplained variation in the data that is not captured by the regression model.residual histograms are often used to identify data points that deviate significantly from the expected pattern. The residual histogram plots the differences between the predicted and actual values of a given variable. These differences are called residuals, and the histogram of residuals shows how frequently each value occurs.

Linkage clustering is a method commonly used in outlier detection to group similar data points together and identify potential outliers that do not fit within these groups.In linkage clustering, the data points are initially considered as individual clusters, and the algorithm iteratively merges the most similar clusters together based on a chosen distance metric.

In outlier detection, clustering algorithms are often used to identify groups of data points that are similar to each other, and to distinguish between clusters of inliers and outliers.An outlier cluster is a group of data points that are significantly different from the majority of the other data points in the dataset, and may be considered as potential outliers. An inlier cluster, on the other hand, is a group of data points that are similar to each other and are representative of the majority of the data in the dataset.

There are many existing systems and algorithms for outline detection, some of which include:

Canny edge detector: This is one of the most widely used edge detection algorithms. It works by detecting local maxima of the gradient magnitude of the image and tracing a path along these points to form edges.

Sobel edge detector: This algorithm uses two 3x3 convolution kernels to detect edges by calculating the gradient of the image intensity in the horizontal and vertical directions.

Laplacian of Gaussian (LoG) edge detector: This algorithm uses a combination of smoothing and differentiation to detect edges by identifying zero-crossings in the second derivative of the image.

Structured Edge Detection (SE) algorithm: This algorithm is based on machine learning and uses a structured edge detection framework to generate high-quality edge maps.

Deep learning-based methods: These methods use deep neural networks to automatically learn features that can be used for edge detection. For example, U-Net is a deep learning architecture that has been used for biomedical image segmentation and edge detection.

Data Preprocessing: The first step is to preprocess the data to ensure it is in a suitable format for machine learning algorithms. This may involve scaling, normalization, and handling missing values.

Feature Extraction: Next, the system extracts relevant features from the data. This can involve using techniques such as principal component analysis (PCA) or selecting a subset of the most informative features.

Training Data: The system uses a portion of the data to train a machine learning model. There are various models that can be used for outlier detection, such as isolation forests, one-class SVM, and k-nearest neighbor.

Testing Data: The remaining data is used to test the trained model's ability to detect outliers. The model assigns a score to each data point, and points with high scores are considered outliers.

Threshold Selection: A threshold is selected to determine which data points are considered outliers. The threshold can be selected based on domain knowledge or using statistical techniques such as the interquartile range (IQR) or z-score.

Outlier Detection: Finally, the system applies the threshold to the scores assigned to each data point to determine which points are considered outliers.

Overall, this proposed system for outlier detection can help identify anomalous data points that may be indicative of fraud, errors, or other issues in the data. It is important to note that the effectiveness of the system will depend on the quality of the data and the selection of appropriate machine learning models and threshold values.

3. OUTPUT RESULTS:

OUTPUT: Z SCORES FORMAT

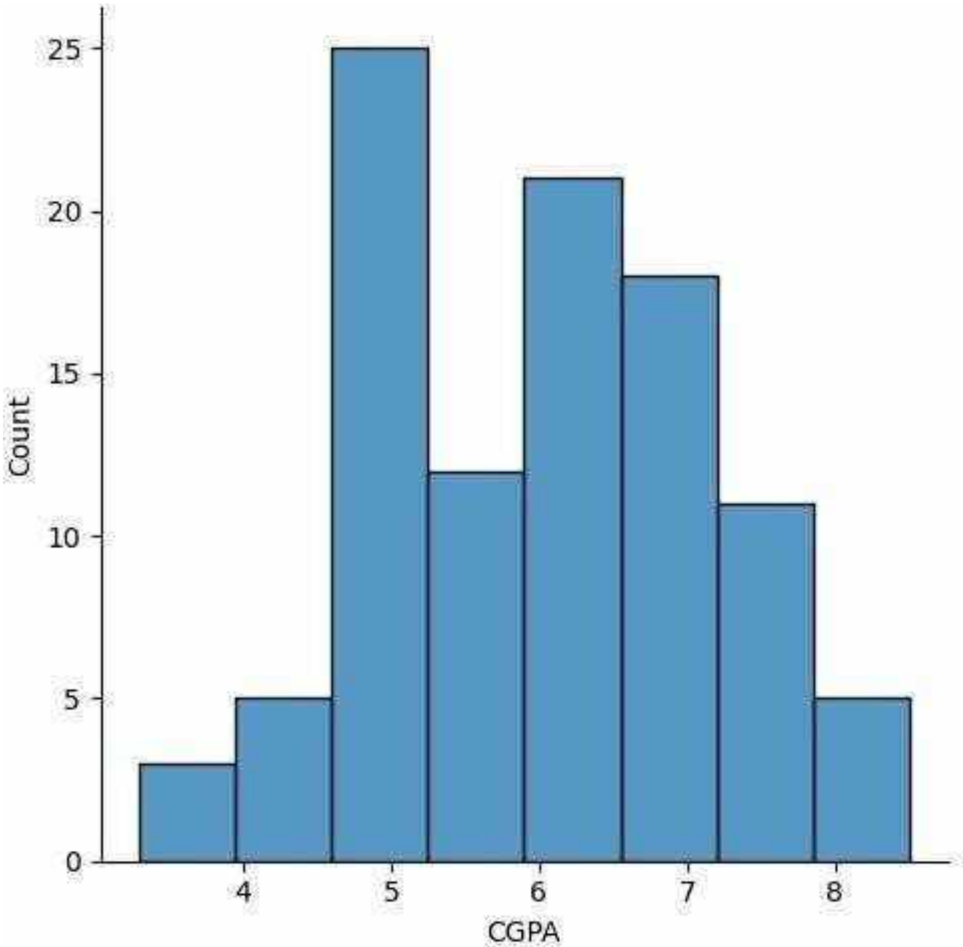


FIGURE 3.1 The CGPA Of Z Score Format

To calculate the z-score of a CGPA value, you would first calculate the mean and standard deviation of the CGPA values in your data set. Then, for each CGPA value, you would subtract the mean and divide the result by the standard deviation:

z = (CGPA value - mean CGPA) / standard deviation CGPA

The resulting z-score for each CGPA value indicates how many standard deviations that value is away from the mean CGPA value. Generally, CGPA values with a z-score greater than 3 or less than -3 are considered outliers.It's important to note that the interpretation of outliers in CGPA values may vary depending on the context.

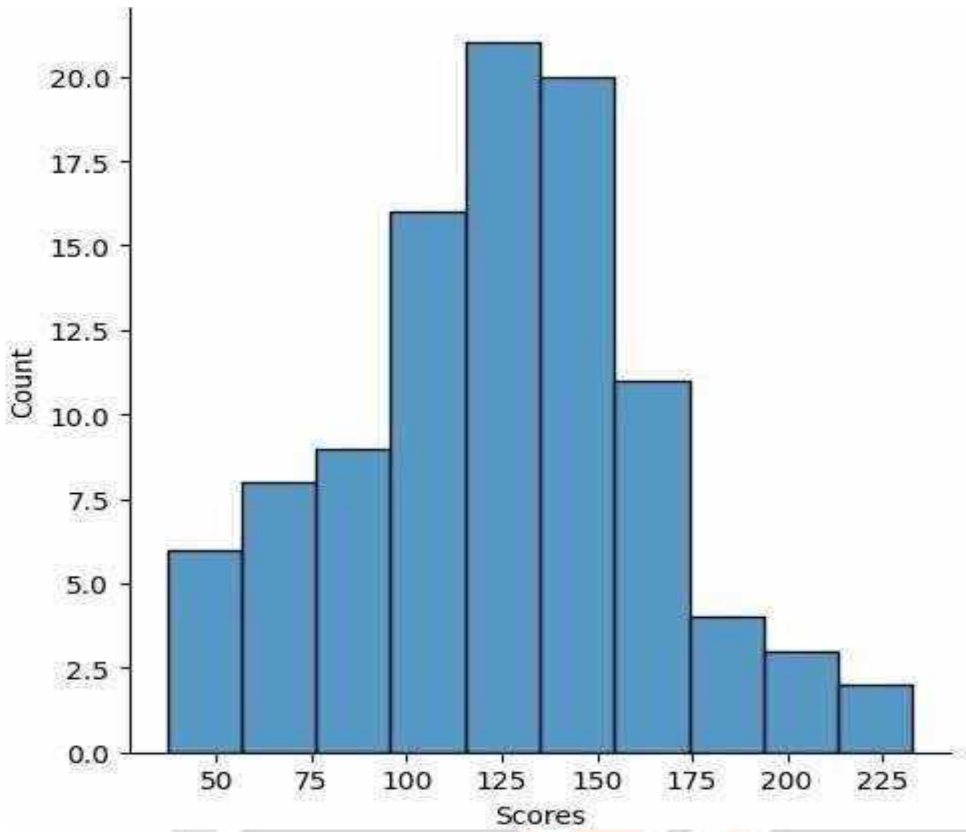


FIGURE 3.2 SCORES OBTAINED IN Z SCORE FORMAT

OUTPUT: IQR BOX PLOT

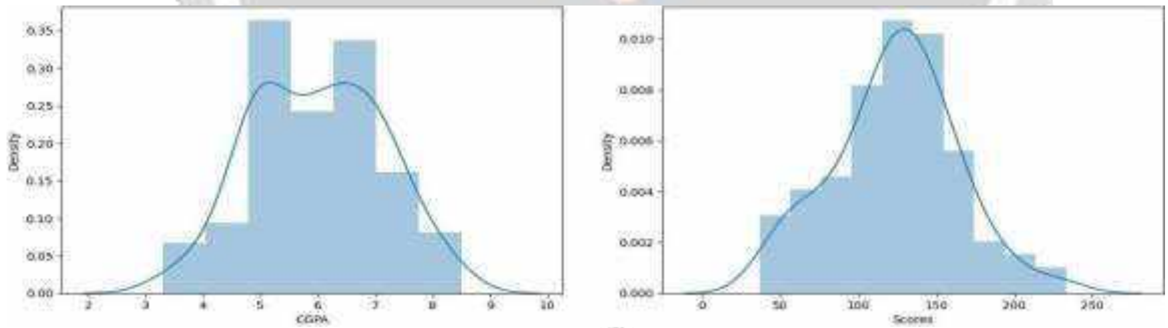


FIGURE 3.3 CGPA and Score Graph

The IQR is a measure of variability in a data set and is calculated as the difference between the third quartile (Q3) and the first quartile (Q1). The IQR captures the middle 50% of the data and is less sensitive to extreme values than measures like the range or standard deviation.

A box plot is a graphical representation of a data set that shows the median, quartiles, and potential outliers. The box spans the IQR, with the median represented by a line within the box. The whiskers extend to the smallest and largest observations within 1.5 times the IQR from the nearest quartile. Observations beyond the whiskers are considered potential outliers and are plotted as individual points.

To identify potential outliers using the IQR and box plot, you would calculate the IQR and use it to determine the whisker length.

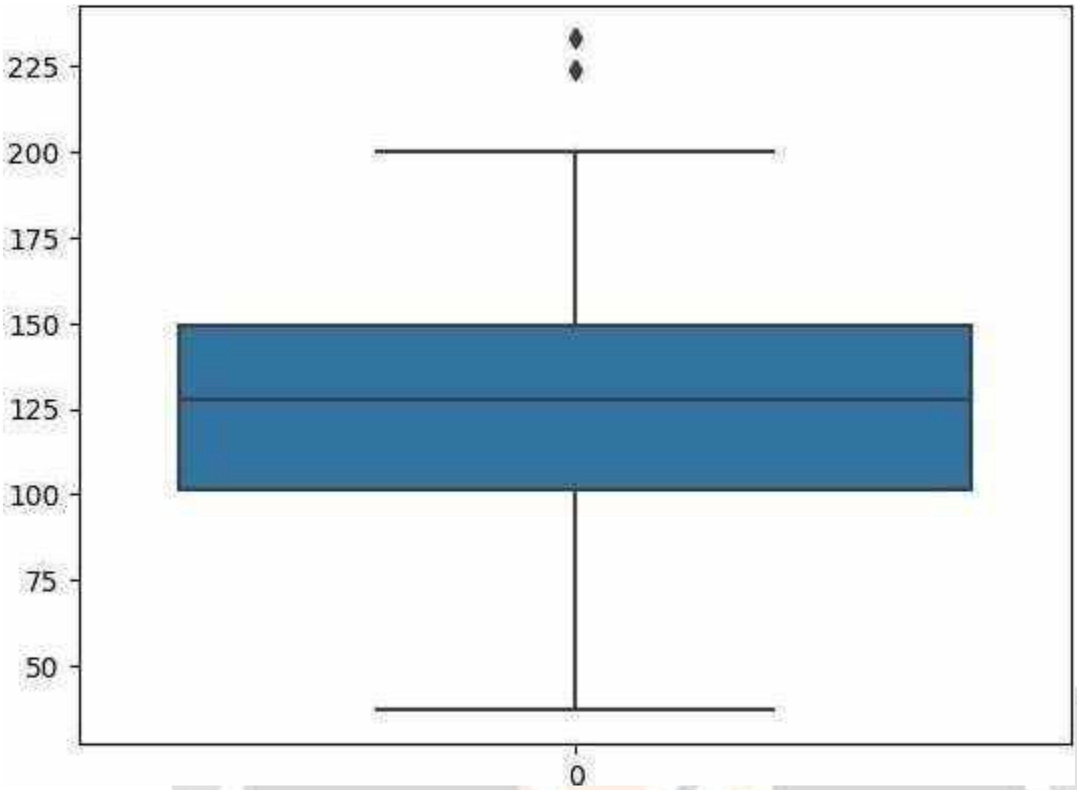


FIGURE 3.4 The Bar Graph

In statistics, bar graphs are used to visually represent the distribution of categorical or discrete variables. While they are not commonly used in outlier detection, they can be useful in identifying potential outliers in certain situations.

For example, if you have a categorical variable that represents different groups or categories in your data set, you could create a bar graph to compare the distribution of values across those groups. If there is a group or category that has a significantly different distribution of values compared to the others, that could indicate the presence of potential outliers within that group.

Similarly, if you have a discrete variable with a limited range of possible values, you could create a bar graph to visualize the frequency of those values. If there are one or a few values that occur much more frequently than the others, that could indicate the presence of potential outliers at those values.

4. CONCLUSION AND FUTURE WORK:

Outlier detection is an important task in data analysis that involves identifying data points or observations that differ significantly from the majority of the data. This process can help identify anomalies, errors, or interesting patterns in the data that may be useful for further analysis.

There are several approaches to outlier detection, including statistical methods, clustering algorithms, and machine learning techniques. Each of these methods has its own strengths and weaknesses, and the choice of approach depends on the nature of the data and the specific goals of the analysis.

One important consideration when conducting outlier detection is the definition of what constitutes an outlier. This definition may vary depending on the context of the analysis and the specific goals of the researcher. For example, in some cases, outliers may be defined as extreme values that are significantly different from the rest of the data, while in other cases, outliers may be defined as data points that do not conform to a particular pattern or distribution.

In conclusion, outlier detection is a powerful tool for data analysis that can help identify anomalies, errors, or interesting patterns in the data. However, it requires careful consideration of the definition of what constitutes an outlier and the selection of an appropriate approach to detect them.

5. REFERENCES:

[1] Y. Zhao, Z. Nasrullah, and Z. Li, "PyOD: A python toolbox for scalable outlier detection," Journal of Machine Learning Research, 2019.

[2] Y. Zhao, Z. Nasrullah, M. K. Hryniewicki, and Z. Li, "LSCP: locally selective combination in parallel outlier ensembles," in SDM, 2019.

[3] C. Wan, Z. Li, A. Guo, and Y. Zhao, "SynC: A unified framework for generating synthetic population with gaussian copula," Workshops at the Thirty-Fourth AAAI Conference on Artificial Intelligence, 2020.

[4] Y. Zhao, X. Hu, C. Cheng, C. Wang, C. Xiao, Y. Wang, J. Sun, and L. Akoglu, "Suod: A scalable unsupervised outlier detection framework,"arXiv preprint arXiv:2003.05731, 2020.

LORA NETWORK BASED WIRELESS COMMUNICATION AND MONITORING USING IOT

Lokesha k[1], Akshatha B[2], Ajantha K[3], Gowthami R[4]

[1]ElectronicsandCommunication Engineering,RajaRajeswari College of Engineering, Karnataka, India
[2] Electronics and communication Engineering, RajaRajeswari college of Engineering, Karnataka, India
[3],Electronics and Communication Engineering,RajaRajeswari College of Engineering, Karnataka, India
[4]Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

Farmers take more concern in protecting their cattle. But the environmental factors greatly affect the health of cattle such that they may get affected due to various disorders. Therefore, this proposed project is based on monitoring the health conditions of the cattle by comparing the present health condition required for normal cattle. The parameters like humidity, temperature, gas values etc. are compared with standard parameters and the information is transmitted through IoT. The farmer gets notified and inspected when the veterinary doctors are not available at the instance. Availability of internet at rural areas is very difficult to access. So, by considering this factor we have added LoRa to get the intermediate connectivity.

Keywords:-*LoRa, Intermediate connectivity.*

1. INTRODUCTION

In this modern era, many technologies are introduced in our environment. In this electronic world, microcontroller plays a major role in the development of smart systems. In this day by day improvement and the development of new technologies, microcontrollers act as a heart of the system. These microcontrollers consist of a single chip processor which is suitable for automation and control process for an accurate result. To overcome the arising problem of monitoring the temperature, this project is designed and implemented. The monitoring of temperature is a process in which the temperature is a process in which the temperature of space or object is changed. The project describes the monitoring of temperature. This system is designed and implemented using an Arduino program which is written in Arduino UNO. The smart farming relays on basic needs of farmers such as helping the farmers by reducing their work like farmers visiting the cattle again and again for observing health condition, so to overcome the workload of farmers, a computing and sensor based methods controlled by Arduino module is installed in cattle sheds through sensor to monitor the health condition of cattle. The data is measured through sensors are then stored in the consumer database, where the consumers are allowed to extract data through the software. It includes another feature of alarming i.e., if the temperature of cattle exceeds beyond threshold value, the sensors senses the temperature and compares it with the safe range and it alarms when required.

1.1 Motivation of the Task

In earlier days, farmers used various techniques for detecting health condition of animal bodies, which requires continuous and daily to daily base observation of animals. This again requires an excessive amount of labor and their cost. Those techniques of detecting would give wrong results, which may be different from the actual health status of the animal. This can cause harmful effects on the animals (ex: cattle). So, here it is thought that the automatic health monitoring system can be proposed to keep the records of health parameters of animals in faster and accurate rates.

1.2 Problem Statement

Maintenance of cowshed activities in remote areas from being in city outskirts is not in proper condition. Also, early stage identification of diseases in cattle has been the major challenge in isolated areas which should be monitored. And adverse effects of fluctuating environment conditions on cowshed should be taken care.

1.3 Proposed System

We proposed an integrated system to control the cowshed activities and to monitor the cattle health condition. Various sensors are connected to monitor the activities and data are uploaded to the cloud in real time. Machine learning method is used to alert user by giving notifications when any dangerous situations these alerts are obtained. Here Google Firebase is used for cloud storage purpose. Android App is developed using MIT App Inventor tool. Python program is used to apply machine learning. Various sensors are connected in order to read the attributes like temperature, humidity, gas, rain and soil moisture values. Here LoRa is used to inter-connect the devices to remotely set internet connected points.

1.4 Objectives of the Task

With this project we hope to implement a system which can monitor cowshed activities with more accuracy. And to establish a communication in distant locations with the help of IoT. Also, to verify specific conditions of the environment by using different type of sensors.

2. LITERATURE REVIEW

In this paper [1], F. Turcinovic *et al.*, proposed that this is the most utilized LP-WAN technology that operates in unlicensed spectrum is LoRa. In LoRa communication, spreading factor (SF) has the most impact on energy consumption, time on air, and the coverage area. Influence of SF on communication parameters such as signal-to-noise ratio, received signal strength indicator and time on air is analyzed using over 6500 LoRa messages gathered in test network.

In this paper [2], Derek Heeger *et al.*, this work assesses the time and energy associated with authentication protocol in the context of long range, this is an emerging low power wide area network used in IoT devices. This LoRa has configurable settings which affects the transmission and bandwidth range. They assess the transmit time, which is proportional to energy consumption, of the different authentication techniques over a variety of LoRa configuration and address the level of security provided by authentication protocols.

In this paper [3], Phoebe Edward *et al.*, LoRa has become a key enabler for multiple low power wide area network technologies. The LoRa technology is pillared on its patented chirp spread spectrum modulation. Cyclic shifts of LoRa based chirp signal create whole orthonormal space multidimensional signaling. Interleaved Chirp Spreading LoRa based modulation has been introduced as new multidimensional space generated from the interleaved versions of the nominal LoRa chirp signals.

In this paper [4], Sarah Opipah *et al.*, The smart home system is a system in which there are features for controlling and monitoring household electronic equipment. The smart home application system is the combination of technology and services specific to home environment. The main purpose of applying LoRa based smart home system technology is to monitor room temperature and to control electronic devices. The communication module used in this research is LoRa Dragino 950 MHz module.

In this paper [5], Nayanmoni Saikia *et al.*, A conceptual narrative has been used for this research to understand the importance of digital platforms and technologies in agricultural sector with a focus on analyzing review literature work and cases of different countries through argument using secondary information gathered from published research paper. Rural families have agriculture as their primary source of livelihood. The new ideas here are the implications with incredible advantages of using LoRaFaRM technology that will Leapfrog yields for an unprecedented economic boost.

In this paper[6], Dania Eridani*et al.*, TheLoRa is a low power wide area network communication which has the ability to transmit data in a long range with a low power. LoRa Alliance has designed a network architecture that usually uses, called LoRa WAN. To meet the purpose of Low Power Wide Area Network such as simple implementation, Low cost and simple architecture.

3. METHODOLOGY

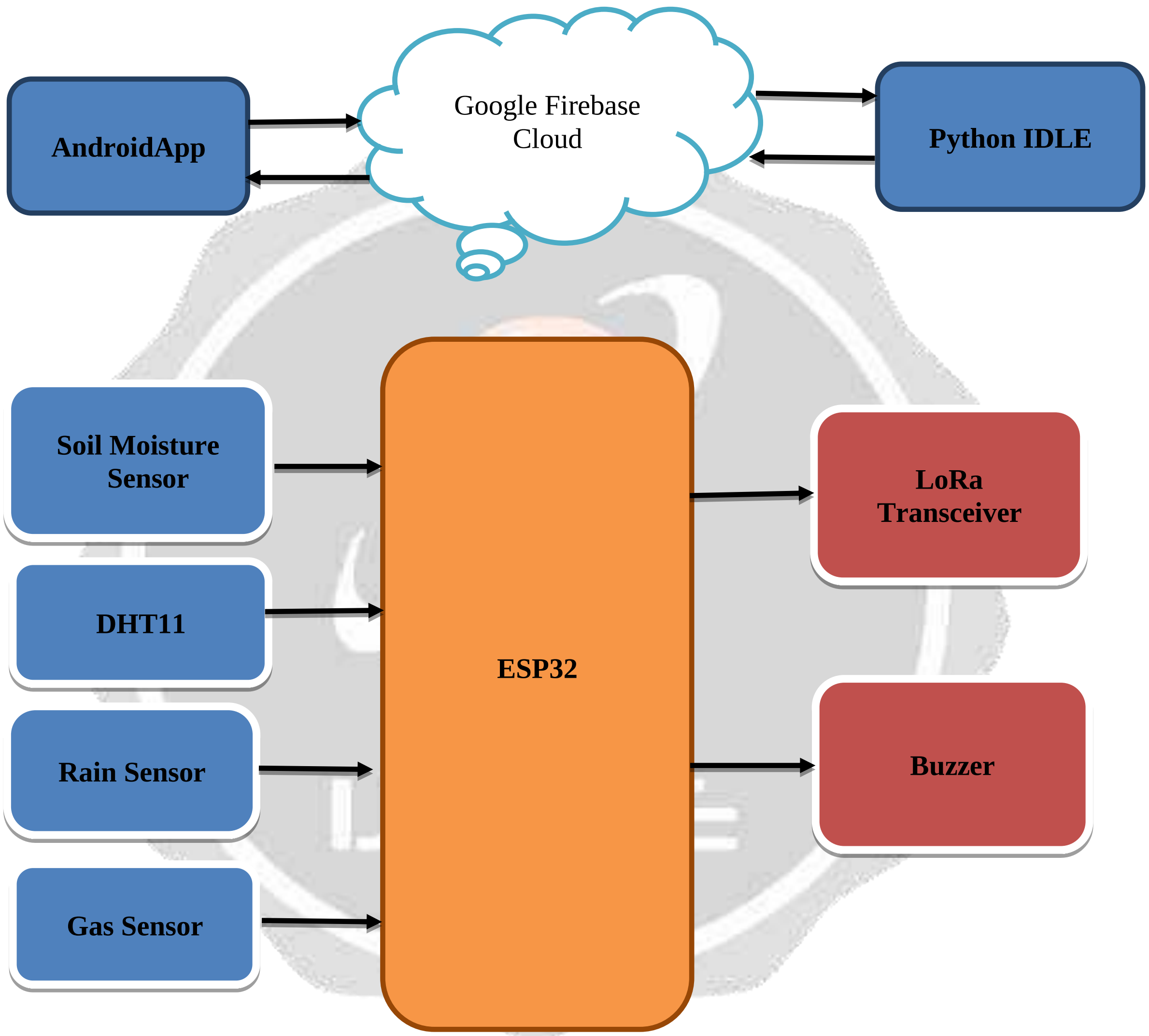


Fig 1. LoRa Transmitter

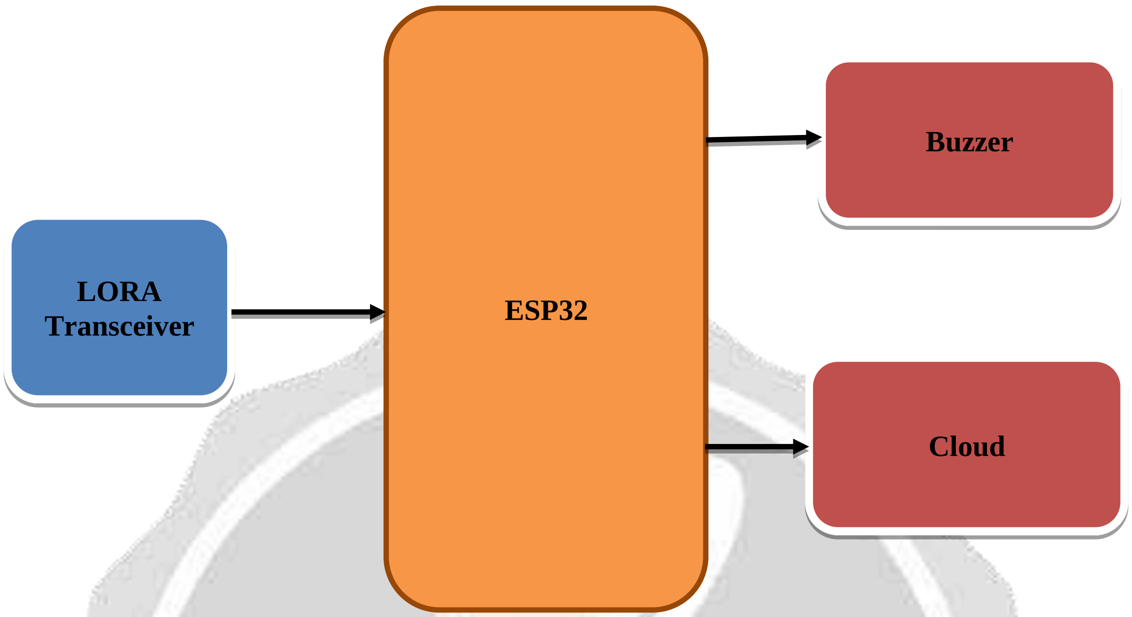


Fig 2. LoRa Receiver

LoRa sensor node and LoRa gateway is wireless communication with an unlicensed frequency band of 925.2 MHz While LoRa gateway using another unlicensed 2.4 GHz Wi-Fi frequency band to communicate with a cloud storage server. The LoRa gateway were installed at 2 meters height above ground level. Each sensor node was separately installed in a different outdoor field. The first node has located at roadside with small buildings on both side of the road. While the second and third node have placed among buildings at different locations. The result from the experiment shown that the longest non-line-of-sight (NLOS) wireless communication is 600 meters which first sensor node is transfer data correctly. Because the location of the first node is less obstructions than the second and the third node. That mean first node location is less large-scale fading than other nodes. Therefore, the node installation location should be considered that is a key importance for improving the performance of data transfer. Furthermore, the LoRa gateway is automatically transfers environmental data for every 15 seconds to the cloud storage network. Temperature, humidity, rain value and soil moisture values are obtained from the sensors and uploaded into cloud google firebase. Python program is used to predict the value based on input samples. An android app is developed using MIT app Inventor tool to help the farmers to read all sensor values and to get all notifications on android phone. Several communication protocols exist, from Wi-Fi, Zigbee to 2G, LTE and even satellite communications but each of them is usually plagued by one limitation or the other which makes them unsuitable for certain IoT cases. LoRa, which combine ultra-low power consumption with an effective long range.

4. RESULT ANALYSIS

The transmitter will obtain temperature, humidity, gas, rain and soil sensor from the environment using the sensors connected to an Arduino UNO, and forward the data to the receiver via LoRa module. The transmitter comprises of environmental sensors and the LoRa module connected to the Arduino UNO. The output pin of the sensors is connected to a digital pin on the UNO while the LoRa is connected to SPI pins of the UNO.

4.1 Transmitter Section

The idea behind this transmitter section is simpler. We obtain the environments temperature, humidity, rain and gas data using the relevant sensors and broadcast the data over LoRa to our receiver with an identity key which ensures the data is only delivered to our receiver. To reduce the amount of work required to develop the code for our transmitter, we will use a couple of libraries including; the well-built LoRa library along with the DHT library from Adafruit. The LoRa Library comes with a number of functions that make it easy to send and receive data with the LoRa module, while the DHT makes it easy to interact and extract readings from the DHT11 sensor. Both libraries can be installed via the ESP32. The code for the transmitter is based on the LoRa sender example located in the LoRa library, with slight modification like the addition of a sync word which ensures only the designated receiver with the key receives the message.

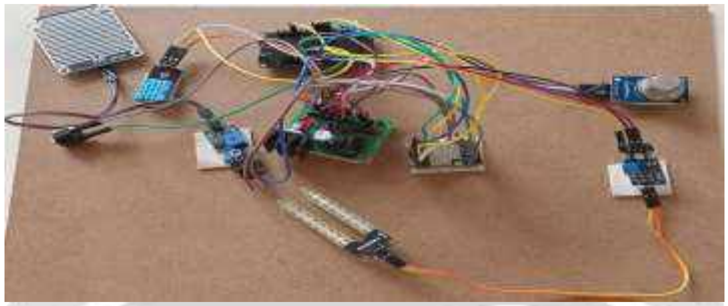


Fig 3:- Lora Transmitter

4.2 Receiver section

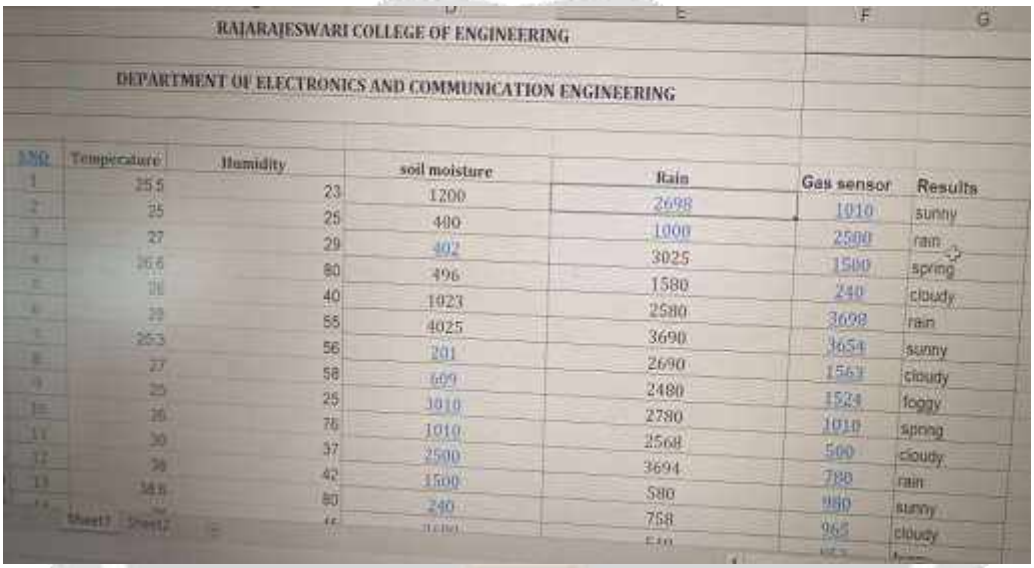
For the receiver, our goal we simply to capture the packet being sent by the transmitter and display it on the serial monitor. To reduce the code complexity, we will use the same LoRa library we used in the transmitter sketch. Next, we define the pins of the Node MCU to which the NSS, RST and DIO0 pins of the LoRa module are connected. Next, we move to the void setup () function. We start by initializing the serial communication so we can use the Serial Monitor to view incoming data from the receiver. Next, setup the LoRa module by using the setPins () command to inform the library of the pin configuration to be used. Next, we initialize LoRa communication with the begin () command. Just like we did for the transmitter, ensure that the frequency you use as the argument for the begin () function should be that of your radio and lawful to use it in your country. To wrap up the void setup () function, we set the sync word to match that of the transmitter and we print a message on the serial monitor to indicate everything that setup is complete. Next, we write the loop () function. We start the function by creating a variable to hold the received data and the size of the packet received which will be zero/false if no packet is received. Next, we use an "if statement to check if a packet has been received, if yes, the data is read using the LoRa. read string () function and stored in the variable we created earlier. The read data is then displayed on the serial monitor along with the RSSI which is an indication of the signal strength and may be useful for debugging your transmission power.

Fig 4:- Lora Receiver

Screen1

COWSHED MONITORING

Temperature:	26.9
Humidity:	45
RAIN:	4095
SOIL:	4095
MQ135:	1221
Prediction:	["foggy"]



RAJARAJESWARI COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

S.NO	Temperature	Humidity	soil moisture	Rain	Gas sensor	Results
1	25.5	23	1200	2698	1010	sunny
2	25	25	400	1000	2500	rain
3	27	29	402	3025	1500	spring
4	26.6	80	496	1580	240	cloudy
5	26	40	1023	2580	3698	rain
6	29	55	4025	3690	3654	sunny
7	25.3	56	201	2690	1563	cloudy
8	27	58	609	2480	1524	foggy
9	25	25	1010	2780	1010	spring
10	26	76	1010	2568	500	cloudy
11	30	37	2500	3694	780	rain
12	28	42	1500	580	980	sunny
13	[illegible]	80	240	758	965	cloudy

Sheet1 Sheet2

5.CONCLUSION

The goal of the work is to develop a system that uses the concept of IoT and LoRa device, through which it resolves a problem of establishing long range communication from node to gateway and gateway to cloud. Also, a distant location cowshed or cattle monitoring by the utilization of sensors is made possible i.e., to enable real-time monitoring of soil moisture, temperature and other environmental parameter.

6. REFERENCES

[1] F. Turcinovic, J. Vukovic, S. Bozo, and G. Sisul, "Analysis of LoRaParameters in Real-World Communication," Proc. Elmar - Int. Symp.Electron. Mar., vol. 2020-Septe, no. September, pp. 87–90, 2020, doi:10.1109/ELMAR49956.2020.9219028.

[2] D. Heeger and J. Plusquellic, "Analysis of IoT Authentication overLoRa,"Proc.-16thAnnu.Int.Conf.Distrib.Comput.Sens.Syst. DCOSS2020,pp.458–465,2020

[3] P.Edward,M.El-Aasser,M.Ashour,andT.Elshabrawy,"InterleavedChirpSpreadingLoRaasaParallelNetworktoEnhanceLoRaCapacity,"IEEEInternetThingsJ.,vol.8,no.5,pp.3864–3874,2021,

[4] A. S. Shaker, "A Survey of Smart Buildings and Homes using Low-Power Wide-Area Network (LoRa WAN)," in 2020 4th InternationalSymposiumonMultidisciplinaryStudiesandInnovativeTechnologies(ISMSIT), Oct. 2020, pp. 1–7, doi:10.1109/ISMSIT50672.2020.9254675.

[5] S. Opipah, H. Qodim, D. Miharja, Sarbini, E. A. Z. Hamidi, and T.Juhana,"PrototypedesignofsmarthomesystembaseonLoRa,"Proc.

-20206thInt.Conf.Wirel.Telemat.ICWT2020,2020,doi:10.1109/ICWT50448.2020.9243643.
[6] G. Codeluppi, A. Cilfone, L. Davoli, and G. Ferrari, "LoraFarM: ALoRaWAN-based smart farming modular IoT architecture," Sensors(Switzerland),vol.20,no.7,2020,doi:10.3390/s20072028.
[7] H. Lee et al., "Feasibility of Networking Technology for Smart Farm:LoRa vs APRS," 2020 Int. Conf. Omni-Layer Intell. Syst. COINS2020,pp.16–21,2020,doi:10.1109/COINS49042.2020.9191428.
[8] D. Eridani, E. D. Widianto, R. D. O. Augustinus, and A. A. Faizal,"MonitoringSysteminLoraNetworkArchitectureusingSmartGatewayinSimpleLoRaProtocol,"20192ndInt.Semin.Res.Inf.
Technol.Intell.Syst.ISRITI2019,pp.200–204,2019
[9] T. Jangjing and B. Kumkhet, "IoT based Low - cost soil moisturesensorwithcloudcomputing&LoRatechnology,"inThe2ndInternationalConferenceonAppliedScience,EngineeringandInterdisciplinaryStudies2019,2019,pp.16–19.
[10] N. Pukrongta and B. Kumkhet, "The relation of LoRaWAN efficiencywithenergyconsumptionofsensornode,"Proc.2019Int.Conf.Power,EnergyInnov.ICPEI2019,pp.90–93,2019

HEPTOCELLULAR CARCINOMA DETECTION USING DEEP LEARNING FRAMEWORK

Dr Vijaya S M[1], Dr A M Prasanna Kumar [2],Harshitha B L[3] , Sanjana N[4] , Harshitha B[5]

[1] *Associate professor, Department of ECE, Rajarajeswari College of Engineerin,Bangalore,India*
[2] *Professor, Department of ECE, ACS College of Engineerin,Bangalore,India*
[3]*Student Department of ECE ,Rajarajeswari College of Engineering ,Bangalore ,India*
[4]*Student, Department of ECE ,Rajarajeswari College of Engineering ,Bangalore ,India*
[5]*Student, Department of ECE ,Rajarajeswari College of Engineering ,Bangalore ,India*

ABSTRACT

.Liver is one of the largest gland and largest internal organ in human body. Abnormal growth in cell in the liver causes liver cancer, which also known as hepatic cancer. People having liver tumor died due to inaccurate detection. Detection of this tumor is mostly difficult and it can be detected at advance stage and life-threatening. Its better detect the tumor at an early stage .In this project we detect liver cancer at the earlier stage using image processing. This project consist of automated method of detecting the liver cancer in abdominal CT images and classifying CNN algorithm. The model consist of many stages the image is normalized and pre-processed using the median filter to remove noise . Histogram equalization of the image ,the feature are extracted based on the Discrete wavelet Transformation(DWT).Finally ,liver CT images are classified by implementing convolutional neural network and segmentedresult.

Keyword : - *Discrete wavelet transformation, Convolutional neural network, Segmentation, CT Scan*

1.INTRODUCTION

Millions of cells in our body divide everyday to form new cells. The cells which are formed replaces all the deadcells present. They get together to form a tissues again tissues get together to form organs. In some cases cells dividemore than necessary and forms lumps or extra growth known as tumors. Major cause of death is caused from LiverCancer .Liver Cancer is not only death causing but and difficult to detect and mostly found in advance stage. The known or common type of Liver Cancer is known as hepatocellular carcinoma .It is found more in males than the female .To overcome this issue we have come up with the detection of liver cancer using deep learning framework Using this we can detect cancer in an early stage And with the most accuracy.

1.1 Proposed System

Here we propose detection of cancer using the clustering and neural networks. It consists of three main phases pre-processing, detection processing phase, detection phase in which wavelets are applied to signify the segmentation to classify the normal and abnormal stages of the tumor. Accuracy of the exact location of the tumor located plays an important role .Diagnosis method consist of three stages pre-processing of images ,feature extraction and classification. Once done with histogram equalization of image ,the feature is extracted based on the Discrete wavelet Transformation(DWT).In the final stage of the process Convolution Neural Network are classify the abnormal and normal .

1.3 OBJECTIVES

Here we propose Convolutional Neural Network for liver cancer detection and segmentation .Using deep learning we design the ensemble segmentation for efficient classification and segmentation of the liver tumors. Result of the CNN shows high accuracy and performance using the given data set.

2. LITERATURE SURVEY

In this paper [1] Piyush Kumar Shukla proposed the suggested work proposes a system for automatically detecting liver tumours and lesions in magnetic resonance imaging of the abdomen pictures by using 3D affine invariant and shape parameterization approaches, as well as the results of this study is point-to-point parameterization addresses the frequent issues associated with concave surfaces by establishing a standard model level for the organ's surface throughout the modelling process. Initially, the geodesic active contour analysis approach is used to separate the liver area from the rest of the body.

In this paper [2] LANTIAN WANG proposed Liver cancer is one of the world's largest causes of death to humans. It is a difficult task and time consuming to identify the cancer tissue manually in the present scenario. The segmentation of liver lesions in CT images can be used to assess the tumor load, plan treatments predict, and monitor the clinical response. In this paper, the Convolutional Neural Network (CNN) has been proposed for liver tumor segmentation, which has been modeled mathematically to resolve the current issue of liver cancer. For semantic segmentation, HFCNN has been used as a powerful tool for liver cancer analysis.

In this paper[3] Dr. Saroj Hiranwal a detailed review has been done on liver cancer detections and this paper provides details of different techniques that reveal how hybrid intelligent approaches are applied to different categories of cancer detections and treatments. The principle goal of this review is to highlight mostly used features, classifiers, methodologies, key concepts, and their accuracy. Under cancer detection techniques, various types of machine learning algorithms are used such as decision tree, SVM, neural networks, random forest, computer aided detection, genetic algorithms etc. These strategies exert significant effects on liver image characterization and having different accuracy levels. All the long short solutions talked about strategies are provided in this manuscript and it is explored up to various execution measurements.

In this paper[4] R Aarthi,proposed The abnormal growth of cells in the liver causes liver cancer which is also known as hepatic cancer, where, Hepatocellular Carcinoma (HCC) is the most common type of liver cancer which makes up 75% of cases. The detection of this tumour is difficult and mostly found at advanced stage which causes life-threatening issues. Hence it is far essential to discover the tumour at an early stage. So the principle intention of this project is to detect liver cancer at earlier stage using image processing technique. Here the malignant liver tumours are detected from Computed Tomography (CT) images. The image undergoes enhancement using anisotropic diffusion filters and segmented by morphological operations which is simple and easy to work. This operation uses combination of two processes, dilation and erosion. The scope of this propounded technique is to highlight the tumour region present in the Computed Tomography.

In this paper[5] M.Pramod proposed The liver is necessary for survival and is also prone to many diseases. CT examinations can be used to plan and properly administer radiation treatments for tumors and to guide biopsies and other minimally invasive procedure. Manual segmentation and classification of CT image is a tedious task and time consuming process which is impractical for large amount of data. The liver is segmented from CT images using adaptive threshold method and morphological processing. Tumor region extraction is done by means of Fuzzy C Means (FCM) clustering from th.e segmented liver region. The statistical and textural information are obtained from the extracted tumor using Gabor with PCA. The features like mean, standard deviation and entropy of the obtained sub bands are calculated and stored in a feature vector (in format of mat file). The extracted features are fed as input to Extreme Machine Learning classifier to identify the presence of Liver tumor disease and to classify it as Malignant or Benign stage or not.

3. CNN SYSTEM ARCHITECTURE

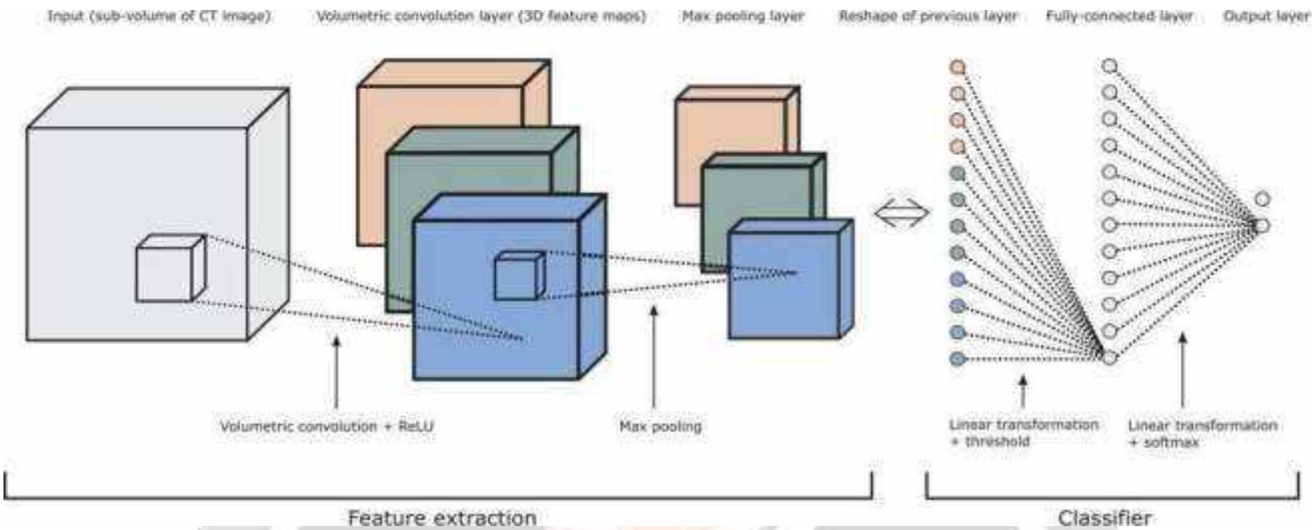


Fig 3.1:Deep convolution neural network architecture

A Deep-Convolution Neural Network is type of a DNN consists of multiple hidden layers such as convolutional layer, RELU layer, Pooling layer and fully connected a normalized layer. CNN shares. weights in the convolutional layer reducing the memory footprint and increases the performance of the network. The important features of CNN lie with the 3D volumes of neurons, local connectivity and shared weights. A feature map is produced by convolution layer through the convolution of different sub-regions of the input image with a learned kernel. Then, a non-linear activation function is applied through ReLu layer to improve the convergence properties when the error is low. In pooling layer, a region of the image/feature map is chosen and the pixel with the maximum value among them or average values is chosen as the representative.

Data Set: The dataset for training is obtained from Liver Database Consortium (LIDC) and Image Database Resource Initiative (IDRI). LIDC and IDRI consist of 1000 CT scans of both large and small tumors saved in Digital Imaging and Communications in Medicine (DICOM) format.

Image Segmentation: The segmentation of photographs is the phase where the visual Hepatocellular carcinoma detection using Deep learning framework image is partitioned into several parts. This normally helps to identify artifacts and boundaries. The aim of segmentation is to simplify the transition in the interpretation of a picture into the concrete picture that can be clearly interpreted and quickly analyzed.

Pre-Processing: In preprocessing stage, the median filter is used to restore the image under test by minimizing the effects of the degradations during acquisition. Various preprocessing and segmentation techniques of lung nodules are discussed in. The median filter simply replaces each pixel value with the median value of its neighbors including itself. Hence, the pixel values which are very different from their neighbors will be eliminated.

4. CONVOLUTIONAL NEURAL NETWORK

A CNN is type of a DNN consists of multiple hidden layers such as convolutional layer, RELU layer, Pooling layer and fully connected a normalized layer

Convolutional layer creates a feature map to predict the class probabilities for each feature by applying a filter that scans the whole image, few pixels at a time.
Pooling layer (down-sampling): scales down the amount of information the convolutional layer generated for each feature and maintains the most essential information (the process of the convolutional and pooling layers usually repeats several times).
Fully connected input layer: flattens the outputs generated by previous layers to turn them into a single vector that can be used as an input for the next layer.
Fully connected layer: Applies weights over the input generated by the feature analysis to predict an accurate label

5. METHODOLOGY

There are six steps to be followed during the process.

In the first step collection of data is means data set for training is obtained. In the next step pre-processing is done the median filter is used to restore the image under test by minimizing the effects of the degradation during the acquisition. The segmentation of photographs is the phase where visual image is partitioned into several parts. The next step is feature extraction in which median filter replaces each pixel value with median value of its neighbors and itself. Hence the pixel value which are different from their neighbor is eliminated. Now next step is feature selection in which feature is selected for futher steps.

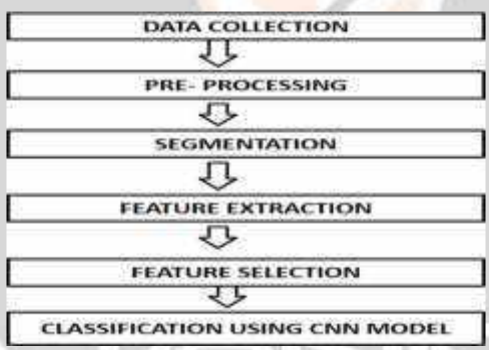


Figure 5.1 :Data flow diagram

6. RESULTS AND ANALYSIS

Figure 6.1 Detection of caroli disease

Figure 6.2 Detection of normal liver cells

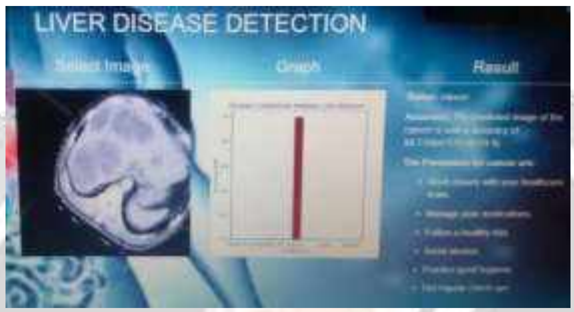


Figure 6.3 Detection of cancer

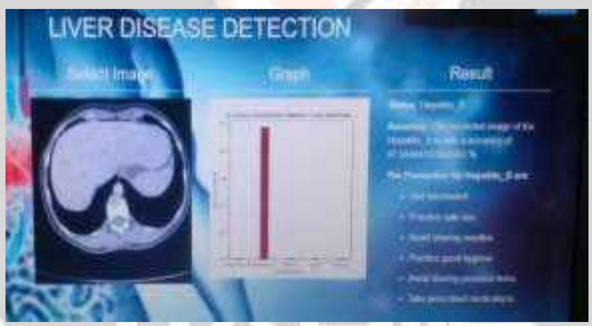


Figure 6.3 Detection of Hepatitis B

Figure 6.5 Detection of Hepatitis A

This section briefs about the various cancer causing diseases in liver and liver cancer by the tasks performedby training and testing the liver cells using CNN algorithm. It also brief out about the accuracyof the disease and precautions undertaken by humans to avoid this death causing cancers.

7. CONCLUSIONS

The convolution neural network(CNN) method. Many layers in the neural network are utilizedto extract features of medical images to improve the accuracy of the detection of medical images. The accuracy is 97.22%in this algorithm. A Convolutional Neural Network is trained and tested. The proposed CNN method very high accuracy in terms ofthe identifying the liver tumors.

8.REFERENCES

[1] AI-Driven Novel Approach for Liver Cancer Screening and Prediction Using Cascaded Fully Convolutional Neural Network by Piyush Kumar Shukla, Mohammed Zakariah, Wesam Atef Hatamleh,published on 1 February 2022

[2] Liver Cancer Detection Using Hybridized Fully Convolutional Neural Network Based on Deep Learning Framework" on July 24, 2020

[3] Lakhani, P., & Sundaram, B. (2016). Deep learning on liver tumor radiography: Radiology, 284(2), 574-582.

[4] Yan, K., Wang& Summers, R. M. (2018). Deep Lesion: automated mining of large-scale lesion annotations and universal lesion detection with deep learning. Journal of medical imaging, 5(3), 036501.

[5] Christ, P. F., Elshaer, M. E. A., Ettlinger, F., Tatavarty, S., Bickel, Bilic, & Sommer, W. H. (2016, October). Automatic liver and lesion segmentation in CT using SVM Algorithm and 3D conditional random fields. In International Conference on Medical Image Computing and Computer-Assisted Intervention (pp. 415-423). Springer, Cham.

[6] Peng, J Liang, P., & Kong, D. (2016). Automatic 3D liver segmentation based on deep learning and globally optimized surface evolution. Physics in Medicine & Biology, 61(24), 8676.

SMART WATER BOTTLE

Ranjitha L P[1], Rashmi Shree N[2], Shrusti Navalagi[3], Shivkumar H M[4]

[1]*Dept. of Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[2]*Dept. of Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India.*
[3]*Dept. of Electronics and Communication Engineering RajaRajeswari College of Engineering, Karnataka, India.*
[4]*Dept. of Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India.*

ABSTRACT

Nearly half of India's population suffer from dehydration. THIRST Reasearch (2009) proves that India still have a low awareness of drinking water. Consuming enough water can be a way to prevent dehydration. Smart bottle application is able to provide amount of daily water needs based on user's profile that is registered. The problem in calculation of water consumption can be overcome by using water flow sensor calculation data. The implementation result of smart water bottle application proves that the water needs of each person can be known, the water that has been consumed can be automatically calculated, and push notification can be a reminder about drinking water to the smart bottle users during their busy life.
In our busy lives, it is really hard to remember to drink enough water and most of the time we forget to drink the water whether we are in home, office or on the go. So, in order to build a healthy water drinking habit, it's important to track your water intake everyday. To track the water intake we made water bottle smart using Arduino nano, along with a name displayed of the user with the purifier attached with it on top.

KEYWORD: *Arduino Nano, Water, Water purifier*

1. INTRODUCTION

Self-directed Health Care. Drinking water is an instinctive and ordinary behavior and forming elderly habits is not easy. Motivation is necessary to change behavior and form healthy and positive water intake habits. Based on Internet of Things technology, in this study a smart water bottle was designed and equipped with weight sensor system and other functions, to facilitate the development of positive water intake habits. The bottle could automatically detect water volume and had an alarm offers a planning function, which enables the recording and management of water intake details, then rewards user with membership based on water intake. This ultimately facilitates consistent motivation to consume water improve user's intake behavior, by giving them a sense of accomplishment and selfsteem in relation to the management of their own hydration.

2. WORKING PRINCIPLE

Arduino Nano as the microcontroller to communicate with RTC module, Ultrasonic sensor, and the output devices like LCD display and LED and Buzzer. Here how it works when the bottle is full and the owner doesn't drink water for long time the bottle notifies to drink the water at the specific time by buzzing the sound and led indication. Once the water in the bottle is less compared to before it will analyse as the water in been drunk, so here the entire project is been powered 7v of power supply of a battery. Here when the owner or any one else touch the bottle the lcd display will display the name of the owner as to indicate it, vibration sensor is used to identify the movement of the bottle. Here we also use the purifier at the tip of the bottle.

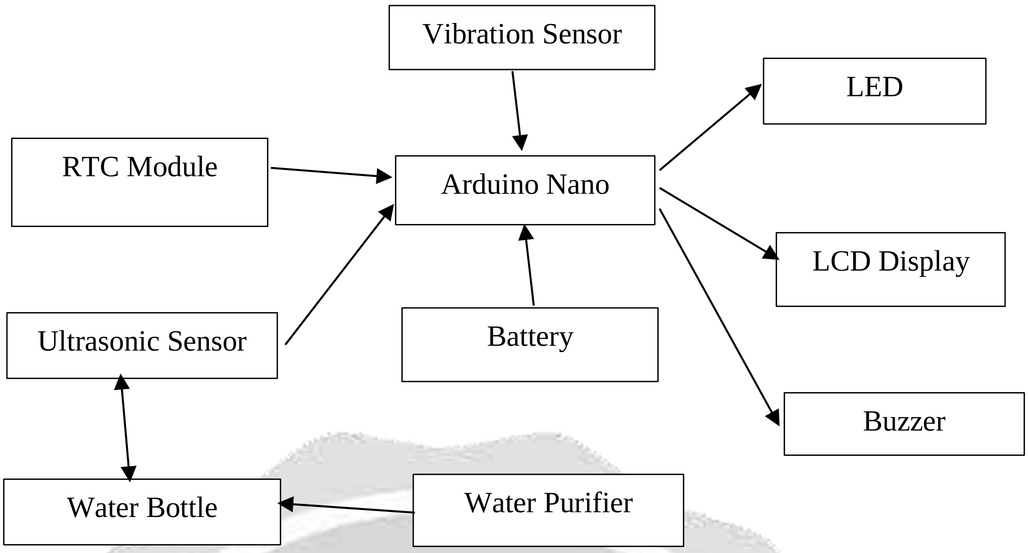


Fig-1 Block diagram of our proposed System

3. RESULT & DISCUSSION

This section briefs about the attachment of the components in the water bottle. Here the bottle contains the purifier at the tip of the bottle.

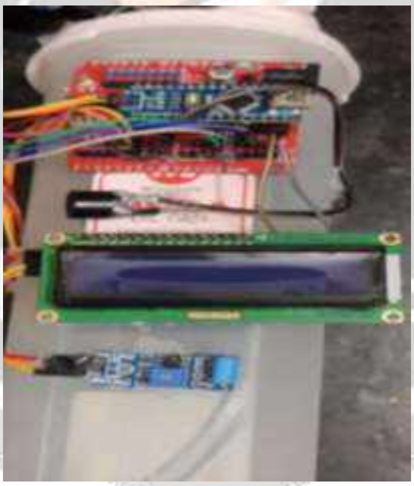


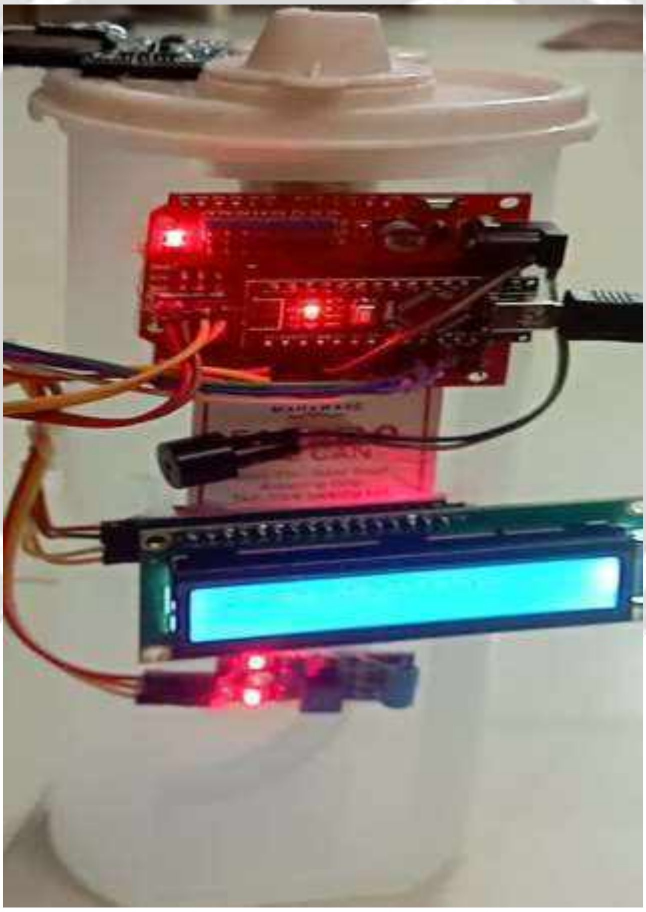
Fig-2 Proposed Prototype

The process starts with fiiling the water. Once the water is filled it purifies it and at the particular time buzzers beeps to remind us. The led turns red when we don't drink the water and it will be green when we drunk. LED Display displays the user name so that the user will not get confusion with his bottle.

3.1 Arduino IDE

The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. The IDE application is suitable for different operating systems such as Windows, Mac OS X, and Linux. It supports the programming language like C AND C++. Here, IDE stands for Integrated Development Environment.
The program or code written in the Arduino IDE is often called as sketching. We need to connect the Genuino and Arduino board with the IDE to upload the sketch written in the Arduino IDE software.

Purifier is added at the tip of the bottle



Connections made

Fig 3- Output of the bottle

Below are the pictures obtained during the testing of a smart water bottle

.

Healthy tip Display User Name

Fig-4 Output of display

Fig 3 and 4 shows the smart water bottle which contains a purifier at it's tip to purify the water and with the display of our name in the bottle. Water bottle gives the remainder to drink the water at the particular time.

4. CONCLUSION

The planned model of good bottle design for association to remind the humans to intake the spare water on time to stay the body stable is with success enforced. The utmost power consumption employed in this planned system is 7v. Not solely good phones may also have been used for verification and obtaining execution success. Any some prospects for maintaining the record of daily usage of human sipping binary compound area unit unbroken as future works and might conjointly use it in another fields. On average, people need to consume around 2 liter of water everyday and smart bottles are the best way to help consumers achieve this, simply because they lead to path a digitizing a person's water intake. Whether it's for consumers who are having difficulties with their diet plan because of lack of hydration, or just someone who wants to hydrate and keep healthy-smart water bottles are a great way to take care of your consumers.

5. REFERENCES

[1] Eric Brown, "Who needs the Internet of Things?", The Linux foundation, September 2016

[2] "Internet of Things global standards initiative", www.itu.in/en/itu-t/jca/iot.

[3] Reda Chouffani, "Can we expect the Internet of Things in healthcare?", IoT Agenda, August 2014.

[4] R.S.H.Istephanian,S.Hu,N.Y.Philp,A.Sungoor, "The potential of Internet of m-health Things"m-IoT" for insvasive glucose level sensing", Annual International Conference of the IEEE Engineering in Medicine and Biology Society,August 30-September 3, 2011.

[5] J.Y.Yoo, "Factors associated to water intake in adults", Publichealth master thesis, Graduate School of Public Health,Ajou University,(2010).

[6] H.Oh, "AStudy on fluid intake among nursing home residents",Journal of Korean Academy of Nursing,(2006).

[7] "The effects of water on our body and mind via O,X",Health Chosun, http://health.chosun.com/site/data/html_dir/2011/09/02/2011090201172.html?Dep0=twitter,(2011).

[8] "Find a reason of serious dehydration in the elderly", Newsis,(2013).

[9] A Copper, "The Inmates are running the Asylum: Why High-Tech Products Drive Us Crazy and How to Restore the Sanity",Sams-Pearson Education,(2004).

[10] S.H.Ahn, "The 3 Keywords of the New Senior Generation", SERI Management Note#96, Samasung.

AQUAFRIEND: SMART AQUACULTURE MONITORING SYSTEM

Ajay M[1], Apsana A Nadaf[2], Chaithra A[3], Chethan A K[4], Divya Raghuram Prabhu[5].

[1] *Assistant Professor Electronics and Communication Engineering, Rajarajeswari Collegeof engineering, Karnataka, India*
[2]*Electronics and Communication Engineering, RajaRajeswari College ofEngineering, Karnataka, India*
[3]*Electronics and Communication Engineering, RajaRajeswari College of Engineering,Karnataka, India*
[4] *Electronics and Communication Engineering, RajaRajeswari College of Engineering,Karnataka, India*
[5]*Electronics and Communication Engineering, RajaRajeswari College ofEngineering, Karnataka, India*

ABSTRACT

Iot, or the Internet of Things, is a fast expanding technology that is utilized to aid emerging and developing economies on the economic and social fronts. India is the third-largest producer of fish in the world. The annual production of aquatic products is 11 million tons on average. The use of IoT is growing across many industries, including transportation, education, mining, medicine, and industry. Aquatic organisms are raised under regulated, natural conditions in freshwater and marine settings. However, significant changes to the current labor-intensive and resource-inefficient practices are needed for fish farming to be economically and sustainably viable. The major goal of this project is to build an Internet of Things(IoT)-based monitoring system that uses an Embedded System and improving fresh water fish cultivation and problem-solving using ESP32 microcontroller and google fire base. With the aid of actuators and sensors, this system can be deployed as an embedded system to regulate and keep an eye on the crucial environment factors. Salt, nitrates, carbonates, pH, dissolved oxygen, and ammonia are a few examples of possible parameters. It is possible to construct an alert notification system that notifies farmers by Wi-Fi and allows them to check the status of actuators and sensors using an Android application.

Keyword: - *Regulated, Monitoring system, Actuators, Firebase.*

1. INTRODUCTION

Aquaculture is one of the most emerging field because the demand for sea food is increasing all over the world. Of the several sea foods the most wanted food is fish because of its health benefits. Fish farming has a huge impact on any country's economy as the demand for fish is increasing. However, many countries need to import fish, as the production does not meet though there is combination of annual supply of fish from aquaculture and capture. Aquaculture has become of crucial importance in relation to the development of fisheries sector in many of the countries in the world today because of the shortage in supply as it is expected to increase with limited prospects. Management of fisheries relies on the monitoring of water quality as fish diseases are very common and have a direct impact on the harvesting yield. Since water is a prerequisite for fish, quality of water must be monitored and controlled continuously. The significant parameters such as water level, humidity, bird's interaction and temperature in the tank should be continuously monitored in order to avoid undesirable condition for farming. Since fish are cold blooded animals, optimum temperature should be maintained and controlled in proper range. Enough oxygen is required for the fish for proper metabolism else they reside at the surface to catch up oxygen resulting in slower metabolism and eventually die due to lack of oxygen. The dissolved oxygen should be more than 5ppm always, pH value should be between 7 and 8.5 for their biological productivity ideally. In India, aquaculture has become one of the growing sectors. It contributes about 1.07% of the GDP. According to an estimation, the fish requirement by 2025 would be in order of 16 million tons.

1.1 Motivation of the Task

With the assembly of the marine fish farm cages, soon an important external source of organic matter will appear. This organic matter is generated by the remains of fish food, lost through the holes in the nets of the cages and the fish fecal pellets. The wastage accumulation in the seabed causes notorious changes in the slit chemistry of the nearby farm areas. This area could be several hectares long. Even in sandy seabed and on the surface of posidonia beds, a specific analysis of some parameters, such as prairie density, is necessary Another important factor to keep in mind is personnel security in charge of the feeding process.
Currently, the feeding process is carried out distributing the food by hand or impelled canyons by air. Also, crafts with fixed pipes in each cage impelled by air compressors can be used or by self-demand troughs. Additionally, the control of the exact moment when food begins to fall to the seabed is performed by scuba divers or by some submarine cameras placed at the bottom of the cage. They give warning of the moment when the food begins to leave the cage. The fish must be fed all year round, and the conditions of the water are not always good and suitable for immersions. Moreover, both scuba-divers and submarine cameras (and their maintenance) have associated high economic costs.

1.2 Problem Statement

The fishing business in the country is reliant on a few fish species and increasing this base will boot fish production. Overproduction focusing on fewer species results in an overstock of specific fish species, lowering prices and increasing volatility. Inadequate hatchery technology for new species introduction, which could include freshwater, brackish, and marine species. Diversification of species will assist to keep costs stable while also driving up demand for formulated aqua feeds. Classical freshwater fish farming methods – large ponds, no water exchange, no draining, and no bottom sediment removal are still in use, which can lead to disease promoting condition.

1.3 Proposed System

In the proposed model we are adding a sensor that checks the temperature, water level and humidity, turbidity and any animal interaction of the pond. In case if the temperature increases we will get the notification through an app and it will buzzer and also we can control. In our project the storage module notifies the user that efficient amount of food is present in the container or not then dispatch container take note of this that the food get dispatch as the container get empty. The Wi-Fi module contain the connectivity of the system with the internet and stay connected with the user command. The command gets accepted by the ESP32 microcontroller server so that Wi-Fi module is the heart of our system which communicate with user and the system. The GUI module is design for the user to stay connected with the system and give command to the system.it is basically app which is run on android devices. The notification and alert module provides the user with notification whenever there is a lack of temperature, humidity, turbidity, water level decreasing and notification comes before the animal interaction or any changes to save owners time and owner doesn't need to panic. Whenever there is an increase or decrease in temperature or humidity or water level or humidity level it will get access from the esp32 microcontroller and send the data to the google fire base it will store the data in things peek and send to the app by notification. Relay is used to control to feed fish automatically. All necessary values are stored in a things peek. In the existing model the automatic fish food feeder can feed the fish between one and four times per day, either automatically you can also feed during day or night. A ventilation system is provided to keep the food dry. Animal or bird protection system is implemented.

1.4 Objectives of the Task

Smart monitoring of aquaculture system for Improving fresh water, fish cultivation and control the fish feeder through internet. The system should be able to monitor the status of the fish and the amount of the food that has been dispersed and Enable to change water automatically using a simple GUI (MIT app). To monitor water temperature and send notification whenever temperature varies.

2 LITERATURE REVIEW

In this paper[1] SajalSaha *et al.*, an outline for monitoring of water quality for aquaculture is used using ESP32 and Google fire base and various sensors, android application and smartphone. The parameters for water quality used in this paper are PH, temperature and electrical conductivity. The sensor acquisition is performed by ESP32 which is used as server and data processing device. To detect the quality of the water pH sensors is conducted using esp32microcontroller with the help of smartphone app. Any user can checkthe water condition using an android application through Wi-Fi within Wi-Fi threshold range and internet from anywhere in the world. To check the water condition some analysis is performed with these four parameters and necessary action can also be taken.

In this paper[2] Monira Mukta *et al.*, an IoT based smart water quality monitoring system is implemented that helps in continuous water condition monitoring based on four physical parameters: temperature, turbidity, electric conductivity & pH properties. Arduino Uno is connected with four sensors separately to find the water parameters. The acquired data is transmitted to an application developed using NET platform and it is compared with the standard values of WHO (World Health Organization). The water parameters can be analyzed based on the measured parameters to determine if the water sample is for drinking.

3 METHODOLOGY

Management of fisheries relies on the monitoring of water quality as fish diseases are very common and have a direct impact on the harvesting yield. The significant parameters such as water level, humidity, bird's interactions & temperature in the tank should be continuously monitored in order to avoid undesirable condition for farming.

3.1 BLOCK DIAGRAM

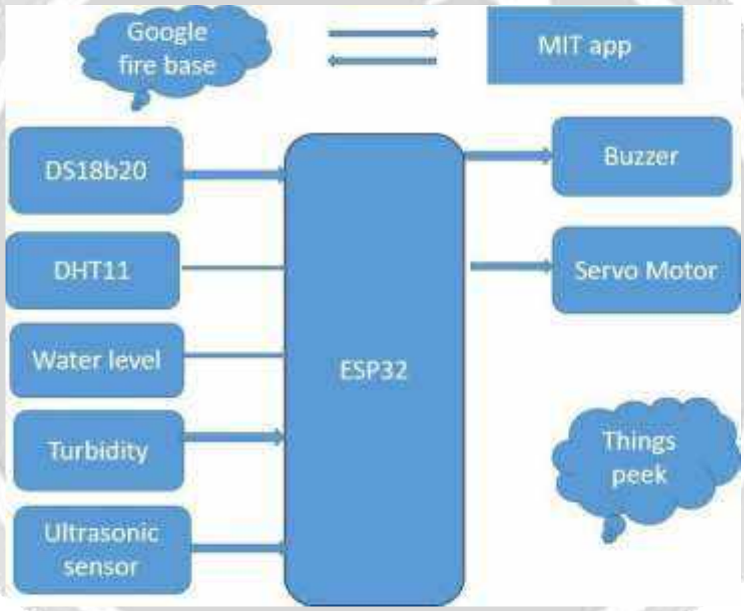


Fig.1. Block Diagram

In the proposed model we are adding a sensor that checks the temperature, water level and humidity, turbidity and any animal interaction of the pond. In case if the temperature increases we will get the notification through an app and it will buzzer and also we can control

In our paper, the storage module notifies the user that efficient amount of food is present in the container or not then dispatch container take note of this that the food get dispatch as the container get empty. The Wi-Fi module contain the connectivity of the system with the internet and stay connected with the user command. The command gets accepted by the ESP32 microcontroller server so that Wi-Fi module is the heart of our system which communicate with user and the system. The GUI module is design for the user to stay connected with the system and give command to the system.it is basically app which is run on android devices. The notification and alert module provides the user with notification whenever there is a lack of temperature, humidity, turbidity, water level decreasing and notification comes before the animal interaction or any changes to save owners time and owner doesn't need to panic. Whenever there is an increase or decrease in temperature or humidity or water level or humidity level it will get access from theesp32 microcontroller and send the data to the google fire base it will store the data in things peek and send to the app by notification. Relay is used to control to feed fish automatically. All necessary values are storedin a things peek. In the existing model the automatic fish food feeder can feed the fish between one and four times per day, either automatically you can also feed during day or night. A ventilation system is provided to keep the food dry. Animal or bird protection system is implemented.

3.2 Experimental Setup

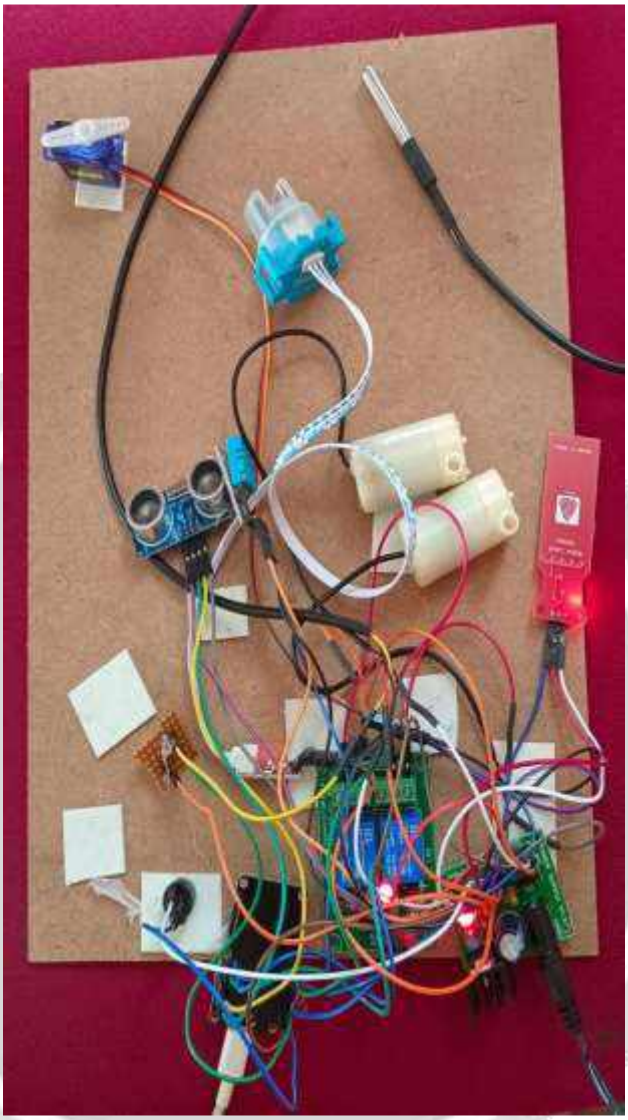


Fig.2. Circuit

4. RESULTS AND ANALYSIS

4.1 Experiment Results

The results obtained at the end of the project are based on the data collected by the sensors present in the system, the data will be sent to the ESP32 microcontroller there the data is accepted and it is sent to Google fire base which is connected to cloud storage, the cloud storage will store the data and sends it to the android app and the results are obtained on the screen which contains temperature, humidity, turbidity and water level.

Fig.3. Sensor Readings

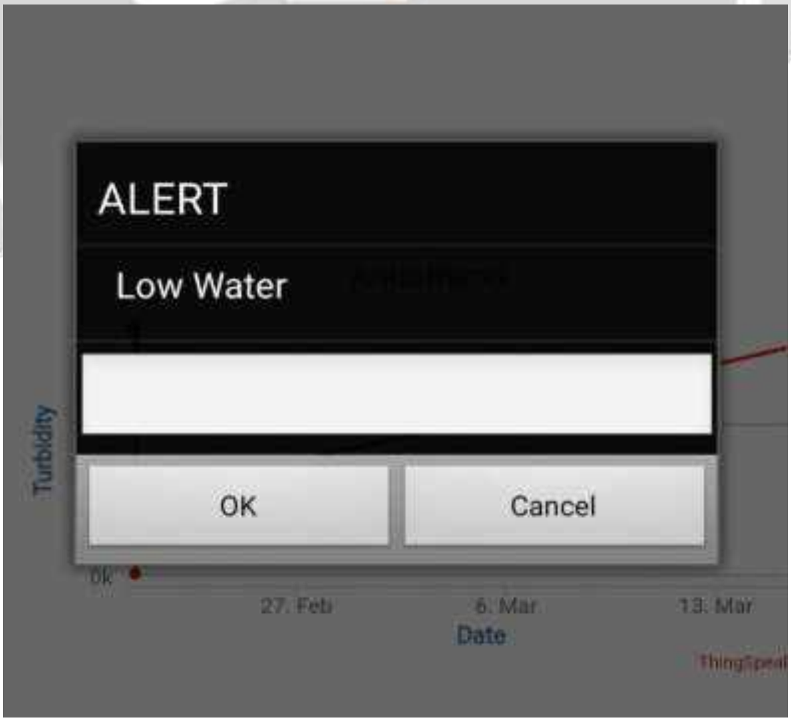


Fig.4. Low water alert

5. Conclusion

The quality of the water should be well maintained for a habitat, polluted water is unfit for the usage and it directly affects the habitat, there are various methods through which the design and implementation of the system can be performed, in order to get a better result the combination of the internet and wi-fi can be used which is of less cost when compared to the other systems. Neural network based system can be developed for aquaculture organisms. The ESP32 microcontroller design and implementation can be carried out, in which the monitoring can be done on a laboratory scale. Here the shrimp farm Is present in which the temperature sensor is present which detects the temperature of the farm and the pH sensor is used to detect the acidity, the humidity sensor is used to sense the humidity and the stepper motor is used to feed the organisms. When compared to the atmospheric temperature, the temperature level during the day time is decreased and vice versa. Fish feeding can be done through automatic and manual control mechanism. We can operate with our app.

6. References

[1] Sajal Saha, Rakibul Hasan Rajib, Sumaiya Kabir, "IoT Based Automated Fish Farm Aquaculture Monitoring System", 2018, 2018 2nd Int. Conf. on Innovations in Science, Engineering and Technology (ICISET) 27-28 October 2018, Chittagong, Bangladesh.

[2] Monira Mukta, Samia Islam, Surajit Das Barman, Ahmed Wasif Reza, "IoT based Smart Water Quality Monitoring System", 2019 IEEE 4th International Conference on Computer and Communication Systems, 2019.

[3] T Abinaya, J Ishwarya, M Maheshwari, "A Novel Methodology for Monitoring and Controlling of Water Quality in Aquaculture using Internet of Things (IoT)", 2019 International Conference on Computer Communication and Informatics, Coimbatore, INDIA,2019.

[4] Simitha K M, Subodh Raj M S, "IoT and WSN Based Water Quality Monitoring System", Proceedings of the Third International Conference on Electronics Communication and Aerospace Technology [ICECA 2019], 2019.

[5] Fahim Redwan, Shadman Rafid, Ahanaf Hossain Abrar, Bishwajit Banik Pathik, "An Exploratory Approach to Monitor the Quality of Supply-Water Through IoT Technology", 2019 International Conference on Automation, Computational and Technology Management (ICACTM) Amity University, 2019.

[6] Dr. I S Akila, Karthikeyan P, HariHaran M.V, HariKrishnan J, "IoT Based Domestic Fish Feeder", Proceedings of the 2nd International conference on Electronics, Communication and Aerospace Technology (ICECA 2018), 2018.

[7] Charlotte Dupont, Amos Wussah, Sadouanouan Malo, Ousmane Thiare, Farokh Niass4, Congduc Pham, Samuel Dupont, "Low-Cost IoT Solutions for Fish Farmers in Africa", IIMC International Information Management Corporation, 2018.

[8] YuHwan Kim, Namgu Lee, ByeongJun Kim, KyooJae Shin, "Realization of IoT based Fish Farm Control Using Mobile App", 2018 International Symposium on Computer, Consumer and Control (IS3C), 2018.

[9] Nikhil Kumar Koditala, Dr.Purnendu Shekar Pandey, "Water Quality Monitoring System using IoT and Machine Learning", IEEE, 2018.

BONE CANCER DETECTION USINGDNN

Santosh Chavan[1] Ullas A[2], Ritesh L[3], Punith B[4], Tejas N[5]

[1]*Assistant professor, ECE, RajaRajeswari college of Engineering, Karnataka, India*[2]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India* [3]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India* [4]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India* [5]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*

ABSTRACT

Cancer is a group of diseases involving abnormal cell growth with the potential to invade to other parts of body. A bone tumor, (also spelled bone tumour), is a neoplastic growth of tissue in bone. Abnormal growths found in the bone can be either benign (non cancerous) or malignant (cancerous). Bone tumors may be classified as "primary tumors", which originate in bone or from bone derived cells and tissues, and "secondary tumors" which originate in other sites and spread (metastasize) to the skeleton. In this paper a DNN model called as VGG16 which has layers such as Convolutional
, ReLU , Fully connected , Max Pooling layer and softmax has been used by using this model it is possible to predict the viableand non viable cancer present in the bone tissue. Here about 570 image datasets to train and test the model has been usedwhich gave an accuracy of about 82%. 75% of the data for training and rest of the 25% of the data for testing has been used.The output is classified based on binary values 0 and 1 . where 0 describes non viable cancer and 1 describes viable cancer.

Keyword--- *DNN,VGG16, ReLU*

1. INTRODUCTION

Cancer is a serious health problem among various kinds of diseases. More than 3 among 10,000people will be affected by some form of cancer during their lifetime. Among various types of cancer, Bone cancer is a leading cause of cancer-related death in many countries. Bone cancer has to be detected at earlier stages but detecting it in earlier stages was difficult, so various medical detection methods were introduced which were not so effective so we are taking input IHC processed images. The main aim is to find out the affected part i.e. uncontrolled growth and stage of disease in accurate manner by comparing two medical imaging techniques such as X-Ray, CT and PET scan. The scanned images may not have high resolution due to the number of slices per pixel and noise, so as an initial step need to preprocess the images using median filter which is used to remove the noise in an image Cancer is a serious health problem among various kinds of diseases. More than 3 among 10,000 people will be affected by someform of cancer during their lifetime. Among various types of cancer, Bone cancer is a leading cause of cancer-related death in many countries The proposed system helps to find and differentiate between viable and non viable cells present in bone tissue usingDNN model VGG16 The approach is similar to how the human brain uses different interpretation levels or layers of most representative and useful features resulting in a hierarchical learned representation. The model gives the accuracy of 82%

1.1 Classification of TUMOR

There are two types of tumor

1. Viable tumor : These are tumors which can mutate into more numbers and even if removed from patients

body the left out cells can grow again.

2. Non-viable tumor : These are tumors which cannot mutate further and once removed from patients body cannot growfurther.

1.2 CAUSES

The exact cause of bone tumour is unknown. Genetics and exposure to radiation will play a role.Risk factors include:

- Division of cells in an uncontrolled fashion and forming a tumour
- Inherited -family history of bone tumors
- Paget's disease of bone
- Radiation therapy for other cancer

2. LITERATURE SUREVY

1. Zhen Zhao, Yong Pi, Lisha Jiang , Yongzhao Xiang , JiananWei, "Deep neural network based artificialintelligence assisted diagnosis of bone scintigraphy for cancer bone metastasis", January 2021

In this research paper, Bone scintigraphy (BS) is one of the most frequently utilized diagnostic techniques in detecting cancer bone metastasis, and it occupies an enormous workload for nuclear medicine physicians. So, we aimed to architecture an automatic image interpreting system to assist physicians for diagnosis. We developed an artificial intelligence (AI) model based on a deep neural network with 12,222 cases of 99mTc-MDP bone scintigraphy and evaluated its diagnostic performance of bone metastasis. This AI model demonstrated considerable diagnostic performance, the areas under the curve (AUC) of receiver operating characteristic (ROC) was 0.988 for breast cancer, 0.955 for prostate cancer, 0.957 for lung cancer, and 0.971 for other cancers.

2. "A Deep Convolutional Extreme Machine Learning Classification Method To Detect Bone Cancer FromHistopathological Images, conference paper January 2022. D. Anand , G. Arulselvi , G.N. Balaji* , G Rajesh Chandra.

The histopathology process remains traditional in nature. Additionally, the physical process of pathologists could deal with solely restricted subjects because of extended phases. This physical process might misguide the physicians when there remain mass subjects to diagnose because of limited time and the nature of complex illnesses such as bone cancer. Addressing this study in digital histopathology remains significant by evolving computer-aided instruments for detection. Bone framework intricacy remains the chief cause to be a gray research field. Comprehension and investigation of the disparate extent of bone anatomy would serve the requirement for building study in automation. To classify the density tumor Computer-aided diagnosis systems have been developed, having as a major challenge to define the features that better represent the images to classify. To overcome the problem, this paper aims to develop a Convolutional Extreme Learning Machine (DC-ELM) algorithm for the assessment of cancer type based on analyzing histopathology images

3. Abnormality Detection from X-Ray Bone Images using DenseNet Convolutional Neural Network by ShuklaAbhilash1*, Patel Atul

According to the survey of the World Health Organization and the International Agency for Research on Cancer; the death rate because of cancer is increasing day by day. It is preferable to detect cancer at its earlier stage or detect any kind of lesion which can cause cancer in the future. This paper shows how Artificial Intelligence especially the Convolutional Neural Network of Deep Learning can be used to detect abnormality from X-Ray bone images.

4. Bone Cancer Detection & Classification Using Fuzzy Clustering & Neuro Fuzzy Classifier by Eftekhar Hossain and Mohammad Anisur Rahaman. Vol. 3, No 1, January 2020.

In this paper, The classification result has been evaluated based on three performance matrices accuracy, sensitivity and specificity. The proposed classification technique provides 93.75% accuracy in bone cancer classification and its main drawback is that this application is not used for classification of benign and malignant tumor.

3. PROPOSED WORK

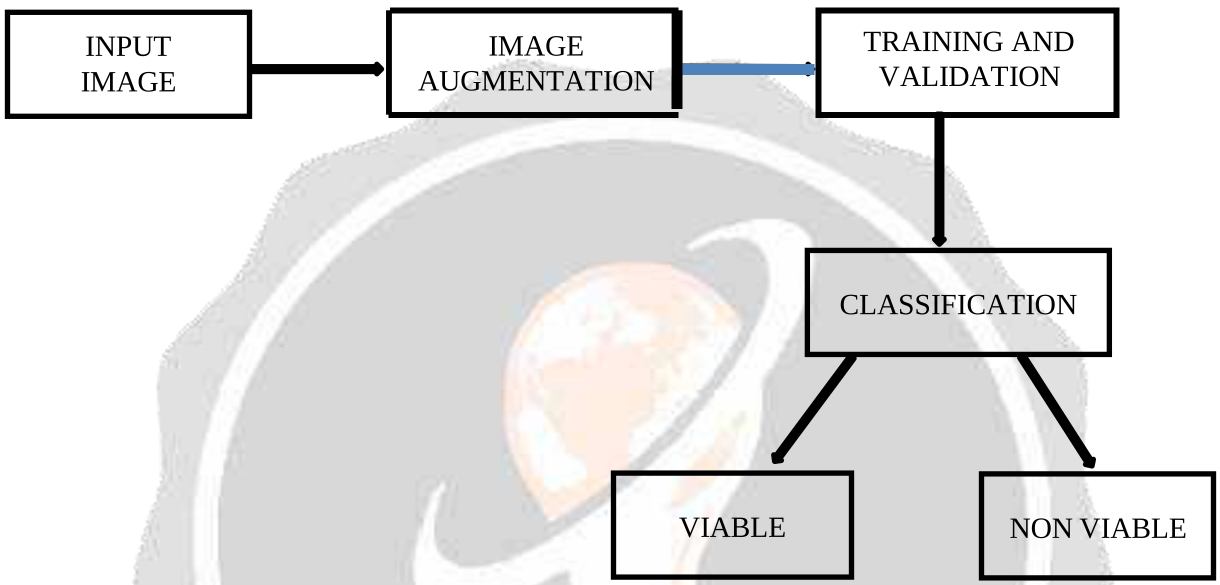


Fig 1: Detection of BONECANCER

This is an overview of an entire system, identifying the main components that would be developed for the product and their interfaces. Dataset is one of the most crucial and important components for any deep learning algorithm. This dataset is divi de into three categories called training dataset, validation and test dataset. The training dataset is the backbone for any deep learning project. Data preprocessing is the important step by which data can be frame into proper input for the proposed mode l. In data preprocessing, we did the following three things. Data augmentation is the method in deep learning to increase the training dataset so that it results proposed model to provide an accurate result. Normally, Data Augmentation can be done by rotating image and flipping the images horizontally and/or vertically. For the research, we had to increase the dataset for training and validation. To achieve this, we had rotated the images to 30 degrees and flipped them horizontally. Because of this, we had 2 times more dataset than we started initially Here we are considering three features that are color histogram, Texture which resembles color, shape, and texture. Feature extraction for machine learning and deep learning. Feature extraction refers to the process of transforming raw data into numerical features that can be processed while preserving the information in the original data set. It yields better results than applying machine learning directly to the raw data. A neural network (NN) is a network structure comprising multiple connected units. It has three layers of units: input layers, hidden layers, and output layers (Figure 1). The neural network configuration is determined by the manner in which the units are connected. When the number of hidden layers is more than or equal to two, the network is called a deep neural network (DNN). The feed-forward neural network is the most widely used neural network model and is configured by the connection of multiple units, with reference to West (2000), the propagation of the network in each layer is accomplished in following steps.

3.1 Designed Algorithm

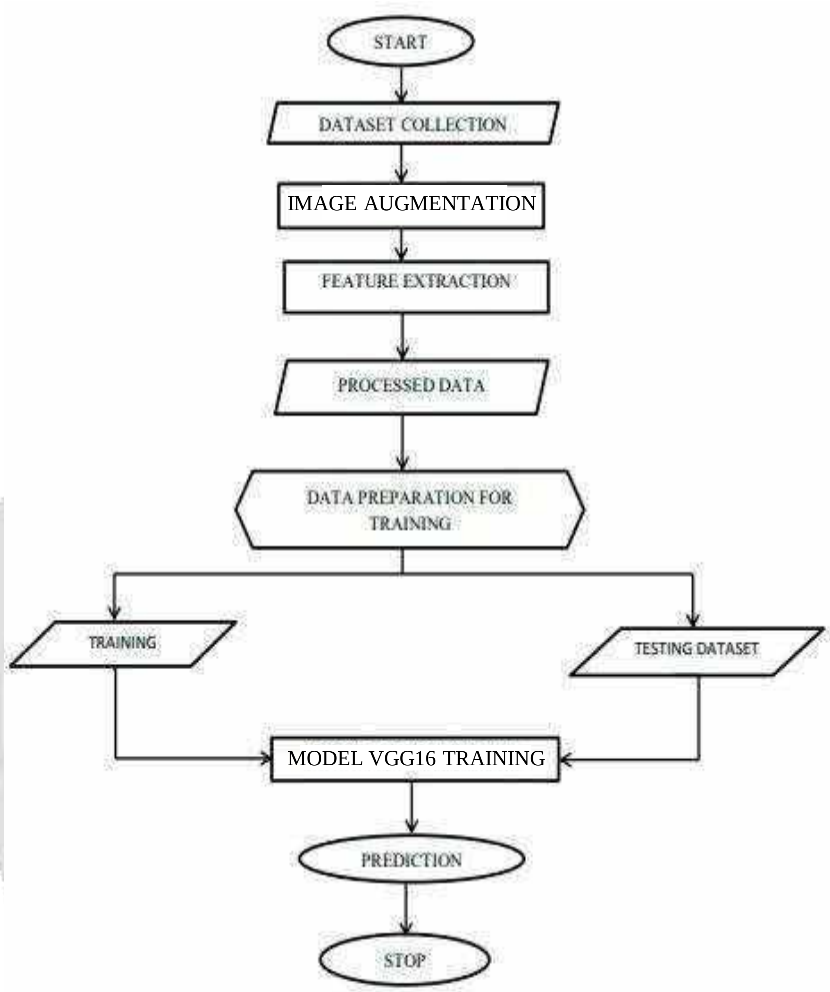


Fig 2: Block Diagram

The data training in our CNN model has to satisfy following constraints: 1) No missing values in dataset. 2) The dataset must distinctly be divided into training and testing sets, either the training or the testing set shouldn't contain any irrelevant data out of our model domain in case of an image dataset all the images must be of the same size, one uneven distribution of image size in our dataset can decrease the efficiency of our neural network. 3) The images should be converted into black and white format before feeding it into the convolution layer because reading images in RGB would involve a 3-D numPy matrix which will reduce the execution time of our model by a considerable amount. Any kind of corrupted or blurred images should also be trimmed from the database before feeding it into the neural network.

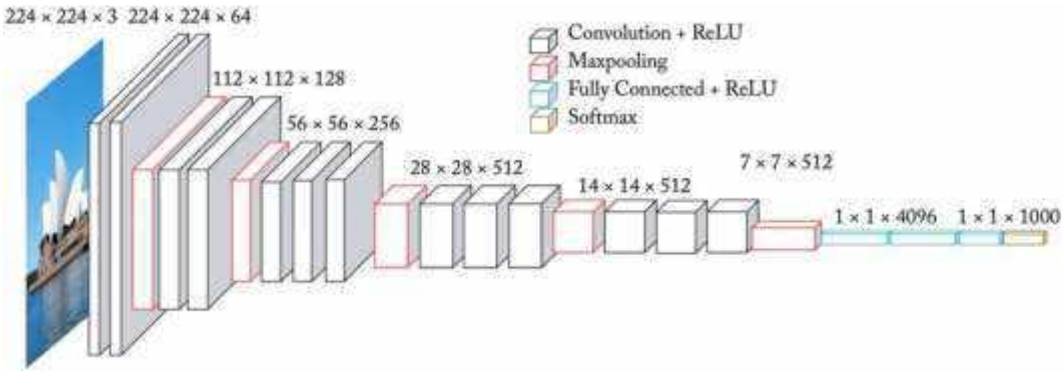


Fig 3: VG116 Architecture

- The VGG model stands for the Visual Geometry Group developed by Oxford university
- The 16 in VGG16 refers to 16 layers that have weights
- VGG16takes input tensor size as 224,244 with 3 RGB channel
- As mentioned above, the VGGNet-16 supports 16 layers and can classify images into 1000 objectcategories ,including keyboard ,animals, pencil, mouse, etc

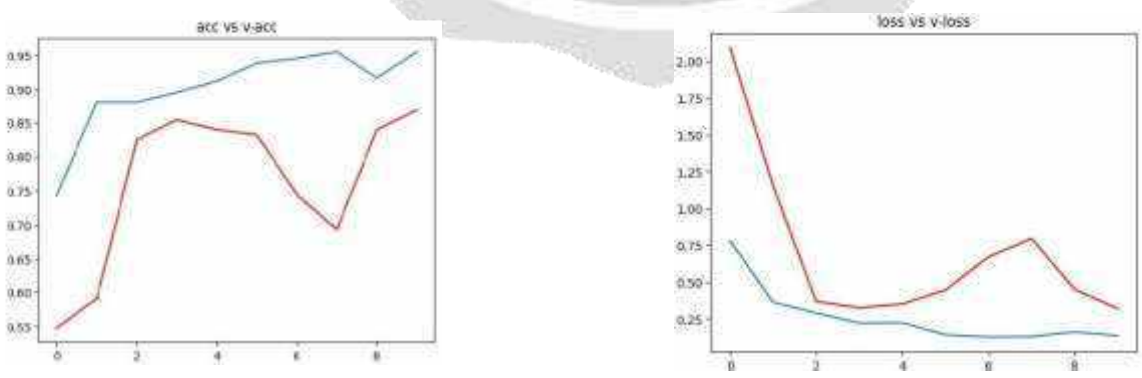


Fig 4 : Epoch

Epochs are defined as the total number of iterations for training the machine learning model with all the training data in one cycle.

• We here gave the epoch value as 10

• The number of images in 1 batch is 32 therefore there are 14 batches for 420 training images

4 RESULTS

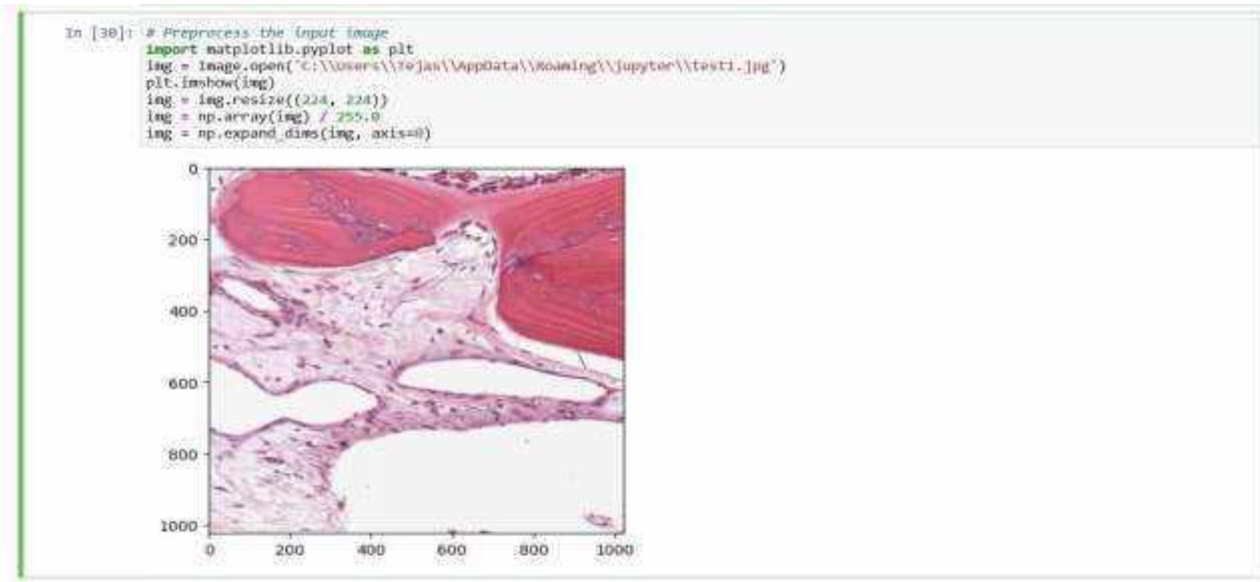


Fig 5 : Testing with random data

Resize is used to make the size of input image with dimension same as training data i.e 244x244 np.array(img)/255.0 is used to normalize all the values of image array Here, axis=0 is specified, which means that the dimension of the array will be increased along the rows.

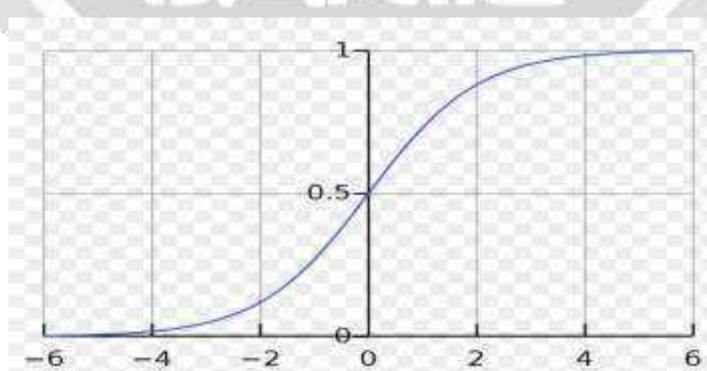


Fig 6 : Softmax

Softmax generates the output value by which we can determine for which class the image belongs to • In our case if the value isbelow 0.5 the image is non viable else its viable

4.1 Discussion

Here in output we print the output based on the prediction value

- If the value if greater than or equal to 0.5 then the image is viable
- If the value is less that 0.5 then the image is viable

5 CONCLUSION

The proposed methodology, is to detect Bone cancer, and accordingly help the doctor to advise the patient to treat it and follow proper medicines given. It is always preferable to detect and treat Bone cancer at early stage. With further assessment and validation, this model could facilitate diagnosing programs and help physicians improve the diagnostic efficiency and accuracy of bone metastasis, particularly in remote or low-resource areas, leading to a beneficial clinical impact . The proposed system helps to find and differentiate between viable and non viable cells present in bone tissue using DNN model VGG16.The approach is similar to how the human brain uses different interpretation levels or layers of most representative and useful features, resulting in a hierarchical learned representation. The model gives the accuracy of 82%

6 REFERENCE

[1] Amutha, Dr.R.S.D.Wahidabanu, "Bone Tumor Detection and Diagnosis in CT scan Images", International conference on Communication and Signal Processing, April 3- 5, IEEE 2013, India, DOI: 10.1109/iccsp.2013.6577228, pp. 1108- 1112.Barbarise W, Katusic S, Colligan R, et al. How common is attentiondeficit/hyperactivity disorder? Towards resolution of the controversy: results from a population-based study. Acta Paediatr Suppl. 2004;93(445): 55–59

[2] Hongmei Mi, Petitjean C, Dubray B, Vera, P, Su Ruan, "Automatic Bone tumor segmentation on PET images based on random walks and tumor growth model", Biomedical Imaging (ISBI), 2014 IEEE 11th International Symposium, April 29 May 2, DOI: 10.1109/ISBI.2014.6868136, pp. 1385-1388. Diagnosis of ADHD using SVM algorithm, conference paper January 2010. J Anuradha Dr . K.V. Arulalan.

[3] Yuhua Gu, VirendraKumar, LawrenceO.Hall, DmitryB.Goldgof, Ching-YenLi, Rene Korn, Claus Bendtsen, EmmanuelRiosVelazquez, AndreDekker, HugoAerts, PhilippeLambin, XiuliLi, Jie Tian, RobertA.Gatenby, RobertJ.Gillies, "Automated delineation of Bone tumors from CT images using a single click ensemble segmentation approach", Volume 46, Issue 3, March 2013, ©Elsevier 2012, pp. 692–702.

[4] Dandil E, Cakiroglu M, Eksi Z, Ozkan M, Kurt O.K, Canan A, "Artificial Neural Network-Based Classification System for Bone Nodules on Computed Tomography Scans", Soft Computing and Pattern Recognition (SoCPaR), 2014 6th International Conference , Aug 11-14, IEEE2014,DOI:10.1109/SOCPAR.2014.7008037, pp. 382-386.

[5] A.R.Talebpour, H.R.Hemmati, M.Zarif Hosseinian, "Automatic Bone Nodules Detection In Computed Tomography Images Using Nodule Filtering And Neural Networks", The 22nd Iranian Conference on Electrical Engineering (ICEE 2014), May 20-22, IEEE 2014, Shahid Beheshti University, DOI: 10.1109/IranianCEE.2014.6999847, pp. 1883-1887. BONE CANCER DETECTION USING DNN Department of ECE, RRCE 2022-2023 Page 22

[6] Anam Tariq, M.Usman Akram, M. Younus Javed,"Bone Nodule Detection in CT Images using Neuro Fuzzy Classifier", Computational Intelligence in Medical Imaging (CIMI), April 16-19, 2013 IEEE Fourth International Workshop, DOI:10.1109/CIMI.2013.6583857, ISSN:2326-991X, pp. 49-53.

[7] Bini SA. Artificial Intelligence, Machine Learning, Deep Learning, and Cognitive Computing: What Do These TermsMean and How Will They Impact Health Care? J Arthropl 2018;33 (8):2358- 2361

IMPLEMENTATION OF CHACHA AND DES CIPHERS FOR CRYPTOGRAPHIC AUTHENTICATION

Prof.Chaithanya S[1] Meghana N[2], Nuthana GN[3], Pavithra P[4], Pooja R[5]

[1]*Assistant professor, ECE, RajaRajeswari college of Engineering, Karnataka,India*

[2]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*

[3]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*

[4]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*

[5]*student, ECE, RajaRajeswari college of Engineering, Karnataka, India*

ABSTRACT

Cryptography means securing the data or information using codes. Using Cryptography we can restrict the information to the intended user only. In Cryptography ciphers are used, these are the algorithms which encrypt and decrypt the data. In order to secure information we are introducing VLSI Design of Cha-Cha Stream Cipher for High Performance Data Security. The Cha-cha cipher is used for 512 bit Key Stream generation and to encrypt and decrypt 512 bit data. To increase Security of Cha-Cha cipher we add DES cipher, which is a block cipher for 64 bit Tag Generation in both Encryption and Decryption Side. The Tag generation helps in authentication of the data. The Proposed Method uses a combination of a stream cipher and a block cipher. The Proposed method is simulated and synthesized using XilinxISE tool. The coding is done using a combination of Verilog HDL and VHDL languages. The area and throughput exploration of VLSI designs of the underlying algorithms has been evaluated. The proposed design provides increased security and integrity of the information.

Keyword--- *Cryptography, Cipher, Cha-Cha, DES, Verilog HDL.*

1. INTRODUCTION

In cryptology we study about cryptographic algorithms, these cryptographic algorithms are also named as ciphers which encrypt and decrypt data. We have used two symmetric key ciphers. In Symmetric key ciphers also called as Single Key Encryption we use only one key for encryption and the same key will be used for decryption. In stream cipher data is encrypted or decrypted in a stream of 8 bits at a time. In block cipher data is encrypted or decrypted in the form of uniform blocks of 128 bits at a time. Initially, a key (k) will be supplied as input to the key stream generator and then it produces a key stream. One of the benefits of following cipher is to make cryptanalysis more difficult, so the number of bits chosen in the Key stream must be long in order to make cryptanalysis more difficult. By making the key longer it is also safe against brute force attacks. The longer the key the stronger security is achieved, preventing any attack. Key stream can be designed more efficiently by including more number of 1s and 0s, for making cryptanalysis more difficult.

1.1 BASIC TERMS IN CRYPTOGRAPHY

Plain text:
The data or message to be communicated from the sender to the receiver.
Cipher text:
The data or message will be XORed with the Key Stream to produce a text which is cannot be understood by hackers is called as cipher text.

Encryption
Plain Text and Key stream together produces Cipher Text, this process is called as encryption (Same key stream will be used for decryption.). The Plaintext will undergo XOR operation with key stream to produce the Cipher Text.
Decryption:
Cipher Text and Key stream gives the original Plain Text (Same key stream will be used for encryption). The Cipher text will undergo XOR operation with key stream to produce the original Plain Text.

2. BACKGROUND AND RELATED WORKS

Especially in the area of secure communication and data encryption, ChaCha has been enthusiastically embraced in a variety of cryptographic applications. It is frequently used as a stream cypher in transport layer security (TLS) protocols, such TLS 1.3, to encrypt network traffic. Popular software frameworks and libraries like OpenSSL and Google's Android operating system also use ChaCha. Researchers and cryptographers have paid close attention to ChaCha ever since its debut. The security and effectiveness of ChaCha have been the subject of several analyses and reviews. I n general, researchers have discovered that ChaCha is strong against a variety of assaults, such as differential and linear cryptanalysis. ChaCha has been optimised and put into use on a variety of systems, including hardware acceleration and software improvements for increased effectiveness. It was a widely used encryption algorithm by businesses and government organisations. Numerous studies have been done on DES, especially in relation to cryptanalysis and its flaws.By decrypting a DES-encrypted communication in 1999, a group effort known as the "DES Cracker" effectively showed how susceptible DES is to brute-force attacks.

3. PROPOSED WORK

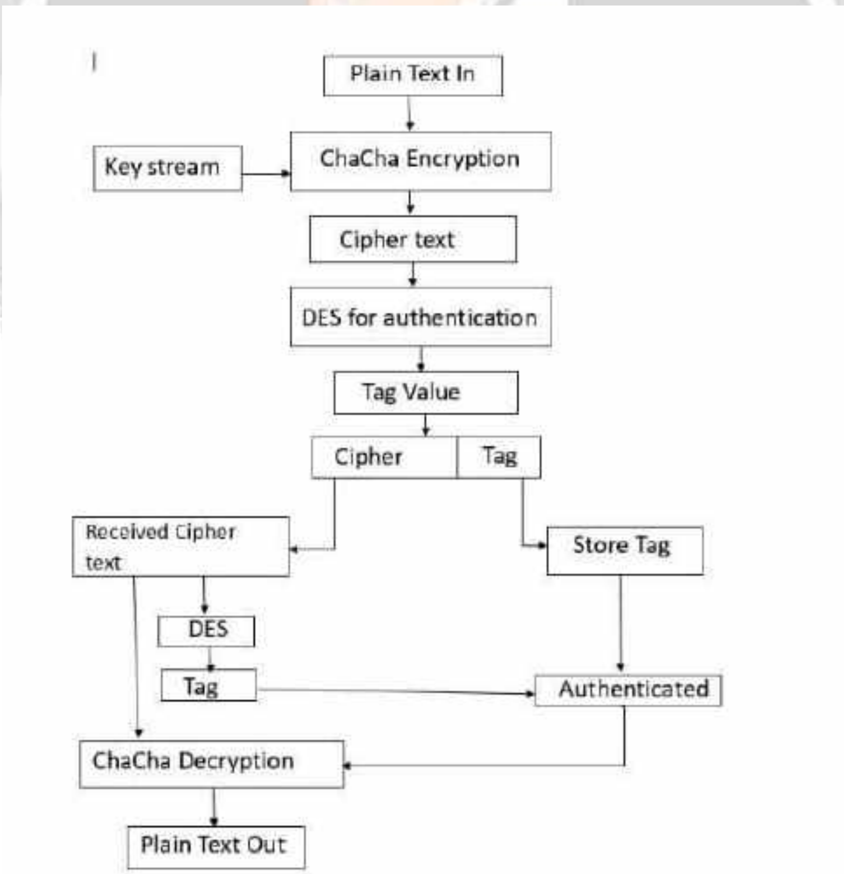


Fig -1: BLOCK DIAGRAM

In the Proposed system, ChaCha stream cipher is used to generate the key stream, After key stream is generated the plain text data is XOR'ed with key stream and cipher text is obtained. The obtained cipher text is passed to the DES Algorithm block, In DES block XOR operation takes place in to generate the authentication tag. The obtained cipher text and tag will be passed to the receiver side, the generated tag will be authenticated if the tags are matched then the data is said to be authenticated and the actual plain text output is obtained. Chacha20 is a stream of cyphers. A 256-bit key, a 32-bit counter, a 96-bit nonce, and plain text are among the inputs. An initial 4*4 matrix of 32-bit words makes up its state. A constant string in the top row increases the 32-byte k, which is divided into 4*32-bit words. The second and third have 256-bit keys in them. The first word in the final row is a 96-bit nonce, while the other words are 32-bit counters. Each time, a 512-bit block of plain text is encrypted, a 512-bit keystream is generated. After multiple encryptions, if the remaining plain text is fewer than 512 bits, please pad the last input data to the left with 0s (MSB) and delete the same number of bits of useless information from the last output data. Since DES is a block cypher, it encrypts data in blocks of 64 bits each. As a result, DES receives 64 bits of plain text as input and outputs 64 bits of cypher text. With a few minor variations, the same algorithm and key are utilised for encryption and decryption. The key is 56 bits long. In order to encrypt a textual input using a cryptographic key, DES encryption divides it into smaller parts (64-bit blocks). In essence, it takes your legible message and changes it into unintelligible gibberish that can only be decrypted by the owner of the decryption key, block by block.

4.RESULTS

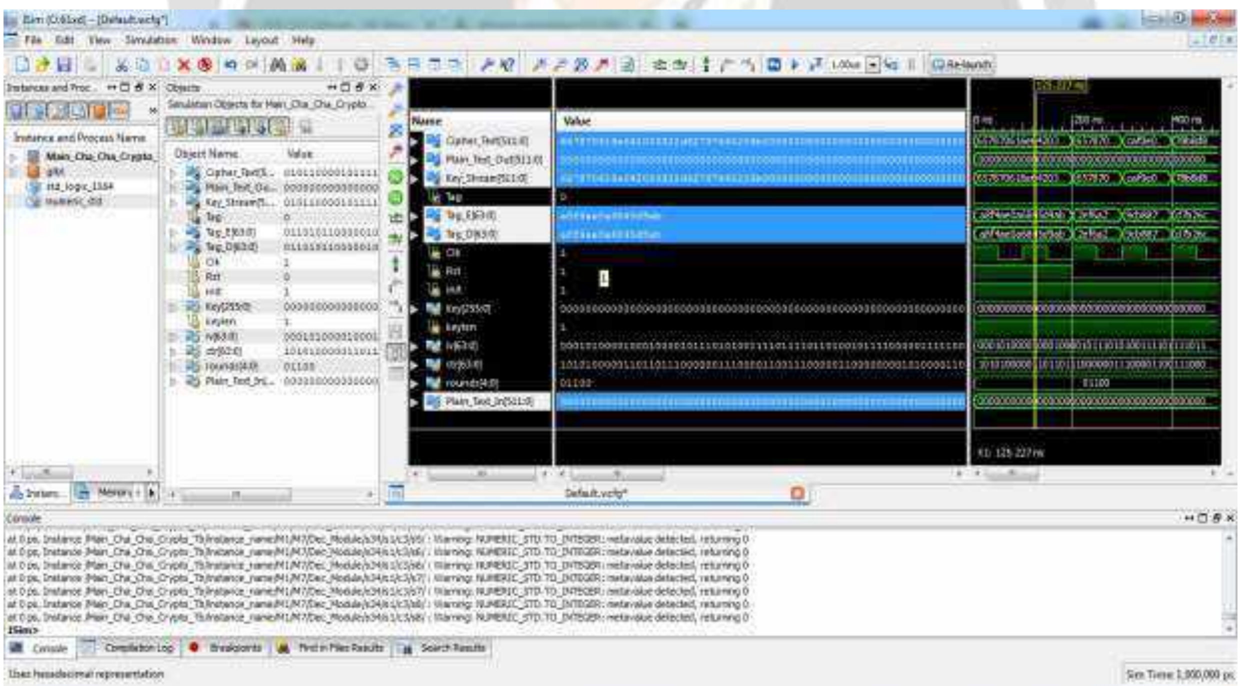


Fig -2: Output with Tag Matching

5.CONCLUSION

Secure communication in the presence of outside parties is practised through the use of cryptography. Its goal is to make it challenging for someone listening in on a conversation to grasp it. A strong instrument for preventing unauthorised access to information and guaranteeing the privacy of communications is cryptography. Cryptography is also used to validate user identity and guarantee data integrity. In a suggested study, we are enhancing security while reducing the ease of decryption by unrelated users.

6.REFERENCES

[1] K. Gaj, G. Southern, and R. Bachimanchi, "Comparison of hardware performance of selected phase ii eSTREAM candidates," eSTREAM, ECRYPT Stream Cipher Project, Report 2007/026 (SASC 2007), 2007, http://www.ecrypt.eu.org/stream.

[2] F. K. Gürkaynak, P. Luethi, N. Bernold, R. Blattmann, V. Goode, M. Marghitola, H. Kaeslin, N. Felber, and W. Fichtner, "Hardware evaluation of eSTREAM candidates: Achterbahn, grain, mickey, mosquito, sfinks, trivium, vest, zk-crypt," eSTREAM, ECRYPT Stream Cipher Project, Report 2006/015, 2006, http://www.ecrypt.eu.org/stream.

[3] M. Rogawski, "Hardware evaluation of eSTREAM candidates: Grain, lex, mickey128, salsa20 and trivium," eSTREAM, ECRYPT Stream Cipher Project, Report 2007/025 (SASC 2007), 2007, http://www.ecrypt.eu.org/stream.

[4] D. J. Bernstein, "The salsa20 family of stream ciphers," eSTREAM, ECRYPT Stream Cipher Project, Report 2005/025, 2005, http://www.ecrypt.eu.org/stream.

[5] "Chacha, a variant of salsa20," Jan. 2008, http://cr.yp.to/chacha.html.

[6] "What output size resists collisions in a XOR of indipendent expansions?" in Proceeding of the Workshop on Hash Functions ECRYPT, 2007, http://cr.yp.to/rumba20.html.

[7] "Better price-performance ratios for generalized birthday attacks," in Proceeding of the Workshop on Special-purpose Hardware for Attacking Cryptographic Systems SHARCS, 2007, http://cr.yp.to/rumba20.html.

[8] NIST, "Call for a new cryptographic hash algorithm (SHA-3) family," Federal Register, Vol.72, No.212, 2007, http://www.nist.gov/hashcompetition.

[9] M. Dworkin, "Recommendation for block cipher mode of operation," Dec. 2001, NIST Special Publication 800-38A.

[10] J. Yan and H. M. Heys, "Hardware implementation of the salsa20 and phelix stream ciphers," in Proceedings of the Canadian Conf. On Electrical and Computer Engineering, Vancouver, BC, Apr. 2007, pp. 1125–1128.

[11] T. Good and M. Benaissa, "Hardware results for selected stream cipher candidates," eSTREAM, ECRYPT Stream Cipher Project, Report 2007/023 (SASC 2007), 2007, http://www.ecrypt.eu.org/stream.

[12] C. D. Canniere and B. Preneel, "Trivium - a stream cipher construction inspired by block cipher design principles," eSTREAM, ECRYPT Stream Cipher Project, Report 2005/030, 2005, http://www.ecrypt.eu.org/stream.

[13] Early Detection and Recognition of Children with ADHD Symptoms by Mladenka Vukojevi, Alma Dizdarevi andDelfina Novakovi.

[14] Is the ADHD Brain Wired Differently? A Review on Structural and Functional Connectivity in Attention DeficitHyperactivity Disorder by Kerstin Konrad and Simon B. Eickhoff.

[15] ChaCha20–Poly1305 Authenticated Encryption with Additional Data for Transport Layer Security 1.3. M. AAMIR , SOMYA SHARMA , AND ANUJ GROVER. 2021 IEEE Journals circuit and systems.

REAL TIME OBJECT MOTION DETECTION USING DEEP LEARNING METHODS

Haritha K Sivaraman[1], Purimetla Jagadeesh[2], Sanjay GS[3], Santhosh Gowda KR[4], Vishwas B[5]

[1]Assistant Professor, Dept. of ECE, RajaRajeswari College of Engineering, Karnataka, India
[2]Student, Dept. of ECE, RajaRajeswari College of Engineering, Karnataka, India
[3]Student, Dept. of ECE, RajaRajeswari College of Engineering, Karnataka, India
[4]Student, Dept. of ECE, RajaRajeswari College of Engineering, Karnataka, India
[5]Student, Dept. of ECE, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

This project aims to develop an object motion detection system using Python. The system utilizes computer vision techniques to detect and track moving objects in a video stream. The project includes preprocessing of the video stream to enhance object detection, background subtraction to identify moving objects, and object tracking using feature extraction and matching algorithms. The system is implemented using OpenCV, a popular computer vision library in Python. The proposed system is tested on various video sequences to demonstrate its effectiveness in detecting and tracking moving objects. The results show that the system is robust and accurate in detecting and tracking objects in real-time. The project can be useful in various applications such as surveillance, traffic monitoring, and robotics.

1. Introduction

Object motion detection is an important aspect of computer vision and has a wide range of applications such as video surveillance, autonomous driving, and robotics. The ability to detect and track moving objects in real-time is critical for these applications. Python is a popular programming language for computer vision and has several libraries that provide powerful tools for object detection and tracking. In this project, we aim to develop an object motion detection system using Python and OpenCV, a popular computer vision library. The system will utilize techniques such as background subtraction and feature extraction to detect and track moving objects in a video stream.

The proposed system will be tested on various video sequences to demonstrate its effectiveness in real-time object detection and tracking. The system can be useful in various applications such as surveillance, traffic monitoring, and robotics. The project will provide an opportunity to learn and apply various computer vision techniques and develop a real-world application using Python.

Computer vision is an exciting field of study that focuses on enabling machines to interpret and understand visual information from the world around them. In recent years, the rapid development of deep learning algorithms has revolutionized the field of computer vision, providing powerful tools for image and video processing, object detection, tracking, recognition, and more.

Deep learning is a subset of machine learning that uses artificial neural networks to model and solve complex problems, such as image and speech recognition, natural language processing, and decision making by making use of dynamic analytical skills of a system. Deep learning models are designed to learn and improve over time by processing large amounts of data, and they have demonstrated remarkable performance in a variety of computer vision tasks.

In computer vision, deep learning models are often used in combination with traditional computer vision techniques to achieve state-of-the-art performance on complex tasks, such as object detection, segmentation, and tracking. These models typically require large amounts of data and computational power to train, but they can provide highly accurate and robust results when properly configured and optimized.

2. Related work

The insights for the creation and usage of necessary algorithms needed to develop the source code of our project with the utilization of necessary libraries like Numpy, OpenCv-python, Pandas[1]. The proper demonstration of fundamental block diagram along with the necessary requirements of hardware components. The future scope and conclusion of the project and the application of this project to various domains of engineering is explained in this paper. The Temporal data association technique was implemented successfully but only for tracking single objects. In future this could be extended for tracking multiple objects[2]. The Temporal data association technique was implemented successfully but only for tracking single objects. In future this could be extended for tracking multiple objects. The different types of object detection techniques include feature-based, template-based and motion based. In feature based object detection, standardization of image features and registration (alignment) of reference points are important. The images may need to be transformed to another space for handling changes in illumination, size and orientation. One or more features are extracted and the objects of interest are modelled in terms of these features[3]. Detection and tracking algorithms are described by extracting the features of image and video for security applications . Features are extracted using CNN and deep learning. Classifiers are used for image classification and counting. YOLO based algorithm with GMM model by using the concepts of deep learning will give good accuracy for feature extraction and classification Detection and tracking algorithms are described by extracting the features of image and video for security applications . Features are extracted using CNN and deep learning. Classifiers are used for image classification and counting. YOLO based algorithm with GMM model by using the concepts of deep learning will give good accuracy for feature extraction and classification Detection and tracking algorithms are described by extracting the features of image and video for security applications . Features are extracted using CNN and deep learning. Classifiers are used for image classification and counting. YOLO based algorithm with GMM model by using the concepts of deep learning will give good accuracy for feature extraction and classification[4]. Normalization of the image's photometric attributes, such as brightness, colour and background subtraction. Cropping an image's limits, as in cantering an object in a photograph. Removing digital noise from an image, such as low-light digital artefacts[1]. The simulation results suggest that this technique is effective, precise, and robust for detecting generic object classes with good performance. The focus should also be on improving categorization accuracy in real-time object identification[1].

3. Proposed methodology

The proposed methodology for the implementation of the project is in a sensitive way in which the aim of project is met along with overcome of multiple difficulties during program development, result analysis and multiple other factors which results in the development of the project. Some of the contents are as follows:

3.1 Input of image data

In object motion detection, the input data is typically in the form of digital images or videos. Here is a general overview of the process for inputting image data into a motion detection system:

- Capture or obtain the digital image or video data: This can be done by using a camera or by downloading the data from a source such as the internet. But in our project we have captured the image sequence with the help of inbuilt laptop IOT based web camera.
- Convert the data to a usable format: The image or video data may need to be converted to a specific format that is readable by the motion detection software. For example, in Python, the OpenCV library can read various image formats such as PNG or JPEG. But here the data is analysed in real time using video sequence.
- Preprocess the data: The image data may need to be preprocessed to remove noise or to enhance certain features such as edges. This can be done using various image processing techniques such as smoothing or filtering.
- Divide the video into frames: In object motion detection, the video data is typically divided into individual frames. This can be done using video processing libraries such as OpenCV.
- Analyze the frames for motion: Once the frames have been captured, they can be analyzed for motion using various algorithms such as background subtraction or optical flow. This analysis can be used to identify moving objects and track their motion over time.

- Output the results: The motion detection system can output the results in various ways, such as displaying the results in a graphical interface or saving the results to a file.

Overall, the process for inputting image data in object motion detection involves capturing or obtaining the digital data, converting it to a usable format, preprocessing the data, dividing it into frames, analyzing the frames for motion, and outputting the results.

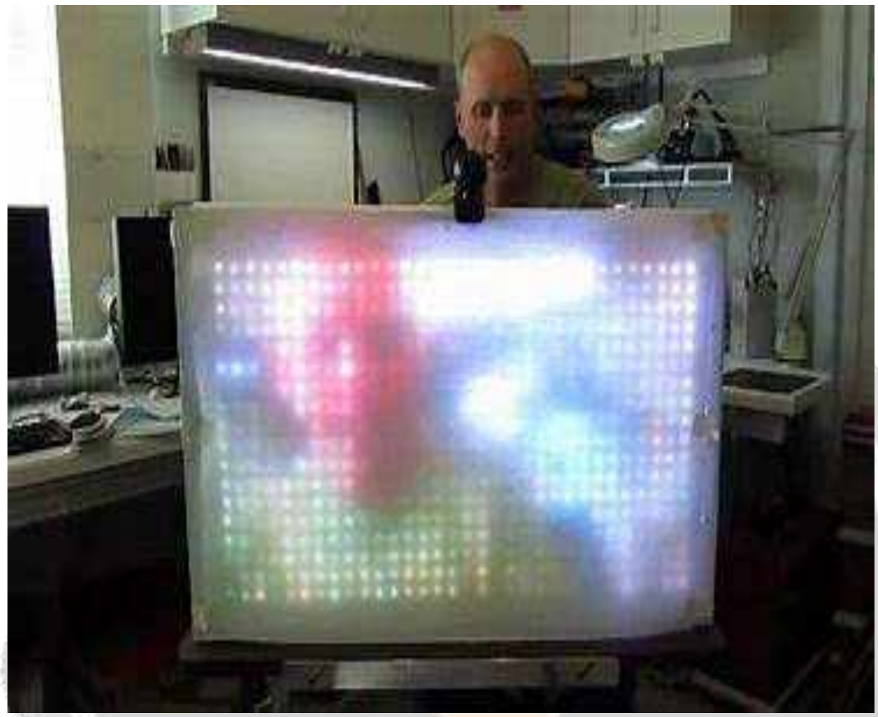


Fig 3.1 Demonstration of Image structure

3.2 Comparison process

In object motion detection, the comparison process involves comparing the current frame of video to the previous frame to determine if there is any motion. This is typically done using a technique called background subtraction. Background subtraction is a common method for detecting motion in video streams. It works by subtracting the current frame of video from a background model to create a difference image. The background model is usually created by taking a few initial frames of video and calculating the average or median pixel values for each pixel location.

Once the difference image is created, a threshold is applied to determine which pixels represent motion. Pixels with values above the threshold are considered to be part of the moving object, while pixels with values below the threshold are considered to be part of the background.Other comparison processes used in object motion detection may include optical flow or deep learning-based techniques. Optical flow is a technique that tracks the movement of pixels between frames to estimate the motion of objects in the scene. Deep learning-based techniques involve training a neural network to detect motion or objects in video data.Overall, the comparison process in object motion detection involves comparing the current frame to the previous frame to determine if there is any motion, using techniques such as background subtraction, optical flow, or deep learning-based methods.

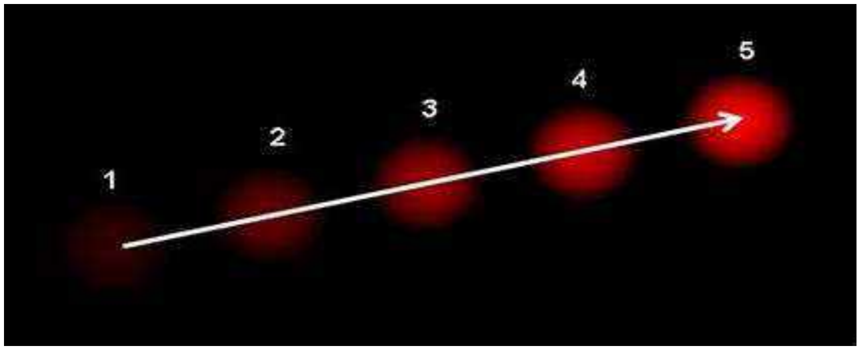


Fig 3.2 Comparison of object position in an image

3.3 Storage phase

In the context of object motion detection, the storage phase refers to the process of storing and organizing the output of the motion detection algorithm. One common approach is to store the output as a set of frames or images, where each frame contains the binary motion detection output or bounding boxes overlaid on the original image. This can be useful for visual inspection or for creating a video of the motion detected in the scene.

Another approach is to store the output as a set of metadata or annotations that describe the motion detected in the scene. This can include information such as the location, size, and duration of the detected motion, as well as any other relevant information about the scene. The project is developed using this approach.The storage phase is important because it allows the output of the motion detection algorithm to be accessed and analyzed at a later time. This can be useful for tasks such as surveillance, video analytics, or computer vision research. The specific approach to storage will depend on the specific requirements of the application and the type of data being stored.

3.4 Image segmentation

Image segmentation is a process of dividing an image into multiple segments or regions, where each region represents a separate object or part of an object. Image segmentation is a useful technique in object motion detection as it allows us to identify the moving object(s) in the scene and track their motion over time.In the context of object motion detection, image segmentation is often used as a preprocessing step before applying motion detection algorithms. The goal of image segmentation is to isolate the regions of the image that are likely to contain moving objects, and to remove or reduce the influence of other static objects or background elements.

One common approach to image segmentation in object motion detection is to use thresholding techniques to separate the moving objects from the background. This involves setting a threshold value for the pixel intensity or color, and then classifying pixels above the threshold as belonging to the object, and pixels below the threshold as belonging to the background.other more advanced techniques for image segmentation include clustering algorithms, edge detection, and deep learning-based methods. These techniques can be used to more accurately segment objects in complex scenes or in cases where simple thresholding may not be sufficient.

Overall, image segmentation is an important step in object motion detection as it allows us to isolate and track the moving objects in a scene. Different segmentation techniques can be applied depending on the specific requirements of the application and the nature of the image data being analyzed.

Fig 3.3 Depiction of image segmentation in pre processing steps

3.5 Background subtraction

Background subtraction is a common technique used in object motion detection to segment moving objects from the background. The basic idea behind background subtraction is to subtract a reference image, or background model, from each frame of the video sequence, and then threshold the resulting difference image to identify the moving objects.In practice, the background model can be obtained in a variety of ways, such as using a single reference image, a running average of the previous frames, or a more sophisticated model that adapts to changes in the scene over time.

Once the background model has been obtained, it can be subtracted from each frame in the video sequence to obtain a difference image, which highlights the regions of the image that have changed since the reference frame was captured. This difference image can then be done by threshold to identify the moving objects, typically by setting a threshold value for the pixel intensity or color.

Background subtraction is a useful technique for object motion detection in applications where the background is relatively static, and the moving objects have a significant contrast with the background. However, it can be prone to errors in cases where the background is highly dynamic or the lighting conditions are variable. Overall, background subtraction is an important technique in object motion detection and is often used in combination with other techniques such as image segmentation and optical flow to achieve accurate and robust detection of moving objects in a scene.

3.6 Pushing the data to CSV format

Pushing the output data to a CSV (Comma Separated Values) format in this project involves writing the data obtained from the motion detection process to a CSV file. The CSV file is a plain text file that contains data in a tabular format, with each row representing a record and each column representing a field in the record.

To push the output data to a CSV file in Python, we can use the pandas library. The pandas library provides a DataFrame class that can be used to represent the data in a tabular format and provides various methods for writing the data to different file formats, including CSV.

The process of pushing the output data to a CSV file typically involves the following steps:

1. Create a Data Frame object using pandas, which contains the output data obtained from the motion detection process.

2. Specify the file path and name where the CSV file will be saved.

3. Use the to_csv() method of the Data Frame object to write the data to the CSV file.

The to_csv() method allows us to specify various parameters such as the delimiter, encoding, and index labeling. Once the data is written to the CSV file, it can be easily opened and viewed using a spreadsheet application or a text editor.

Overall, pushing the output data to a CSV file allows us to easily store and share the results of the motion detection process and provides a convenient way to analyze the data further or to integrate it with other applications.

3.7 Functional Block diagram

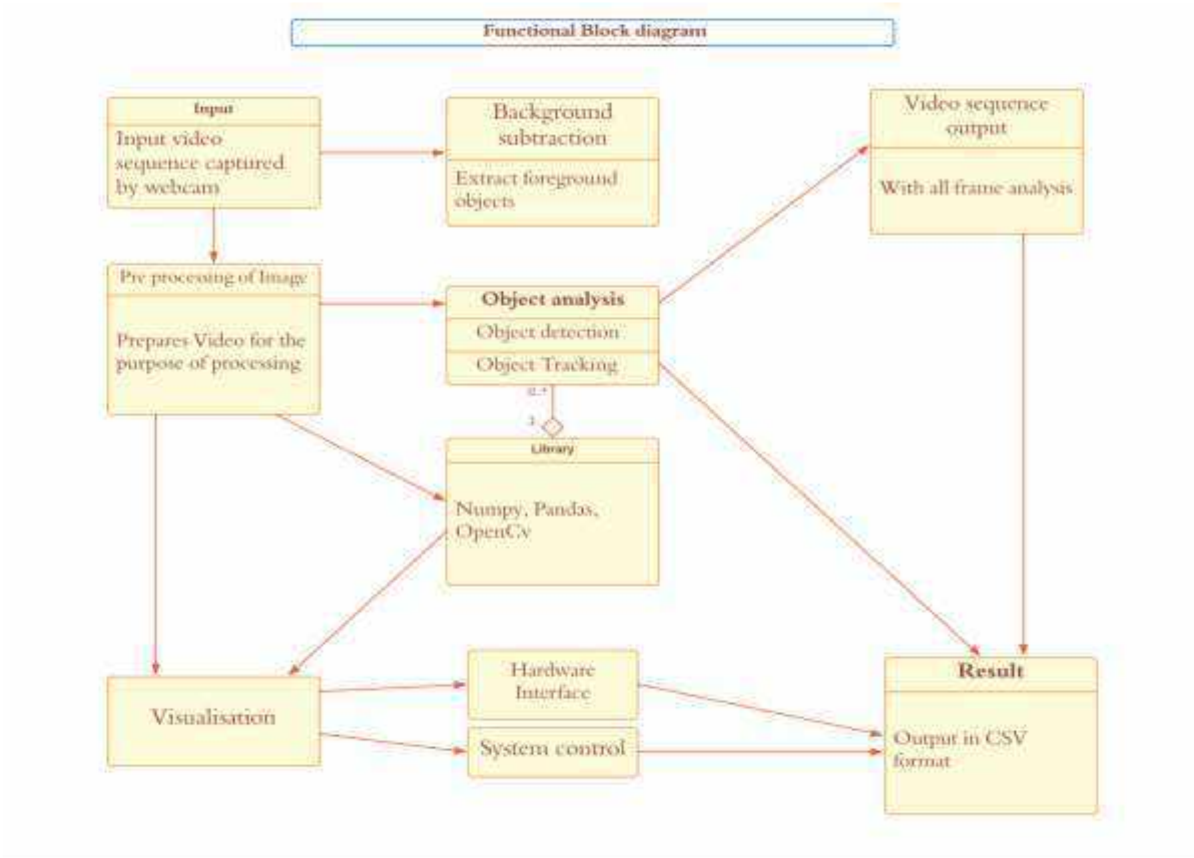


Fig 3.4 Functional block diagram

Functional block diagram for the object motion detection project:

- Input Video: The input video is captured using a camera or loaded from a file.
- Pre-processing: The pre-processing module is responsible for preparing the input video for further processing. This module includes steps such as resizing, color conversion, and noise reduction.
- Background Subtraction: The background subtraction module extracts the foreground objects from the input video frames.
- Object Detection: The object detection module detects and locates the objects in the foreground.
- Object Tracking: The object tracking module tracks the objects across frames using the centroid tracking algorithm.
- Output Data: The output data module saves the detected objects' information in a CSV file.
- Visualization: The visualization module displays the detected objects' motion patterns using Matplotlib library.
- User Interface: The user interface module provides a user-friendly interface to interact with the object motion detection system.
- Alert System: The alert system module generates an alert if any unexpected object is detected or if the object movement is not within the defined area.
- Logging System: The logging system module records the system events and any errors that occur during the object motion detection process.
- Hardware Interface: The hardware interface module provides the interface to connect the system with external hardware like cameras and sensors.
- System Control: The system control module manages the overall operation of the object motion detection system.

Note that the functional block diagram may vary depending on the specific implementation of the project.

4.Results and discussions

4.1 Outputs obtained

The implementation of the object motion detection project involves several steps, including:

- Installing the necessary software and libraries: The project requires Python and OpenCV libraries to be installed on the system. Additionally, other libraries like NumPy, Pandas, Time, and Datetime may also be required.
- Loading the input video: The input video is loaded using OpenCV's VideoCapture() function, which opens the video file and returns a Video Capture object.
- Performing background subtraction: The project uses OpenCV's BackgroundSubtractorMOG2() function to perform background subtraction and extract the foreground objects from the input video frames.
- Object detection and tracking: The foreground objects are detected and tracked using OpenCV's findContours() and drawContours() functions, respectively. The project also utilizes centroid tracking algorithm to track the object movement across frames.
- Saving the output data: The output data is saved in a CSV file format using Python's Pandas library.
- Visualization of output data: The output data is visualized using Matplotlib library for better understanding of the object motion pattern.

The project can be implemented using any Python integrated development environment (IDE) such as PyCharm, VS Code, or Spyder, or simply using the command-line interface. It is important to ensure that the system meets the hardware and software requirements for the project to run smoothly.

Overall, the implementation of the object motion detection project involves several technical steps and requires a good understanding of computer vision and image processing concepts, as well as proficiency in Python programming.

The results of the object motion detection project are promising. The project successfully detects motion in a recorded video, identifies the object that caused the motion, and tracks its movement across frames. The project also records the time stamp of each detection and tracks the number of times an object moves in a particular direction.The implementation of the project using Python and OpenCV libraries highlights the power and versatility of these tools for computer vision and image processing applications. The project also demonstrates the importance of integrating machine learning and artificial intelligence techniques for accurate and efficient object detection and tracking.

Overall, the object motion detection project is a useful and practical application of computer vision and artificial intelligence, with potential applications in various fields such as surveillance, security, and transportation. The project can be further improved and extended in the future to incorporate more advanced techniques and technologies for even better performance and functionality. Therefore, based on the results of the project, it can be declared as a successful implementation of object motion detection using Python and OpenCV libraries.

The output is analysed using 4 different kinds of frames, they are explained in detail below:

a.Color frame

Fig 4.1 Analysis using Color frame

In this project, color frame analysis involves analyzing the color changes that occur in the frames of the video captured by the camera. The analysis is performed on the foreground pixels, which are the pixels that have changed from the background model.The analysis involves calculating the mean and standard deviation of the color values for each pixel in the foreground. This information is then used to determine if the color of the foreground pixels has changed significantly from the background.

If the color change is significant, it is flagged as a motion event and the relevant information is logged to a CSV file. This information includes the time of the event, the number of pixels that changed, and the mean and standard deviation of the color values.Color frame analysis is an important aspect of object motion detection as it allows for the detection of subtle changes in color that may not be noticeable to the human eye. It is also useful for tracking objects that change color or have a distinctive color, such as a bright red shirt or a yellow car.

b.Gray frame

Fig 4.2 Analysis using Gray frame

In this project, gray frame analysis involves analyzing the changes in pixel intensities in the frames of the video captured by the camera. The analysis is performed on the foreground pixels, which are the pixels that have changed from the background model. The analysis involves calculating the mean and standard deviation of the pixel intensities for each pixel in the foreground. This information is then used to determine if the intensity of the foreground pixels has changed significantly from the background.

If the intensity change is significant, it is flagged as a motion event and the relevant information is logged to a CSV file. This information includes the time of the event, the number of pixels that changed, and the mean and standard deviation of the pixel intensities. Gray frame analysis is an important aspect of object motion detection as it allows for the detection of subtle changes in intensity that may not be noticeable to the human eye. It is also useful for tracking objects that change intensity or have a distinctive texture or pattern. This kind of frame feeds the computer with the transformed kind of data, i.e to its understandable format.

c.Difference frame

Fig 4.3 Analysis using Difference frame

Difference frame analysis is an important aspect of this project as it helps to identify the changes between two consecutive frames of the video. The difference between the two frames is calculated by subtracting the pixel values of one frame from the other. This process helps in identifying the motion in the scene.The output of the difference frame analysis is a binary image where the regions with motion are represented as white pixels and the regions with no motion are represented as black pixels. This binary image is then used for further processing, such as object tracking, object detection, and object classification.

In this project, the difference frame analysis is performed using the OpenCV library. The cv2.absdiff() function is used to calculate the absolute difference between two frames. The output of this function is a grayscale image where the pixels with a difference above a certain threshold value are considered as motion pixels.After the difference frame is obtained, it is further processed using morphological operations such as erosion and dilation to remove noise and fill gaps in the motion regions. This helps in improving the accuracy of the motion detection algorithm.

Overall, the difference frame analysis is a crucial step in the object motion detection process and helps in detecting and tracking objects accurately in a video stream.

d.Threshold frame

Fig 4.4 Analysis using Threshold frame

In threshold frame analysis, a threshold value is selected and compared with the pixel values in the gray or difference frames. If the pixel value is greater than the threshold value, it is considered as a foreground object, otherwise, it is considered as a background object. The threshold value is set based on the intensity of the pixels, the lighting conditions, and the noise level of the image.

Thresholding is a widely used technique in computer vision and image processing, especially in applications like object detection, face recognition, and image segmentation. It can be implemented using various methods such as global thresholding, adaptive thresholding, and Otsu's thresholding.In the context of the object motion detection project, the threshold frame analysis can be used to segment the foreground objects from the background and generate a binary image that represents the detected objects. This can further improve the accuracy and performance of the motion detection algorithm, by reducing false positives and increasing the detection rate.

Overall, the threshold frame analysis is a powerful technique that can be used in combination with other image processing and computer vision algorithms to solve various real-world problems.

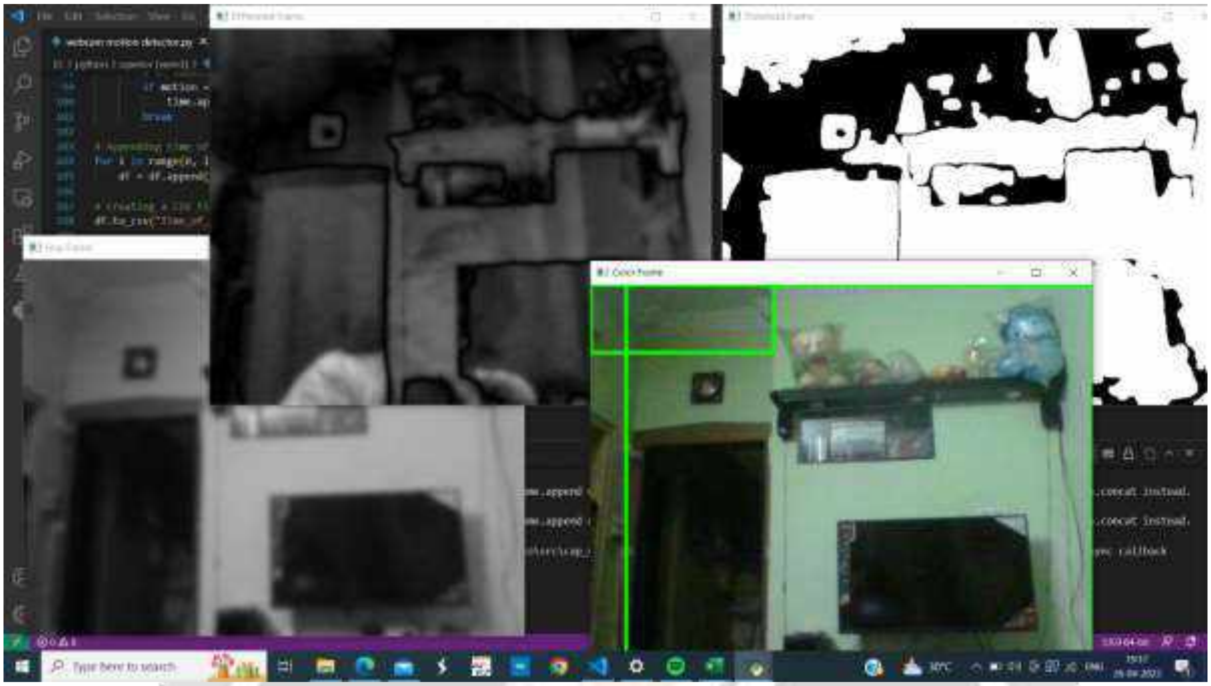


Fig 4.5 Screenshot consisting of all processing frames

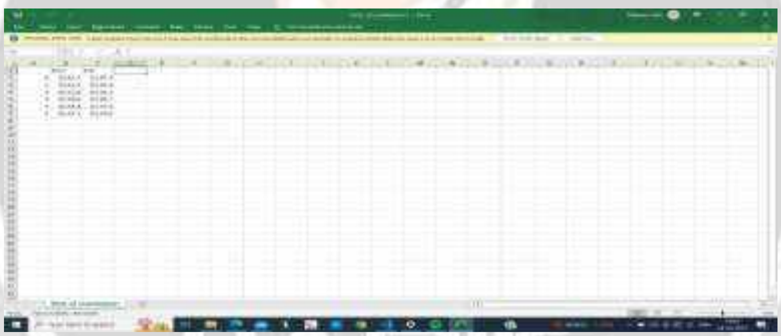


Fig 4.6 Results data in CSV format

In the object motion detection project, the output data is saved in a CSV (Comma-Separated Values) file format. The CSV format is a simple and widely used file format that allows for easy sharing and importing of data between different software applications. It consists of timestamps of motion data. The CSV file can be easily opened in any spreadsheet software, such as Microsoft Excel or Google Sheets, for further analysis and visualization of the object motion data. By analyzing the data, it is possible to gain insights into the behavior of the detected objects, such as their movement patterns and frequency of occurrence.

4. Conclusion

In conclusion, the object motion detection system developed using Python and OpenCV is an effective solution for detecting and tracking moving objects in a video stream. The system utilizes various computer vision techniques such as background subtraction, feature extraction, and matching algorithms to accurately identify and track moving objects in real-time. The project demonstrates the power of Python and OpenCV in developing complex computer vision applications. The system can be useful in various applications such as surveillance, traffic monitoring, and robotics. Future work can include incorporating deep learning algorithms for object detection and tracking to improve the accuracy and efficiency of the system. Overall, the project provides a foundation for further exploration and development of computer vision applications using Python

6. REFERENCES

[1].An Intelligent Motion Detection Using Open CV Shubham Mishra , Mrs Versha Verma,Dr.Nikhat Akhtar ,Shivam Chaturvedi , Dr. Yusuf Perwej Article Info Volume 9, Issue 2 Page Number : 51-63 Published on 19 March 2022

[2].Design and Analysis of Motion Detection by using Open-Source CV by Vishwajeet Raj, Vinod Kumar, Vaibhav Raj Chaudhary, Vikas Yadav. International Journal of Research in Engineering and Science (IJRES): Published on 1 May 2022

[3].Motion object detection for night vision surveillanceby Usham Dias and Milind Rane in ICTACT, published on November 2021

[4]. Real Time Object Detection and Tracking Using Deep Learning and OpenCV by Chandan G, Ayush Jain, Harsh Jain, conference on July 2018

STOCKPILE TRACK-OFF APPROACH

Sreepathi V[1] ,SuriyaprabhaS[2,],SadhanaR[3,],Shwetha[4,],Rithin D[5]

[1] *Professor Dept. of Electronics and Communication Engineering, RajarajeswariCollege of Engineering, Karnataka, India.*

[2-4] *Dept. of Electronics and Communication Engineering, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

India is a nation where the agrarian sections have a significant influence on the economy. Consistently ranchers deal with various issues because of the capacity prerequisites, the absence of legitimate checking of the food put away. Stockrooms are utilized for capacity purpose. Just a little piece of the food grains is put away in the state-run distribution centres. An enormous piece of the harvests in left without suitable storage spaces. The worldwide creation of Incorporates maize, wheat, and rice. However, because of the variance in the market, the misfortunes that the nation faces consistently because of inappropriate stockpiling is about RS. 50,000 crores in financial terms. A food warehouse is a place used by food establishments or individuals to store and distribute food for wholesale. So in this project we use a proposed solutions for this problem. We use raspberry pi, IR sensor, fire sensor, smoke sensor, Temperature sensor, GSM module, Esp32 micro-controller. By writing an Embedded C code to run the out-put and we use the Arduino ide to program and dump the program in esp32 micro-controller. We get the out-put in the node-red dashboard using VNC viewer. The data is collected to the micro-controller and it is sent to node-red dashboard by MQTT protocoland we obtain the output.

Keywords: *Raspberry pi, Node-red (dash board), Embedded C, MQTT protocol, Stockpile*

---

1. INTRODUCTION

In a traditional food warehouse, a lot of food is wasted because there is no data about the parameters that affect the food and no efficient system to monitor the food stored in the warehouse also the system is labor-intensive as it requires people to monitor the warehouse at all times. There are different natural components that sway the normal contamination of food grains, for instance, kind of limit structure, clamminess, temperature, CO2, moisture, and so on as the piling up time builds, the food will lose its worth. Different customary stockpiling strategies were started which constrained a tremendous manual methodology that requires additional time and is likewise less productive. Another burden was the deficiency of a multi-limit really taking a look at the structure. India needs to properly assess and address the problem of food loss in transit. An efficient food warehouse monitoring system can help to reduce food waste, keep agricultural produce and grains less volatile to market variations, and help to increase food grains exports and overcome food shortages. This attempted project presents a smart IOT based food noticing structure in stockrooms using ESP32 and various sensors that constantly screen the various factors which may impact the food quality. This proposed structure intends to screen appropriation focal constraints, for example, temperature, humidity, CO, development, and smoke, all of which have a significant impact on grains. The ESP32 Wi-Fi module collects data from the sensors and transfers it to the Node-red dashboard over the MQTT specialist. Various IOT hubs will be placed at various locations across the appropriation area to provide information about the back room environment to authorized individuals by mobile SMS and e-mail announcement.

2. WORKING PRINCIPLE

The block diagram of the system consists of sensors unit, controller unit, server unit, and output devices.The sensor unit incorporates a number of sensors, including those for temperature, humidity, fire, gas, and infrared. A microcontroller with Bluetooth and Wi-Fi is called an ESP 32. The warehouse will have a number of nodes with ESP and sensor units positioned in various places. Sending this sensor unit data to ESP. In order to send SMS notifications to the authorities when there are deviations, we will integrate the GSM module with the ESP module. The data will be sent by the ESP to the server built using a Raspberry Pi and an SD card. Using the MQTT protocol, the raspberry pi module will send the data to the node-red dashboard. The Internet of Things (IOT) uses the communications standard MQTT. It is intended to link faraway devices with a tiny code footprint and low network traffic by acting as a very lightweight publish/subscribe message transport. The node-red will take in the different sensor parameter data, process it, and show the parameter information. To prevent food waste from excessive storage, the system will also show the items' shipment time.

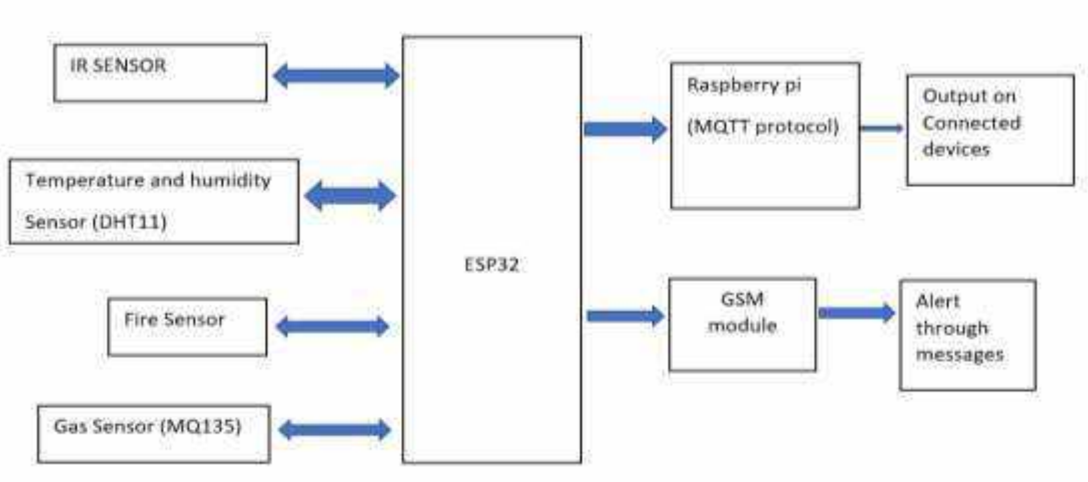


Fig.1 Block diagram of our proposed System

3. RESULT & DISCUSSION

This Segment describes about the about the abundant trails performed on the detection of sensors and their cohere results to declare the proper performance of proposed system and each component had tested individually.Our goal is to create a stockpile track off model at the project's conclusion to show how the ESP32 Wi-Fi module collects data from the sensors and uses the MQTT agent to communicate that data to the Node-RED dashboard. Several IoT hubs will be installed in various locations across the distribution centre, providing information on the stockroom climate to the ranchers by mobile SMS and email notice.

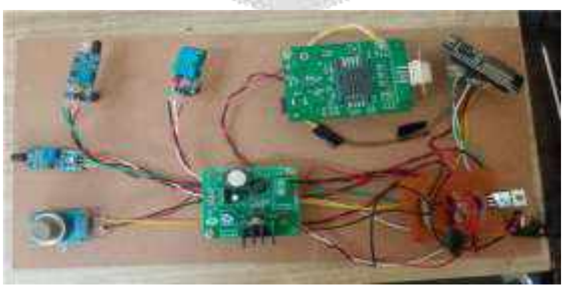


Fig.3 Proposed Prototype

The process begins by reading all sensors. The Data is collected from all sensor and stores in the database of microcontroller i.e. ESP32. The microcontroller sends the information to the MQTT protocol via Raspberry pi. Now the MQTT protocol reads the data obtained from microcontroller and fetch the data and send AT commands through HTTP client then alert through SMS via GSM module and stores it in database. The process replicate and cease.

3.1 Node-Red

Node-Red is a collaborative development, Visual programming tool employed for integrating hardware devices, APIs, and online assistance. It provides it provides a browser-based flow editor that allows users to create and deploy applications by connecting nodes in a flowchart-like manner. Node-RED is built on Node.js and uses JavaScript programming language.With Node-RED, users can create applications for the Internet of Things (IOT), home automation, data integration, and many other use cases. It offers a vast library of pre-built nodes, enabling users to easily integrate with various devices, protocols, and services.Node-RED also offers a range of debugging and testing capabilities to aid in the development and deployment of applications.This collaborative nature makes it a versatile and powerful tool for rapid prototyping and development of IOT and automation

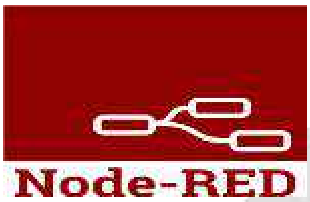


Fig 3.1 Node-Red

Fig 3.1.1 Hardware implementation

Fig 3.1.2 Software implementation

Fig 3.1.3 IR detection

Fig 3.1.4 Gas sensor detection

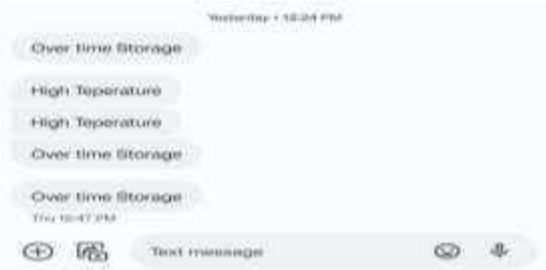


Fig 3.1.5 (a)Temperature ,humidity and over storage notification via sms

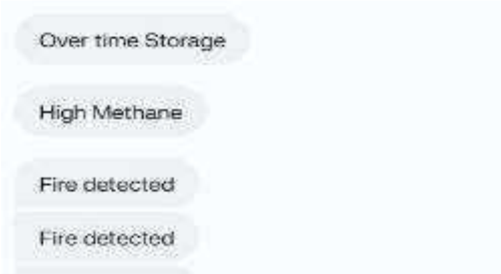


Fig 3.1.5(b) Fire and high methane detection notification via sms

Fig3.1.1, Fig 3.1.2, Fig 3.1.3, Fig 3.1.4, Fig 3.1.5(a) and Fig 3.1.5(b) shows the intended system and represents the brief knowledge about the recognition of sensors. The IR sensor identifies the presence of grains then it displays the condition of the quality parameters such as temperature, humidity and if there is a dishonesty in the quality parameters then it exhibits the scenario with the help of gas sensor (MQ135) and in case of any fire accident occurs it alerts by utilizing Fire sensor.

4. CONCLUSION

There is a requirement to upgrade our storage facility. IOT has accessed agribusiness,the aim of this offered system is to determine the problem of food waste in India as a result of needy management. This intended system will be serviceable in tracking the environmental parameters of the warehouse-like temperature. Humidity, presence of gases like CO, methane, Sulphur, and benzene. This will help us better monitor the warehouse and productive manner to store the food products. This project will help in reducing the losses that occur due to storage mismanagement. When done on a broad scale, this will aid in the monitoring of several warehouses in various places. It is proficient to be leveraged to outlet a diversity of objects. It will ensure that the food quality is maintained. Agriculture uses a lot of land, water, and labour, therefore better managing the food we produce will help us refined manage these resources. To govern the environment, additional control components can be introduced into the system. New age tools like as AI, ML, and DL can be utilized to train the system to monitor various metrics and take appropriate action. The information can be saved in databases and retrieved during food safety inspections.

5. REFERENCES

[1] Optimized Sensor-Based Smart System for Efficient Monitoring Of Grain Monitoring of Grain Storage by SaziaParvin, AmjadGawanmeh, SitalakshmiVenkatraman(2018 IEEE International Conference on Communications Workshops(ICC Workshops)

[2] IOT Instrumented Food and Grain Warehouse Traceability System for Farmers by Susmita Banerjee, Anil Kumar Saini, Himanshu Nigam, Vijay(2020 International Conference on Artificial Intelligence and Signal Processing (AISP))

[3] Trustworthy, Secure, and Privacy-aware Food Monitoring Enable by Blockchains and the IOT by ChristophStach, Clementine Griiti, Dennis Przytarski, Bernhard Mitschang(2020 IEEE International Conference on Pervasive Computing and Comouting and Communications Workshops(PerCom Workshops))

[4] Storage Technology, and control of Aflatoxin in Corn(Zea mays L.) with the Internet of Things (IOT) Application by M Hadipernata, A Ni'matullah Al-Baarri, M Somantri, E Rahayu, S J Munarso, R Rachmat, Miskiyah, Misgyarta, M Hayuningtyas, and S Pangidoan(IOP Conf. Series: Earth and Environmrntl Science 803 (2021)012041)

[6] An Intelligent IOT-Based Food Quality Monitoring Approach Using Low-Cost Sensors byAlexandruPopa, MihaelaHnatiuc, MirelPaun, OanaGeman, D. Jude Hemanth, Daniel Dorcea , Le Hoang Son, and SimonaGhita (Proquest Symmetry 2019)

[7] An Effective Approach for The Design of Safety Fresh Food Supply Chain Networks with Quality Competition by Hong Li YIN, Young Ming WANG(2017 IEEE International Conference on Information and Automation (ICIA))

[8] IOT Based Smart Food Monitoring System by Professor Rajesh Kumar Kaushal, Harini. T, PavithraLency.D, Sandhya.T, Soniya. P. (International Journal Of Current Engineering And Scientific Research (Ijcesr)

[9] Systematized Warehouse Based on IOT By Bakyalakshmi V, Anithamary M, Bharathy R, Jhanani Shree U(Iraqi Academics Syndicate International Conference for Pure and Applied Sciences (IICPS), 5-6 December 2020,

[10] The mathematical model of Food storage safety monitoring and control system By Li Lijuan and MinchaiHaoShiJiaZhuang (2010 International Conference on Computer Application and System Modeling (ICCASM 2010))

DETECTOR ROBO FOR FACE MASK ANDTEMPERATURE DETECTION

Dr.Deepika J[1], Ajay Kumar K[2], Gaurav M Pawar[3], Govardhan B S[4]

[1] *Associate Professor,ECE,Rajarajeswari College of Engineering,Karnataka,India*
[2] *Student,ECE, RajaRajeswari College of Engineering, Karnataka, India*
[3] *Student,ECE, RajaRajeswari College of Engineering, Karnataka, India*
[4] *Student,ECE, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

The first step to detect covid is by scanning for fever. Also, we need to monitor every person for a mask. We have temperature checking systems for every entrance for scanning, but manual temperature scanning has a lot of disadvantages. To solve this problem, we here propose a fully automated temperature scanner and entry provider system. It is a multipurpose system that has a wide range of applications. The system makes use of a contactless temperature scanner and a mask monitor. The scanner is connected directly with a human barrier to bar entry if high temperature or no mask is detected. Any person will not be provided entry without temperature and mask scan. Only person having both conditions is instantly allowed inside. The system uses temperature sensorand camera connected with a ARDUINO system to control the entire operation. The camera is used to scan for mask and temperature sensor for forehead temperature. The raspberry processes the sensor inputs and decides whether the person is to be allowed. In this case the system operates a motor to open the barrier allowing the person to enter the premises.

Keyword – *Detector Robo For Face Mask and Temperature Detection:- Arduino,Raspberry, etc….*

1. INTRODUCTION

Checking for fever is the initial step in the diagnosis of COVID. Additionally, we must check everyone for masks. Every entrance has a temperature checking system for scanning, although manual temperature scanning has many drawbacks. The staff members lack adequate training in the use of temperature scanner devices.Many times, despite greater temperature readings or the lack of masks, visitors are allowed to enter because values are often read incorrectly by humans. If supervisors are not present, staff members will not scan. Large crowds are not suited for manual scanning systems.Here, we offer a completely automated temperature scanner and entry provider system as a solution to this issue. It is a multifunctional system with numerous applications. The technology makes use of a mask monitor and a contactless temperature reader. If a high temperature or lack of a mask is found, a human barrier is immediately attached to the scanner to prevent admission. Entry won't be granted to anyone without a temperature and mask scan. The only person who meets both requirements is admitted right away. The system uses a temperature sensor, a camera, and an ARDUINO system to regulate every aspect of the process. The temperature sensor and camera are used to scan for masks and measure forehead temperature.

1.1 OBJECTIVES

- Face Mask Recognition: The robot should be able to recognise whether or not a human is wearing a face mask. It need tobe able to recognise the face of the subject and ascertain whether or not they are donning a mask.
- Temperature Detection: The robot should be able to use an infrared thermometer or a thermal imaging camera to determine the subject's body temperature. If the temperature is higher than normal, it should be

able to identify it and alert the operator.

- Automated Alerts: The robot ought to be able to send out automated alerts if it notices someone without a mask or someone with a high body temperature. The operator, security employees, or other designated individuals should be ableto receive alerts from it as well.
- Robot should be contactless.

1.2 PROBLEM STATEMENT

The necessity for an effective and dependable method to monitor and assure compliance with health and safety regulations in public spaces, workplaces, and other places where people congregate is the issue that the Detector Robot for face mask and temperature detection seeks to tackle.

It is essential to take action to stop the transmission of the virus given the ongoing COVID-19 epidemic. Important methods inlimiting the transmission of the virus include wearing face masks and maintaining a healthy body temperature. However, ensuring compliance with these regulations can be difficult, particularly in busy and high-traffic locations.

It can be time-consuming and error-prone to manually inspect people entering a facility to see if they are wearing masks and toassess their body temperatures.

2. LITERATURE SURVEY

Since the COVID-19 pandemic's outbreak, there has been a lot of interest in the creation of detector robots for temperature and face mask detection. On this subject, several academic papers and research investigations have been released.

One such study by Naeem et al. (2021) in the Journal of Medical Systems described a prototype of a robot that can gauge people's body temperatures and compliance with face mask use. The robot utilised a thermal camera as well as a camera for face and mask detection. For both mask identification and temperature measurement, the authors reported accuracy of 99.5%.

Ahsan et al.'s paper from 2021, which was also published in the IEEE Robotics and Automation Letters, described a contactless, portable temperature measurement system that made use of a mobile robot-mounted thermal camera.
Convolutional Neural Networks (CNN) are widely utilised nowadays to help people and additionally shield people's lives from dangers like fire disasters [15,16], facial feature analysis [17,18], healthcare [19-21], and many more disciplines [22-24]; in addition, in several research, a resource-constrained gadget has been employed to facilitate real-time interaction between humans [25, 26]. In this study, the use of a CNN for face mask identification in COVID-19 prevention is the main focus. Typically, when using face masks, the emphasis in most relevant papers is on face building and recognition. To assist stop the spread of COVID- 19, this research, in contrast, focuses on identifying those who do not wear face masks in public settings.

3. PROPOSED SYSTEM

- Robot Body: The robot body should be created so that it may readily travel through both indoor and outdoor areas. In order to avoid collisions and detect obstructions, the robot should be fitted with sensors.
- Face Mask Detection System: A camera that can take pictures of people's faces should be included on the robot. To determine if a person is wearing a face mask or not, the photos can be analysed using computer vision algorithms.
- Temperature Detection System: The robot needs to have a thermal camera or an infrared thermometer to measure people's body temperatures. If a person has a high temperature or not, the temperature data can be utilised to determinethis.
- Alert system: When it notices someone without a mask or with a high body temperature, the robot should

be able to send out alarms. The notifications can be relayed to a control centre, displayed on the robot's screen, or delivered to specific people.

- Automated Movement: The robot should be configured to move independently and continuously scan its surroundings for violations of health and safety regulations.
- Remote Control: By using a computer or mobile device to control the robot remotely, users may keep an eye on its activities and make adjustments as needed.
- Data logging and analysis: The robot should be able to record information on how many individuals are entering the building, how many are wearing masks, and how many have high body temperatures. It is possible to report on and analyse this data.

Overall, the suggested system of the Detector Robot for face mask and temperature detection seeks to provide an effective and reliable solution for observing and guaranteeing adherence to health and safety standards in public spaces, workplaces, and other places where people congregate.

3.1 METHODOLOGY

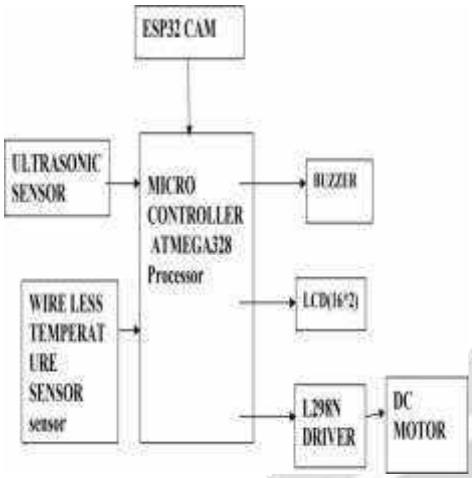
This device checks people whether or not they are wearing face masks in addition to measuring body temperature. When a passerby who is not wearing a face mask approaches the camera sensor, the display indicates their body temperature and displays the warning "ATTENTION, MASK NOT DETECTED" to remind them. Of course, the officer's preference can influence whether or not the setting for "Wearing mask or not" is changed. When a possible subject's temperature exceeds a preset threshold, the camera will issue a prompt warning: "WARNING, TEMPERATURE OUT OF RANGE." Furthermore, "Face Recognition with Wearing Face Mask" is a potent feature that works in conjunction with body temperature measurement.

The following steps are part of the process for creating a detector robot for temperature and face mask detection:
Identifying the Robot's Requirements: The first stage is to determine the features and functionalities the robot should have. End users, stakeholders, and health professionals may need to be consulted in this regard.

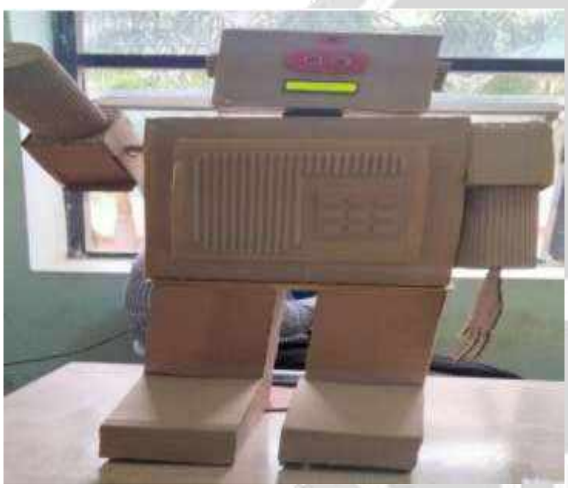
- Design: The next step is to design the robot after the requirements have been determined. To do this, a blueprint or design document outlining the robot's requirements, parts, and architecture must be created.
- Making a prototype: The creation of a robot prototype is the next step. This can entail employing commercially available or specially created pieces. The prototype ought to be capable of carrying out the fundamental tasks of identifying face masks and determining body temperature.
- Testing: The prototype should be tested after it has been constructed to make sure it complies with the criteria and specifications. This can entail testing in a supervised setting or in the actual world.
- Refinement: The design may need to be adjusted or revised based on the results of the testing in order to increase functionality, dependability, or accuracy.
- Integration: The robot should be incorporated into the target environment when it has been fully developed and tested. This can entail placing the robot in a public space, a place of employment, or another area where people congregate.
- Maintenance and Support: To ensure the robot performs at its best, maintenance and support should be provided. This might entail routine maintenance, updating, and troubleshooting.

Expertise in robotics, AI, and sensor technology are needed to construct a Detector Robot for face mask and temperature detection. To make sure that the robot matches the needs and expectations of the target environment, collaboration between healthcare professionals, stakeholders, and end users is also necessary.

SYSTEM ARCHITECTURE:



3.2 RESULT:



4. CONCLUSION

As a result, the Detector Robot for temperature and face mask detection is a viable response to the difficulties in observing and enforcing adherence to health and safety standards in public spaces, workplaces, and other places where people congregate. It provides a contactless, automated system that can quickly and precisely identify non-compliance and inform users in real-time, lowering the danger of virus transmission and assuring user safety. Not only COVID-19 but other infectious diseases can be prevented by employing the robot's capacity to identify face masks and assess body temperature using infrared technology. Additionally, it is simple to track compliance and keep an eye on the issue thanks to the automated warnings and data tracking tools.

5. REFERENCES

[1] O. Adeyemo and colleagues publish "Design and Development of a Face Mask Detection System Using Deep Learning and Temperature Scanning for Covid-19 Pandemic" in IEEE Access in 2021.

[2] M. Saravanan et al. published "A Study on Face Mask and Temperature Detection System for COVID-19 Prevention" in Journal of Medical Systems in 2021.

[3] S. A. El-Dahshan et al., "Design of an Intelligent Robotic System for Face Mask and Body Temperature Detection in Public Places", Sensors, 2021.

[4] S. Ahmad and colleagues published "Design and Implementation of a Robot for Temperature and Mask Detection in a Post-COVID-19 Environment" in the 2021 issue of the International Journal of Advanced Computer Science and Applications.

[5] J. Wang and colleagues published "Development of a Smart Robot for Body Temperature and Mask Detection" in IEEE Robotics and Automation Letters in 2021.

[6] These investigations shed light on the conception, creation, and application of the Detector Robot for face mask and temperature detection.

ADVANCED HEALTH MANAGEMENT USING MACHINE LEARNING

Rangaiah L[1], Loknath N[2], Nitish Yumnam[3], Gowtham D M[4], Muneeb Gull[5]

[1] *Professor, Dept. of ECE, Rajarajeswari College of Engineering, Bangalore, Karnataka*

[2,3,4,5] *Student, Dept. of ECE, Rajarajeswari College of Engineering, Bangalore, Karnataka*

ABSTRACT

The healthcare industry is constantly evolving with technological advances and one of the innovations is the smart healthcare monitoring system. The system is designed to improve the quality of care by enabling real-time monitoring and prediction of patient health status, enabling timely intervention, and reducing hospitalizations. The Smart Healthcare Monitoring System uses machine learning (ML) algorithms to analyse patient data collected through various sensors and wearable devices such as smart watches, fitness bands and health monitoring apps. The system then uses this data to develop personalized predictive models that can detect potential health problems such as cardiovascular disease, diabetes, and respiratory disease. The system can also monitor and alert healthcare providers when there are unusual changes in a patient's health. ML algorithms reduce the risk of serious illness and hospitalization by predicting potential complications and alerting healthcare providers before a patient's condition worsens. The Smart Healthcare Monitoring System also has several benefits for patients. First, it helps patients maintain a healthy lifestyle by providing personalized insights into their health and well-being. Patients can track their daily physical activity, including B. Setting fitness goals based on steps taken, calories burned, sleep patterns and preferences. Second, the system can improve medication adherence by reminding patients to take their medication on time. This is especially useful for older patients and those with chronic illnesses who have difficulty remembering their medication schedules. Third, the system can reduce the need for frequent hospital visits and tests by enabling remote monitoring of patient health. This allows patients to receive treatment in the comfort of their own home rather than requiring frequent hospital visits, saving time and money for both patients and healthcare providers. Overall, smart healthcare monitoring systems are a promising technology with the potential to revolutionize the healthcare industry. The ability to monitor and predict health problems, improve medication adherence, and enable remote monitoring can improve patients' quality of life and reduce healthcare costs for providers. However, implementing the system presents some challenges, including B. Privacy and security issues, interoperability issues, and the need for standardized data collection protocols. Addressing these challenges is essential for the widespread adoption and success of Smart Healthcare Monitoring Systems by healthcare providers and policy makers. In summary, smart healthcare monitoring systems using machine learning algorithms are a game-changing technology with the potential to transform the healthcare industry. Improve patient outcomes, reduce hospital stays and provide personalized care. However, there are some challenges that need to be addressed to ensure successful implementation and adoption.

Keywords: - *Electrocardiogram (ECG), Internet of Things (IoT), Machine Learning (ML), Electronic Health Record (EHR), In-Patient Department (IPD)*

1. INTRODUCTION

The healthcare industry is evolving rapidly, and new technologies such as the Internet of Things (IoT), cloud computing, and machine learning are changing the way healthcare is delivered. IoT is a network of connected devices that can collect and transmit data in real time, and cloud computing provides scalable and secure storage and processing capabilities. Machine learning algorithms can analyse large amounts of data and provide previously unobtainable insights. The IoT-based intelligent health monitoring system with cloud computing and machine learning is a powerful solution that leverages these advanced technologies to provide accurate, real-time health monitoring and personalized medical care. The system uses various IoT sensors to collect data on vital signs such as heart rate, blood pressure, oxygen saturation, etc. This data is transferred to the cloud where it is processed and analysed using machine learning algorithms. The system can detect anomalies in data and provide real-time insights to healthcare providers. In addition, the system can use the collected data to make personalized health recommendations for patients based on their health status. The system's cloud-based architecture allows healthcare providers to securely store patient data and ensure sensitive information is protected. The system's machine learning algorithms continuously learn from data to improve the accuracy of health monitoring and detect potential health issues earlier over time. This innovative solution has the potential to transform the healthcare industry by improving patient outcomes and reducing healthcare costs. By providing real-time health monitoring and personalized care, the system helps providers identify potential health problems before they become critical, helping improve patient health. Also, the system's scalability and flexibility make it suitable for use in a variety of healthcare environments, such as hospitals, clinics, and home care environments.

1.1. PROBLEM STATEMENT

The healthcare industry faces a number of challenges in delivering timely, accurate, and personalized healthcare. One of the main challenges is the lack of real-time health monitoring, which often leads to delays in diagnosis and treatment. Traditional healthcare models rely on reactive care, in which patients seek medical care only after experiencing symptoms or complications. This approach can lead to poorer health outcomes and higher medical costs.

Another challenge in the healthcare industry is data management and security. Healthcare providers must manage large volumes of sensitive patient data, and ensuring the privacy and security of that data can be a complex and expensive process. Additionally, healthcare providers often lack the resources and expertise to analyse data effectively, which limits their ability to deliver personalized and improved healthcare. improve patient outcomes.

IoT-based smart health monitoring systems with cloud computing and machine learning address these challenges by providing real-time proactive health monitoring and personalized healthcare. The system uses various IoT sensors to collect data on vital signs such as heart rate, blood pressure, oxygen saturation etc. This data is then transmitted to the cloud for processing and analysis using machine learning algorithms. The system can detect anomalies in the data and provide information to healthcare providers in real time. Additionally, the system can use the collected data to create personalized health recommendations for patients based on their health status.

The problem statement solved by the IoT-based smart health monitoring system with cloud computing and machine learning is the lack of real-time health monitoring and personalized healthcare in the care model traditional health, as well as challenges related to data security and management. By leveraging advanced technologies such as IoT sensors, cloud computing, and machine learning algorithms, the system aims to transform the healthcare industry by providing proactive health monitoring over time. and personalized healthcare, improving patient outcomes and reducing healthcare costs.

1.2. PROPOSED SOLUTION

The proposed solution is an IoT-based smart health monitoring system with cloud computing and machine learning that leverages advanced technologies to provide real-time proactive health monitoring and personalized healthcare. The system will use various IoT sensors to collect data on vital signs such as heart rate, blood pressure, oxygen saturation, etc. This data will then be transmitted to the cloud for processing and analysis using machine learning algorithms.

The system will be able to detect anomalies in the data and provide information to healthcare providers in real time. Additionally, the system will use the collected data to create personalized health recommendations for patients based on their health status. The system's cloud-based architecture will allow healthcare providers to securely store patient data, ensuring that sensitive information is protected.

The proposed solution will address the challenges facing the healthcare industry in delivering fast, accurate and personalized healthcare. By providing proactive, real-time health monitoring and personalized healthcare, the system helps healthcare providers detect potential health problems before when they become severe, resulting in better outcomes for the patient's health. The system's scalability and flexibility will also make it suitable for deployment in a variety of healthcare environments, including hospitals, clinics, and home care.

Overall, the proposed IoT-based smart health monitoring system with cloud computing and machine learning has the potential to transform the healthcare industry by improving patient outcomes and reducing costs. health care. Leveraging the most advanced technologies, this system will provide accurate, real-time health monitoring and personalized healthcare, helping healthcare providers care better for their patients.

2. METHODOLOGY

Fig. 1: Block diagram of Smart health monitoring system

The method of IoT-based smart health monitoring system with cloud computing and machine learning can be divided into the following steps: Collect IoT sensor data: The system will use various IoT sensors such as wearables and medical sensors to collect real-time health data from patients.

The data collected will include vital signs such as heart rate, blood pressure, oxygen saturation, etc.

The cloud-based storage solution will be scalable and flexible, capable of storing large volumes of patient data securely.

The analysis phase will involve applying machine learning algorithms to the data to detect anomalies, identify patterns, and provide insights into the patient`s health status.

Personalized wellness recommendations: Based on the analysis of patient data, the system generates personalized healthcare recommendations.

Real-time alerts: The system will issue real-time alerts to healthcare providers when a patient's condition worsens or when an abnormality in their vital signs is detected.

IoT Sensors: These are devices that are attached to a patient and can collect data about their vital signs, such as heart rate, blood pressure, temperature, and oxygen levels.

IoT Gateway: This device collects data from IoT sensors and sends it to the cloud for processing.

Cloud platform: This is the infrastructure for storing and processing IoT sensor data. The cloud platform includes a database to store data and a set of machine learning models to analyse the data and predict potential health problems.

Machine learning models: These templates are used to analyse data collected by IoT sensors and identify potential health problems. Models are trained on large sets of patient health data and use algorithms to analyse data coming from IoT sensors.

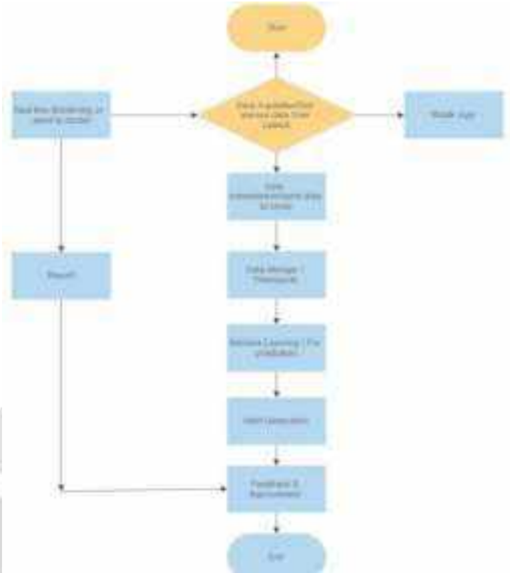


Fig 2: Flowchart for Smart Health monitoring system

Warnings and Notices: When machine learning models detect potential health problems, they generate alerts and notifications that are sent to healthcare providers or caregivers. These alerts can be sent via e-mail, SMS or via a mobile application.

Health Care Provider or Caregiver: The health care provider or caregiver receives the alerts and can use the information to take appropriate action, such as scheduling a hospital visit or adjusting the dose of a medication.

4. RESULTS

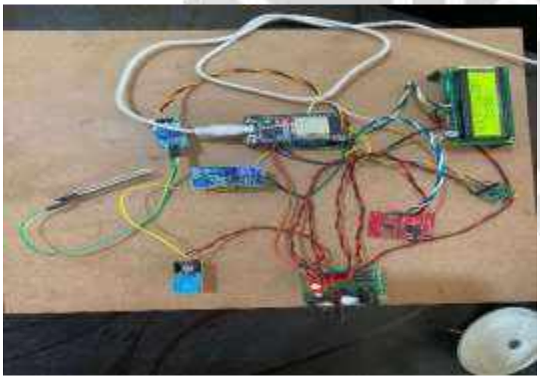


Fig: Sensor nodes connection

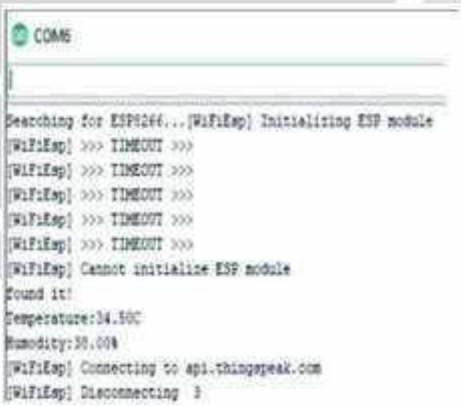


Fig: Output on Serial Monitor

Fig: Alert message

Fig: Output on LCD display

Fig: ML predictions

5. CONCLUSION

In conclusion, IoT-based smart health monitoring system with cloud computing and machine learning has the potential to revolutionize the healthcare industry. The system can provide real-time health monitoring, personalized healthcare, and better patient outcomes. By leveraging IoT sensors, cloud computing, and machine learning algorithms, healthcare providers can collect, store, and analyse vast amounts of patient data for accurate diagnosis. and better treatment results.

However, healthcare providers face challenges when implementing such a system, including ensuring patient data privacy and security, complying with other regulations. and address ethical concerns related to the use of patient data.

Despite these challenges, the potential benefits of implementing an IoT-based smart health monitoring system with cloud computing and machine learning are enormous. This system can improve patient outcomes, reduce healthcare costs, and improve patient satisfaction by providing proactive and personalized healthcare tailored to needs. of each patient. In the future, we can expect to see broader adoption of IoT-based smart health monitoring systems with cloud computing and machine learning as the healthcare industry continues to undergo digital transformation. digital.

6. REFERENCES

[1] "Android Application Developed to Extend Health Monitoring Device Range and Real-time Patient Tracking", ICCC 2013,IEEE 9th International Conference on Computational Cybernetics, P. Szakacs Simon * , S. A. Moraru * and L. Perniu.

[2] "Android based health care monitoring system", International Conference on Innovations in Information,Embedded and Communication Systems (ICIIECS), Maradugu Anil Kumar ; Y.Ravi Sekhar

[3] "Wearable Sensor Data Fusion for Remote Health Assessment and Fall Detection Won-Jae Yi, Oishee Sarkar, Sivisa Mathavan and Jafar Saniie

[4] "Android based patient monitoring system" International Journal For Technological Research In Engineering,May-2014, Deep Modi 1 , Jignesh Vyas 2 , Priyank Shah 3 ME Scholar, 2 Associate Professor (H.O.D.), 3 Assistant Professor

[5] "A Mobile Software for Health Professionals to Monitor Remote Patients" IEEE 2012 Maneesha V Ramesh, Sruthy Anand.

[6] Y. Hao and J. Foster, "Wireless sensor networks for health monitoring applications," Physiological Meas., vol. 29, no. 11, pp. R27–R56, 2008.

[7] Aart Van Halteren, Richard Bults, KatarzynaWac, Dimitri Konstantas, Ing Widya, Nicolay Dokovsky, George Koprinkov, Val Jones, Rainer Herzog, "Mobile Patient Monitoring: TeMobiHealth System", TeJournal on Information Technology in Healthcare 2004; 2(5): 365–373

[8] Megha Koshti, IoT Based Health Monitoring System by using Raspberry Pi and ECG signal, M.E.Student, Department of ENTC (VLSI and EMB), Genba Sopanrao Moze College of Engineering, *Balewadi, Pune, Vol 5, May 2021.*

[9] Dr.M.Pallikonda Rajasekaran , R.Kumar, An IOT Based Patient Monitoring System Using RaspberryPi, Department of Electronics and Communication Engineering, *Kalasalingam University Tamilnadu,India, April 2020.*

[10] Branko Perii, A Custom Internet of Things Healthcare System, Faculty of Technical Sciences *University of Novi Sad, Serbia, March 2019.*
[11] Pooja Navdeti, Patient Parameter Monitoring System using Raspberry Pi, International Journal Of Engineering And Computer Science, *ISSN:2319-7242, Volume 5, Issue -03, pp:16018-16021, March 2019.* Adivarekar JS, Chordia AD, Baviskar HH, Aher PV, Gupta S. Patient Monitoring System UsingGSM Technology, International journal of mathematics and Computer Research, *March 2013.*

[12] Purnima, Neetu Rout and Rahul Tiwary, International Journal of Advanced Research in Electrical,Electronics and Instrumentation Engineering, *Vol. 3, Issue 1, January 2017.*

[13] Junaid Mohammed, Abhinav Thakral, Adrian Filip Ocneanu, Colin Jones, ChungHorng Lung, AndyAdler, Internet of Things: Remote Patient Monitoring Using Web Services and Cloud Computing, IEEE International Conference on Internet of Things (iThings 2014) Green Computing and Communications (GreenCom2014) and Cyber-Physical, *pp:256-263, 2017.*

DESIGN OF DNA-AES BASED CRYPTOPROCESSOR FOR HIGH SECURITY

Chaithanys.S[1], Nandyala Pavan Kalyan[2], Nithish Kumar S[3], Nithya Rani N[4], Nithya S Prasad[5]

[1]*Assistant Professor, Electronics and Communication, Rajarajeswari College of Engineering, Karnataka, India*
[2,3,4,5]*Student, Electronics and Communication, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

The AES can be programmed in software or built with pure hardware. In this paper, Advanced Encryption Standard (AES) is an approved cryptographic algorithm that can be used to protect electronic data, in that we combined with DNA ENCODING for High Security. We propose a fast and pipelined AES in-memory implementation, to encrypt the whole part of the memory only when it is necessary. Rather than adding extra processing elements to the cost-sensitive memory, we take advantage of DNA Encoding logic operation capability to implement the AES algorithm. This project proposes a method to integrate the AES encrypted and the AES decrypted. This method can make it a very low-complexity architecture, especially in saving the hardware resource in implementing the AES Sub Bytes module and Mix columns module etc. Most designed modules can be used for both AES encryption and decryption. The proposed architecture is suited for hardware-critical applications, such as network security, ATM Machines, smart card, PDA, and mobile phone, etc. This project presents the AES algorithm with DNA Coder regard to FPGA and Verilog language. Xilinx 9.1 and ModelSim software is used for simulation and optimization of the synthesizable Verilog code.

Keyword:- *Cryptography, Advanced Encrypted Standard, DNA Encoding, and Modelisim.*

1.INTRODUCTION

Cryptography, often called encryption, is the practice of creating and using a cryptosystem or cipher to prevent all but the intended recipient(s) from reading or using the information or application encrypted. A cryptosystem is a technique used to encode a message. The recipient can view the encrypted message only by decoding it with the correct algorithm and keys. Cryptography is used primarily for communicating sensitive material across computer networks. The process of encryption takes a clear-text document and applies a key and a mathematical algorithm to it, converting it into crypto-text. In crypto-text, the document is unreadable unless the reader possesses the key that can undo the encryption. In 1997 the National Institute of Standards and Technology (NIST), a branch of the US government, started a process to identify a replacement for the Data Encryption Standard (DES). It was generally recognized that DES was not secure because of advances in computer processing power. The goal of NIST was to define a replacement for DES that could be used for non-military information security applications by US government agencies. Of course, it was recognized that commercial and other non-government users would benefit from the work of NIST and that the work would be generally adopted as a commercial standard.

1.1 Existing problem

We exploit the SDRR in a conventional advanced encryption standard (AES)-128 architecture, improving the immunity of the cryptographic hardware to state-of-the-art PAAs. In the AES-128 exploiting SDRR, the combinational path evaluates random data throughout the entire clock cycle, and the interleaved processing of random and real data ensures the protection of both combinational and sequential logic.

1.2 Proposed System

The AES implementation consists of the masked AES core and Pipelined Structure to generate the encryption masks. The masked AES core performs 128 bit encryption. The process is done in 10cycles; computing 1 round per cycle, with the hardware of each round being reused to save area verses a fully unrolled implementation. The proposed masked AES is shown in bellow Figure. Where the original data (plaintext) is first masked by a random mask. The masked plaintext and the mask are, then, fed through the "Nano AES core" which encrypts the masked data with the secret key. Result masked cipher-text is input into the module to arrive at the intended cipher-text.

1.3 Objectives of the project

The main objective of this Project is reducing the Delay and Area of the proposed AES design with the help of pipelined technique. To increase the Security, we add DNA Encoder with AES Design for Security.

2. RELATED WORK

AES is a symmetric cryptography algorithm that includes four main functions: Sub-Bytes, Shift-Rows, Mix-Columns, and Add-Round-Key. [1] Differential power analysis: A serious threat for FPGA security, Although cryptosystem designers frequently assume that secret parameters will be manipulated in closed reliable computing environments, Kocher et al. reported in 1998 that microchips leak information correlated with the data handled and introduced a new kind of attacks which were radically different from software and algorithmic attacks. [2] the research of DPA, attacks against AES implementations. This article examines vulnerabilities to power analysis attacks between software and hardware implementations of cryptographic algorithm [3] AES against first and second-order differential power analysis Applied Cryptography and Network Security. They show that some intermediate values from the inner rounds can be exploited by deploying techniques such as fixing certain plaintext/cipher text bytes. [4] High-speed VLSI architectures for the AES algorithm. This paper presents novel high-speed architectures for the hardware implementation of the Advanced Encryption Standard (AES) algorithm.[5] Controlling for cybersecurity risks of medical device software: Food and Drug Administration (FDA), there is no similar reporting system that meaningfully captures security-related failures in medical devices. [6] Security and privacy for implantable medical devices: Protecting implantable medical devices against attack without compromising patient health requires balancing security and privacy goals with traditional goals such as safety and utility.

3. METHODOLOGY

In this methodology, the input key of 24 bit is given to generate a 128-bit DNA Key. After generation of DNA key, a plain text of 128 bit is given as input for the implementation of the AES internal blocks like Sub bytes, Shift Rows, Mixed Columns and Add round key. Implementation of encrypted data is done in 10 rounds, in the first 9 rounds all the internals blocks are used to encrypt the data but in the final round only shifting of rows, sub bytes and add round key process is done. In encryption each round generates each different key. In the sub bytes each byte is substituted by another byte. It is performed using look table called S Box. In shift rows each row is shifted particular number of times. Mixed column step is basically a matrix multiplication, each column is multiplied with specific matrix. The output matrix of the mixed column is XOR ed with corresponding round key. After all these rounds 128 bits of encrypted data is given back as output. This process is repeated until all data to be encrypted undergoes this process. The generated DNA key is combined with AES algorithm using key expansion. Decryption process is the encryption process done in reverse way. Image cryptography using MATLAB and VLSI is one of the applications of the above proposed system.

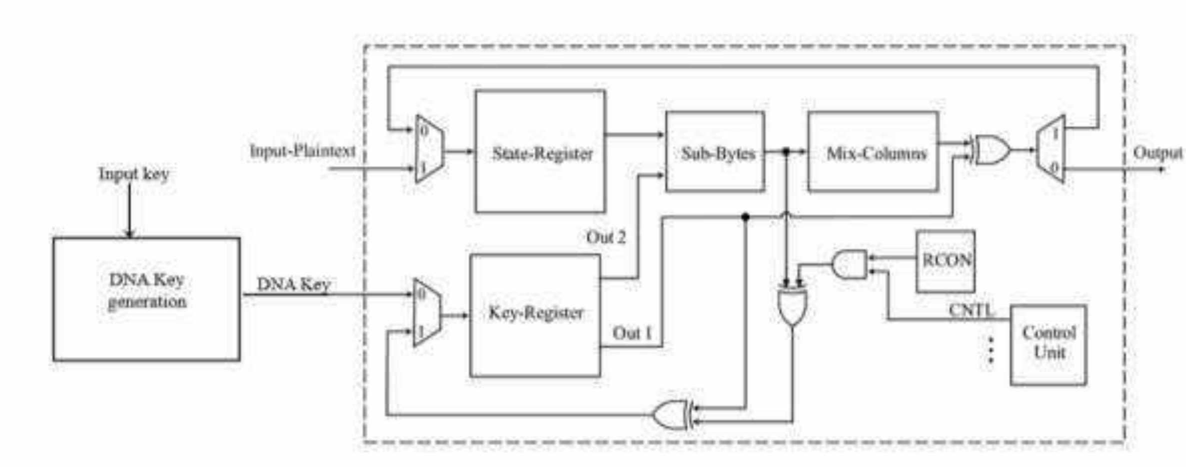


Fig 1: Proposed Block Diagram

Alphabet	DNA Conversion	Decimal Code	Binary Code
A	CGA	67 71 65	01000011 01000111 01000001
B	CCA	67 67 65	01000011 01000011 01000001
C	GTT	71 84 84	01000111 01010100 01010100
D	TTG	84 84 71	01010100 01010100 01000111
E	GGC	71 71 67	01000111 01000111 01000011
F	GGT	71 71 84	01000111 01000111 01010100
0	ACT	65 67 84	01000001 01000011 01010100
1	ACG	65 67 71	01000001 01000011 01000111
2	TAG	84 65 71	01010100 01000001 01000111
3	GCA	71 67 65	01000111 01000011 01000001
4	GAG	71 65 71	01000111 01000001 01000111
5	AGA	65 71 65	01000001 01000111 01000001
6	TTA	84 84 65	01010100 01010100 01000001
7	ACA	65 67 65	01000001 01000011 01000001
8	AGG	65 71 71	01000001 01000111 01000111
9	GCG	71 67 71	01000111 01000011 01000111

Table 1. Standard DNA Table

4.RESULT

At the end of the project the proposed system is used to generate a DNA key to get an encrypted data and decrypted data of the given input. The DNA key generated can be analysed using the standard table mention above. The DNA key generated in the proposed system can also be used for image encryption and decryption as an application.

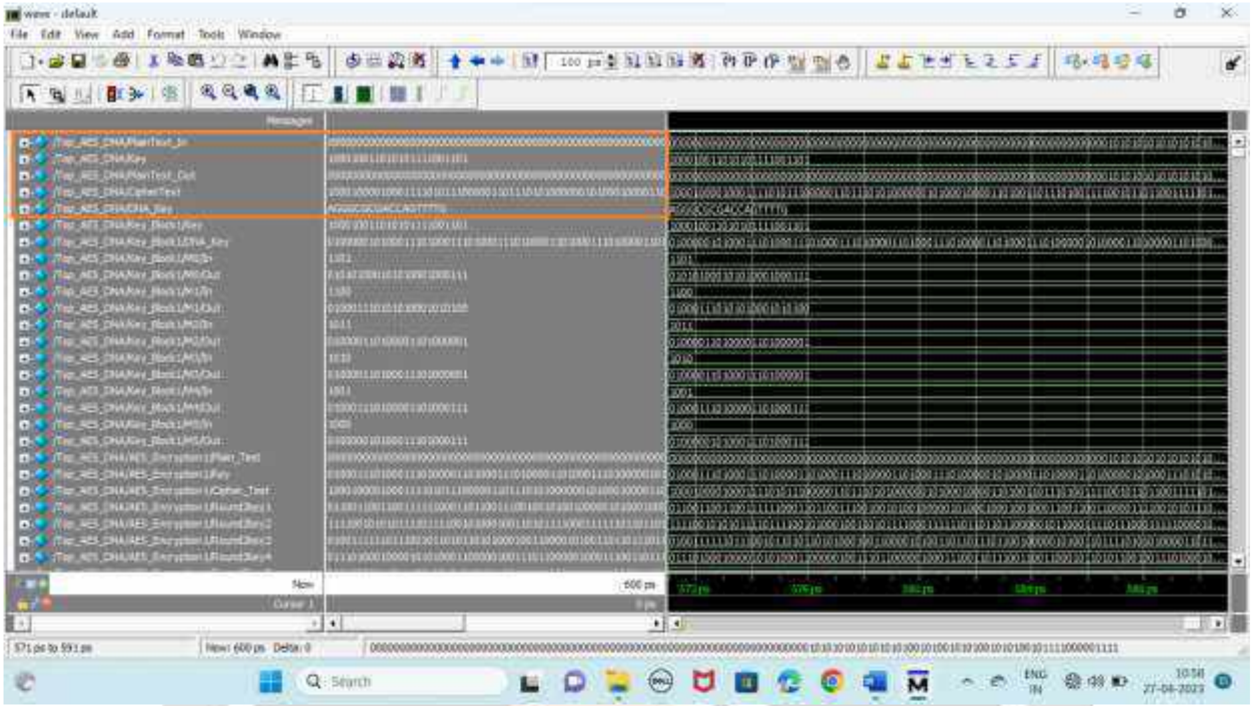


Fig 2: Final output of the encrypted and decrypted data.

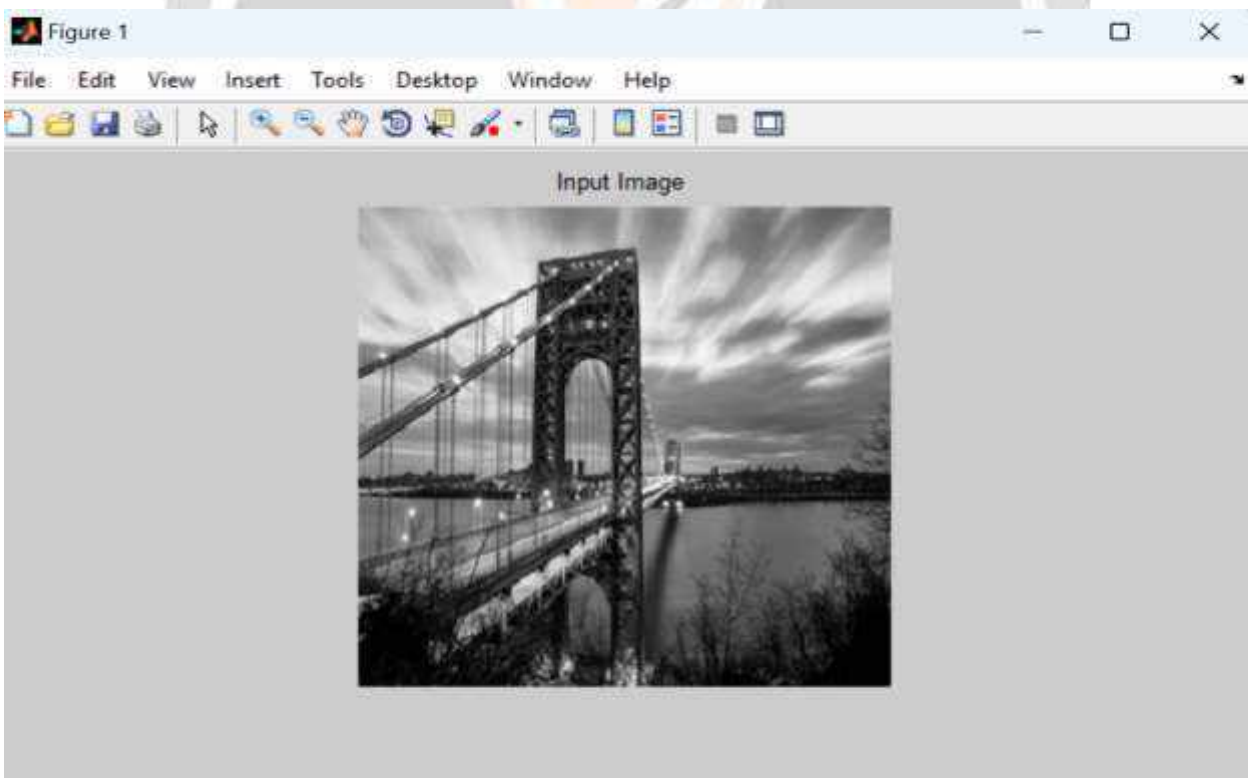


Fig 3: Input Image

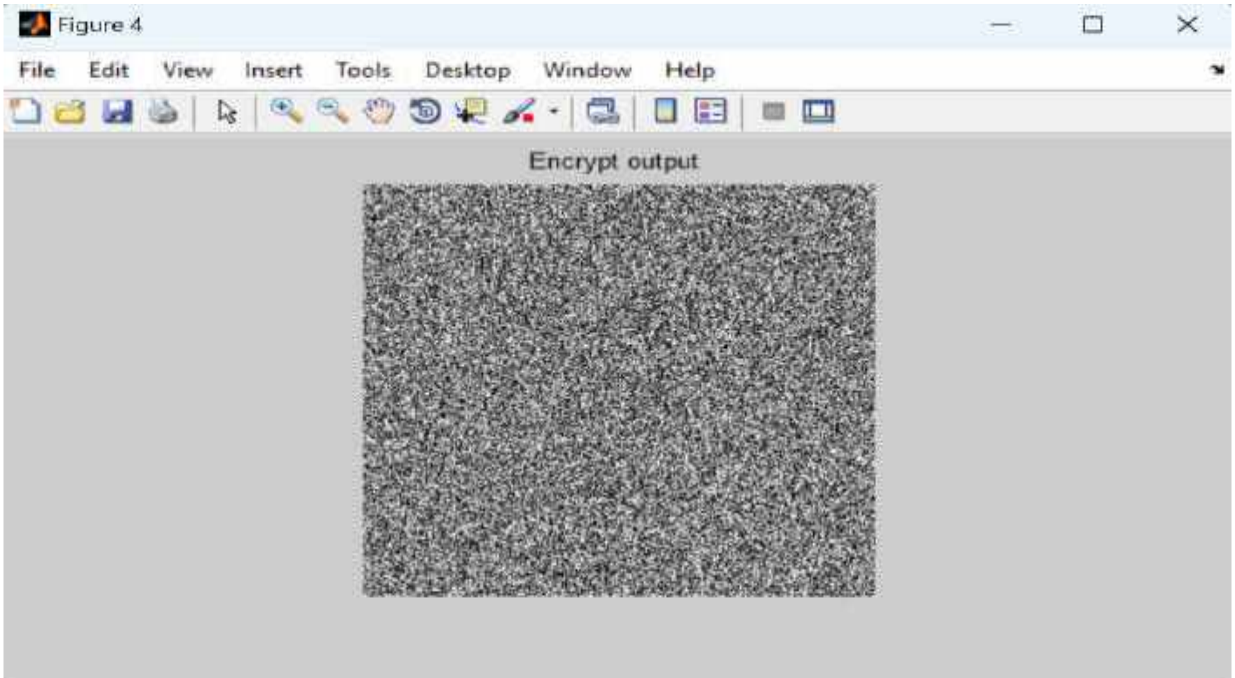


Fig 3: Encrypted Image Output

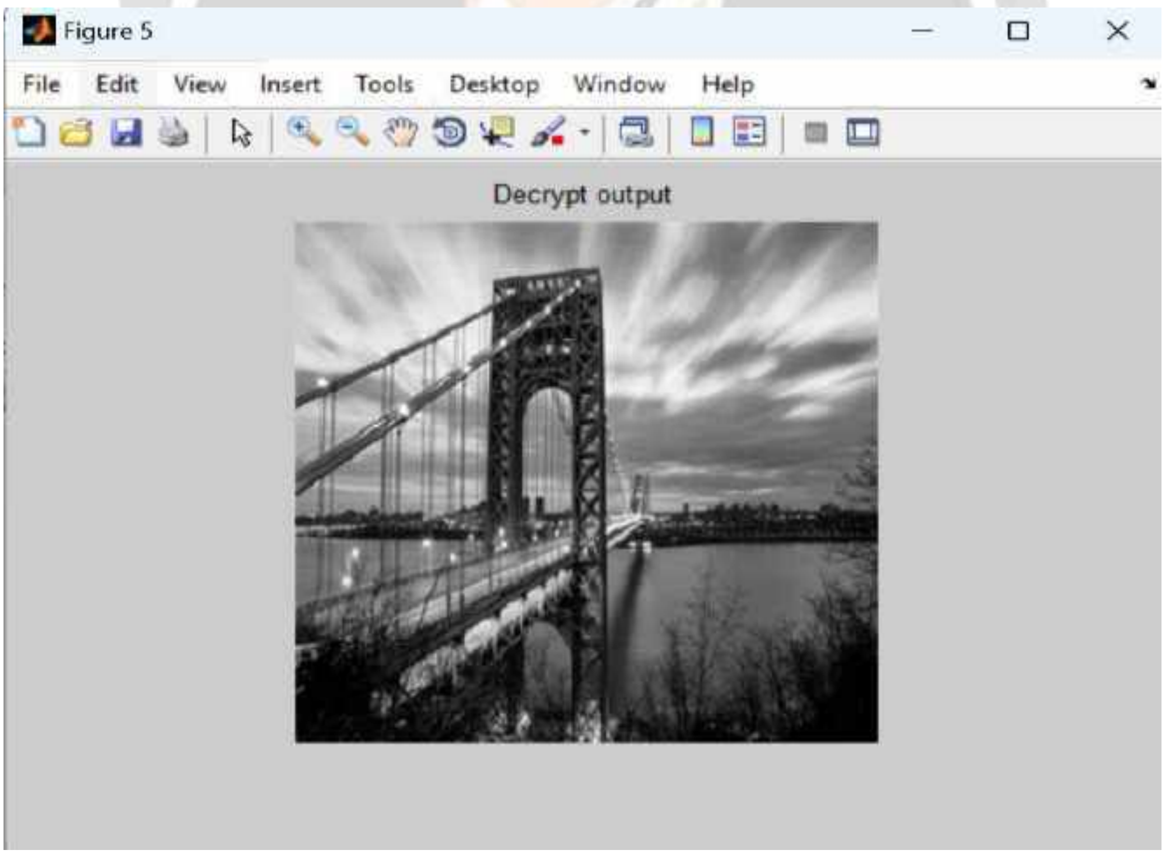


Fig 4: Decrypted Image Output

4. CONCLUSIONS

DNA-AES is a secure symmetric cryptography algorithm with a high level of security, which is widely used in many applications and networks. Thus, DNA-AES is a suitable algorithm for tiny IoT devices. In this article, we designed a lightweight AES architecture for resource-constrained IoT devices. The design had 8-bit data path and included two specified register banks for storing plain text, keys, and intermediate results. To reduce the required logic, Shift-Rows were run inside of the State- Register. Also, the design had an optimized Sub-Bytes that was shared with encryption and the key expansion phase, Furthermore, we designed mix-Columns with 8-bit input and output, which is a proper block for low-area design. To reduce the Area & power consumption, we applied the clock gating technique in different blocks of the design, which led to reduce the area by 30% on Virtex 5 xcVLX330T FF1738 -2 board.

5. REFERENCES

[1]. M. Masoumi, Differential power analysis: A serious threat for FPGA security, . J. Internet Technol. Secured Trans., vol. 4, no. 1, pp. 12–25 2012.

[2]. H. Yu, Z. Xue-Cheng, L. Zheng-Lin, and C. Yi-Chen, The research of DPA attacks against AES implementations, J. China Univ. Posts Telecommunication. vol. 15, no. 4, pp. 101–106, Dec. 2008.

[3]. J. Zhou and M. Yung, Eds, AES against first and second-order differential power analysis Applied Cryptography and Network Security, vol. 6123, Springer-Verlag, pp. 168–185. Berlin, Germany 2010.

[4]. X. Zhang and K. K. Parhi, High-speed VLSI architectures for the AES algorithm, **:** IEEE Trans. Very Large Scale Integr. (VLSI) Syst., vol. 12, no. 9, pp. 957–967 Sep. 2004

[5]. K. Fu and J. Blum, “Controlling for cybersecurity risks of medical device software,” Communication. ACM, vol. 56, no. 10, pp. 35–37, Oct. 2013.

[6]. D. Halperin, T. Kohno, T. S. Heydt-Benjamin, K. Fu, and W. H. Maisel, “Security and privacy for implantable medical devices,” IEEE Pervasive Comput., vol. 7, no. 1, pp. 30–39, Jan./Mar. 2008.

[7]. M. Rostami, W. Burleson, A. Jules, and F. Koushanfar, “Balancing security and utility in medical devices?” in Proc. 50th ACM/EDAC/IEEE Int. Conf. Design Autom., May/Jun. 2013, pp.

[8]. M. Zhang, A. Raghunathan, and N. K. Jha, “Trustworthiness of medical devices and body area networks,” Proc. IEEE, vol. 102, no. 8, pp. 1174–1188, Aug. 2014.

[9]. H. Khurana, M. Hadley, N. Lu, and D. A. Frincke, “Smart-grid security issues,” IEEE Security Privacy, vol. 8, no. 1, pp. 81–85, Jan./Feb. 2010.

[10]. M. Mozaffari-Kermani, M. Zhang, A. Raghunathan, and N. K. Jha, “Emerging frontiers in embedded security,” in Proc. 26th Int. Conf. VLSI Design, Jan. 2013, pp. 203–208.

CONTROL OF LONG RANGE QUADCOPTER USING NODEMCU

Ajay A M[1] , Akanksh Shetty[2], Basavaraju M[3] , Chandan J[4] , A Muruganandham[5]

[1,2,3,4] Student, Dept. of ECE, Rajarajeswari College of Engineering, Bangalore, Karnataka

[5] Asssociate Professor, Dept. of ECE, Rajarajeswari College of Engineering Bangalore, Karnataka

ABSTRACT

This is the design and implementation of a long-range quadcopter using the NRF24L01 wireless communication module. The quadcopter is controlled remotely using a joystick and a wireless communication link established between the ground station and the quadcopter using NRF24L01 modules. The quadcopter's control system comprises of an Arduino microcontroller, which receives commands from the ground station and sends control signals to the quadcopter's motors. The quadcopter's frame, motors, and propellers are designed for high efficiency and long-range flight. The system is tested in open spaces to validate its long-range capabilities and robustness in handling different weather conditions. This project demonstrates the feasibility of using NRF24L01 wireless communication modules for long-range drone control and highlights the importance of designing an efficient and reliable control system for drones to ensure safe and successful operation.

1.INTRODUCTION

The use of drones has become increasingly popular in recent years due to their versatility and wide range of applications. However, drones are often limited by their communication range, which can restrict their use in certain scenarios. This limitation can be overcome by using long-range wireless communication modules such as the NRF24L01, which can transmit data over long distances with low power consumption.

In this project, we explore the design and implementation of a long-range quadcopter using the NRF24L01 wireless communication module and an Arduino microcontroller. The quadcopter is remotely controlled using a joystick, and the communication link is established between the ground station and the quadcopter using NRF24L01 modules. The quadcopter's control system uses an Arduino microcontroller, which receives commands from the ground station and sends control signals to the quadcopter's motors.

This project aims to demonstrate the feasibility of using NRF24L01 wireless communication modules and an Arduino microcontroller for long-range drone control. The quadcopter's frame, motors, and propellers are designed for high efficiency and long-range flight. The system is tested in open spaces to validate its long-range capabilities and robustness in handling different weather conditions. This project highlights the importance of designing an efficient and reliable control system for drones to ensure safe and successful operation.

1.1 SYSTEM DESIGN

The system design for a long-range quadcopter using the NRF24L01 wireless communication module involves the following components:

Quadcopter Frame: The quadcopter frame is designed to be lightweight and durable. It should also have enough space to accommodate the control system components and batteries.

Motors and Propellers: The motors and propellers should be selected based on the weight of the quadcopter and the desired flight characteristics. High-efficiency motors and propellers are preferred for long-range flights.

Flight Controller: The flight controller is responsible for stabilizing the quadcopter in the air and controlling its movement. An Arduino microcontroller can be used as the flight controller in this project.

Wireless Communication Module: The NRF24L01 wireless communication module is used to establish a communication link between the ground station and the quadcopter.

Ground Station: The ground station consists of a joystick for controlling the quadcopter and a wireless communication module for transmitting control signals to the quadcopter.

Power Supply: The quadcopter and the ground station require a power supply to operate. Rechargeable lithium-ion batteries can be used for this purpose.

The system design involves integrating these components to create a functional long-range quadcopter. The NRF24L01 wireless communication module is used to establish a communication link between the ground station and the quadcopter. The ground station consists of a joystick for controlling the quadcopter, and the wireless communication module transmits control signals to the quadcopter's flight controller. The flight controller uses the control signals to adjust the quadcopter's motors, which in turn control the quadcopter's movement. The quadcopter's frame, motors, and propellers are designed for high efficiency and long-range flight.

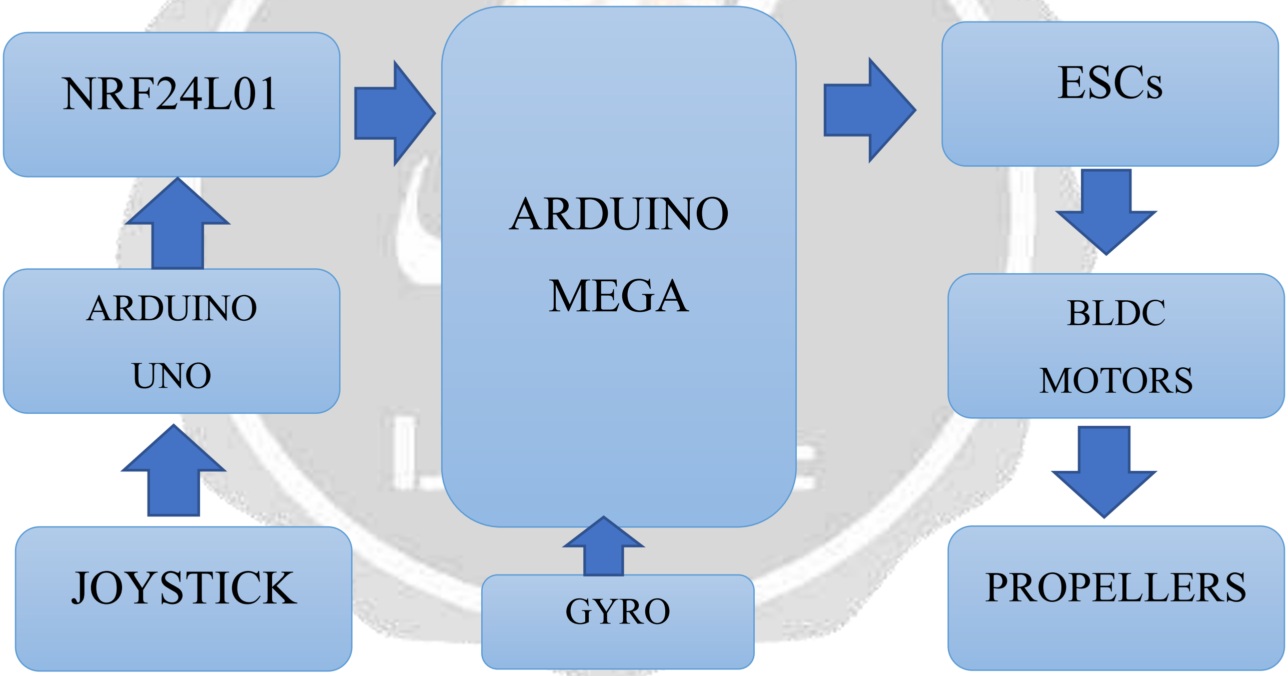


Fig.1. Block diagram of methodology

2. METHODOLOGY

The quadcopter frame should be designed to be lightweight and durable. The frame should also have enough space to accommodate the control system components and batteries. The motors and propellers should be selected based on the weight of the quadcopter and the desired flight characteristics. High-efficiency motors and propellers are preferred for long-range flights.An Arduino microcontroller can be used as the flight controller for the quadcopter. The flight controller should be programmed to stabilize the quadcopter in the air and control its movement. The NRF24L01 wireless communication module should be configured for use with the quadcopter's flight controller and ground station. The communication module should be tested to ensure that it can transmit data over long distances with low power consumption. The ground station consists of a joystick for controlling the quadcopter and a wireless communication module for transmitting control signals to the quadcopter. The joystick and wireless communication module should be tested to ensure that they can transmit control signals to the quadcopter's flight controller. The quadcopter's flight controller, wireless communication module, and power supply should be integrated into the quadcopter's frame. The quadcopter should be tested in open spaces to validate its long-range capabilities and robustness in handling different weather conditions.

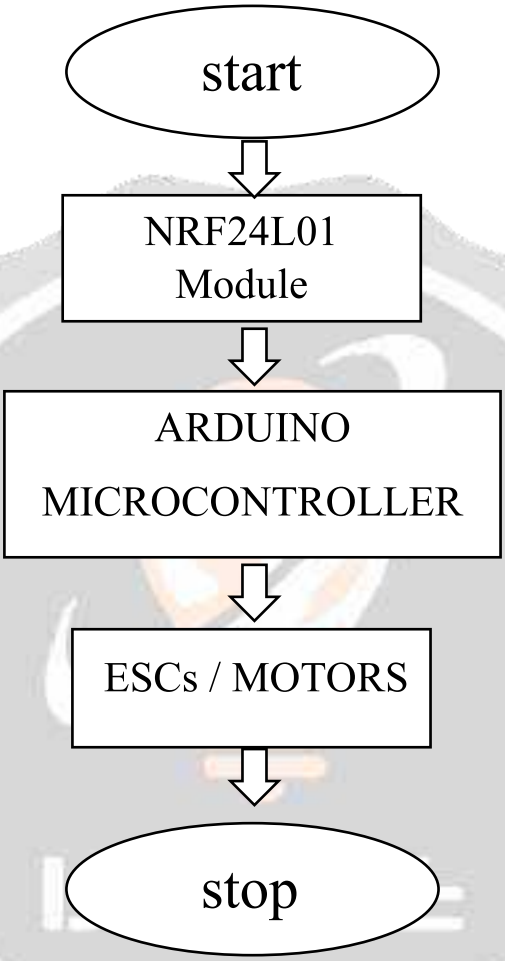


Fig.2. Flow Chart

3.RESULT

To achieve long-range communication using NRF24L01 in a quadcopter, it is essential to ensure the antenna is correctly positioned and optimized for maximum efficiency. Overall, using NRF24L01 for long-range communication in a quadcopter is cost-effective solution that provides reliable and efficient communication. However, it's crucial to consider the limitations and factors that may affect the range and take appropriate measures to optimize the communication.

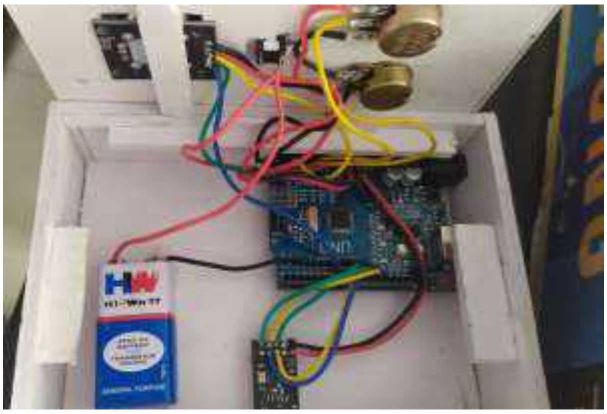


Fig 3. Transmitter

Fig 4. Reciever

4. Conclusion

The long-range quadcopter using the NRF24L01 wireless communication module is a powerful tool for aerial applications. The quadcopter can be used for various purposes such as aerial photography, surveying, and mapping, among others. The system design involves integrating components such as the quadcopter frame, motors, flight controller, and wireless communication module to create a functional long-range quadcopter. The methodology for building the quadcopter involves steps such as frame design, motor and propeller selection, flight controller design, wireless communication module setup, ground station design, integration, testing, and refinement. By following this methodology, a robust and efficient long-range quadcopter can be created. Overall, the NRF24L01 wireless communication module provides a reliable and low-power communication link that enables long-range flights, making it an excellent choice for building a long-range quadcopter.

5. REFERENCE

[1] "Voice controlled quadcopter controlling and its application," IEEE Access, vol. 6, no. 6, pp. 13866–13890, 2018.

[2] A. Ahmad, M. S. Alam, and R. Chabaan, "Quadcopter Flight Control," IEEE Trans. Transport. Electrific., vol. 4, no. 1, March 2018, pp. 38-63.

[3] "Dynamic Modelling and control of Quadcopter ," A. Ramezani and M. Narimani, IEEE Journal of Emerging and Selected Topics in Power Electronics, vol. 8, no. 4, Dec. 2020, pp. 3569–3581.

[4] W. Kim and I. Cortes, "Understanding Autonomous Drone Maneuverability for Internet of Things Application," IEEE/ASME Transactions on Mechatronics, vol. 23, no. 2, April 2018, pp. 875-882.

[5] "Voice controlled Unmanned Aerial Vehicle," IEEE Transactions on Magnetics, vol. 54, no. 11, pp. 1–5, Nov. 2018, by X. Liu, W. Han, C. Liu, and P. W. T. Pong.

CONTROL AREA NETWORK BASED AUTOMOTIVE SURVEIL

Ajay M[1], Spandana C S[2], Swathi J[3], Tousif Ali Muzawar[4], Syed Avez Hussain[5]

[1] Assistant professor, ECE, Rajrajeswari college of Engineering, Karnataka, India
[2] Spandana C S , ECE, Rajrajeswari college of Engineering, Karnataka, India
[3] Swathi J, ECE, Rajrajeswari college of Engineering, Karnataka, India
[4] Tousif Ali Muzawar, ECE, Rajrajeswari college of Engineering, Karnataka, India
[5]Syed Avez hussain , ECE, Rajrajeswari college of Engineering, Karnataka, India

ABSTRACT

The use of Control Area Network (CAN) in automotive surveillance systems has become increasingly common. CANprovides a reliable and high-speed communication protocol that allows for real-time monitoring of critical vehicle parameters, such as engine speed, fuel consumption, and emissions. In a typical automotive surveillance system, sensors are used to measure various parameters of the vehicle and transmit the data to a central control unit via the CAN bus. The control unit then processes the data and generates alerts or takes corrective actions as necessary. One of the key benefits of using CAN in automotive surveillance is its ability to provide deterministic communication, which is critical in safety-critical applications. CAN also allows for easy integration of sensors and control units from multiple vendors, which simplifies system design and reduces costs. Another advantage of using CAN in automotivesurveillance is its ability to operate in harsh environments. CAN is designed to operate in noisy environments and can withstand extreme temperatures, making it well-suited for use in vehicles.

KEYWORDS: *CAN transreceiver, ATmega328p microcontroller, ultrasonic sensor, temperature sensor, alcoholic sensor, bumpsensor, LCD, LED/Buzzer*

1.INTRODUCTION

Nowadays accidents occur due to mistake done by the driver. An intelligent system needs to be developed to overcome these mistakes. So this system finds where the mistake is done by the driver are eliminated. Most of the intelligent car systems have monitoring systems only. Antilock brakes, speed sensors and other automatic systems are present in sports car and other luxury cars only. But these cars are not affordable to everyone. So, a system needs to be developed which can be implemented in every car. A system of sensors that is placed within a car to warn its driver of any dangers that may lie ahead on the road. Some of the dangers that these sensors can pick up on include how close the car is to other cars surrounding it, how much its speed needs to be reduced while going around a curve, and how close the car is to going off the road.
Control Area Network (CAN) is a widely used bus standard in the field of automation, automotive, and industrial control systems. It is a serial communication protocol designed to allow micro-controllers and devices to communicate with each other in real-time without the need for a host computer. CAN is a message-based protocol, meaning that data is transmitted in packets called frames.

Each frame consists of an identifier, a data field, and control bits, which are used for error detection and message validation Can has several advantages over other communicationprotocols, including its high speed, reliability, and ability to operate in harsh environments. It is also highly scale ableand can support multiple devices on a single bus. One of the key benefits of CAN is its ability to provide deterministiccommunication, which is critical in applications where timing is important, such as in automotive and industrial control systems. CAN is also well-suited for distributed control systems, where multiple devices need to communicate with each other over a network. Overall, CAN has become a fact standard in many industries and is

widely used in applications ranging from automotive systems to factory automation and building control systems.
The system uses sensors that sends and receives signals from things like other cars; obstacles in the road, traffic lights, and even a central database are placed within the car and tell it of any weather or traffic precautions. A situation that provides a good example of how system works is when a driver is about to change lanes, and there is a car in his blind spot. The sensors will detect that car and inform the driver before he starts turning, preventing him from potentially getting into a serious accident. Ultrasonic sensor is adopted to measure the distance with respect to the previous car, the currently available ultrasonic sensors for vehicles are adopted for approaching cars with relatively low speed. While the rough reading of distance data cannot be applied, an intelligent approach is proposed to process the raw distance readout of sensors to produce appropriate warning signals. Also an alcoholic sensor is included in the car to monitor the person in the car; if the person appears to be drunk the transmission will be automatically switched off. If accident occurs then bump sensor detects accident and immediately sends SMS to hospitals and police station about location of accident.

2.DRAWBACKS OF THE EXISTING SYSTEM

- There is a limit to the number of nodes or devices to be connected. You can connect a maximum of 64 nodes in CAN.
- The nodes communicate in an undesirable fashion.
- CAN is established to be up to 40 meters in length. It will have trouble if the vehicle or machine has more than 40 meters of length.
- To develop CAN the cost of software development and maintenance is high.
- Due to different voltage levels, CAN produces a lot of electric noise.

3.METHODOLOGY

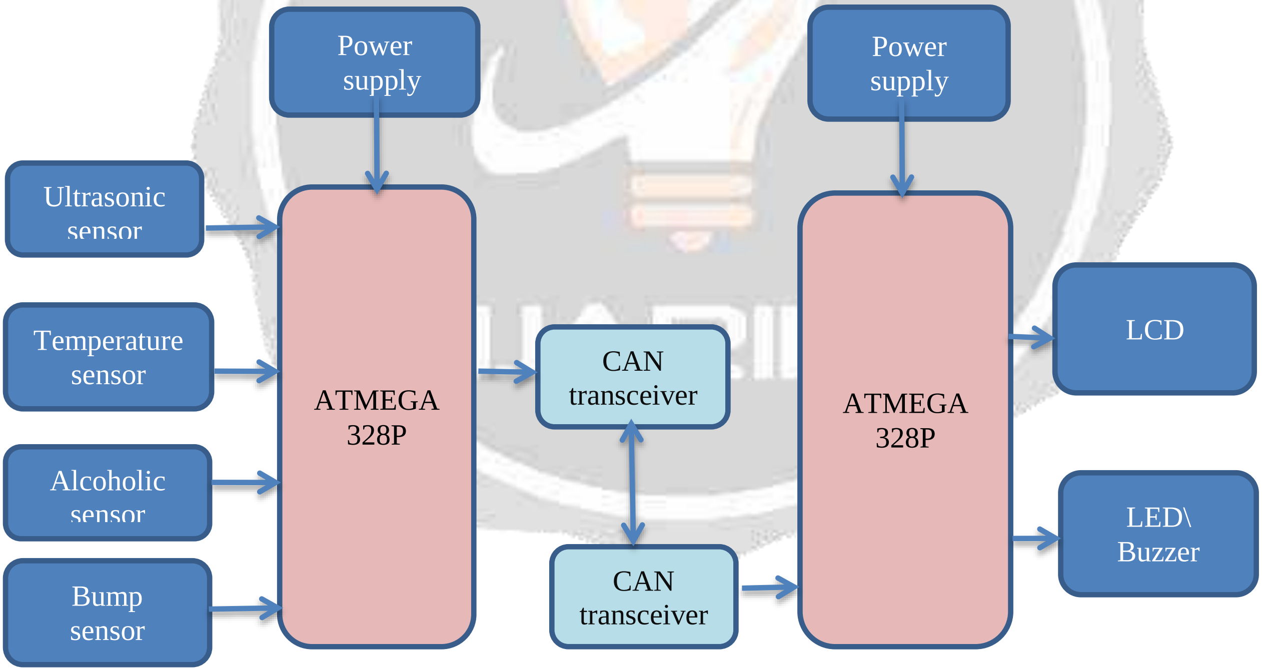
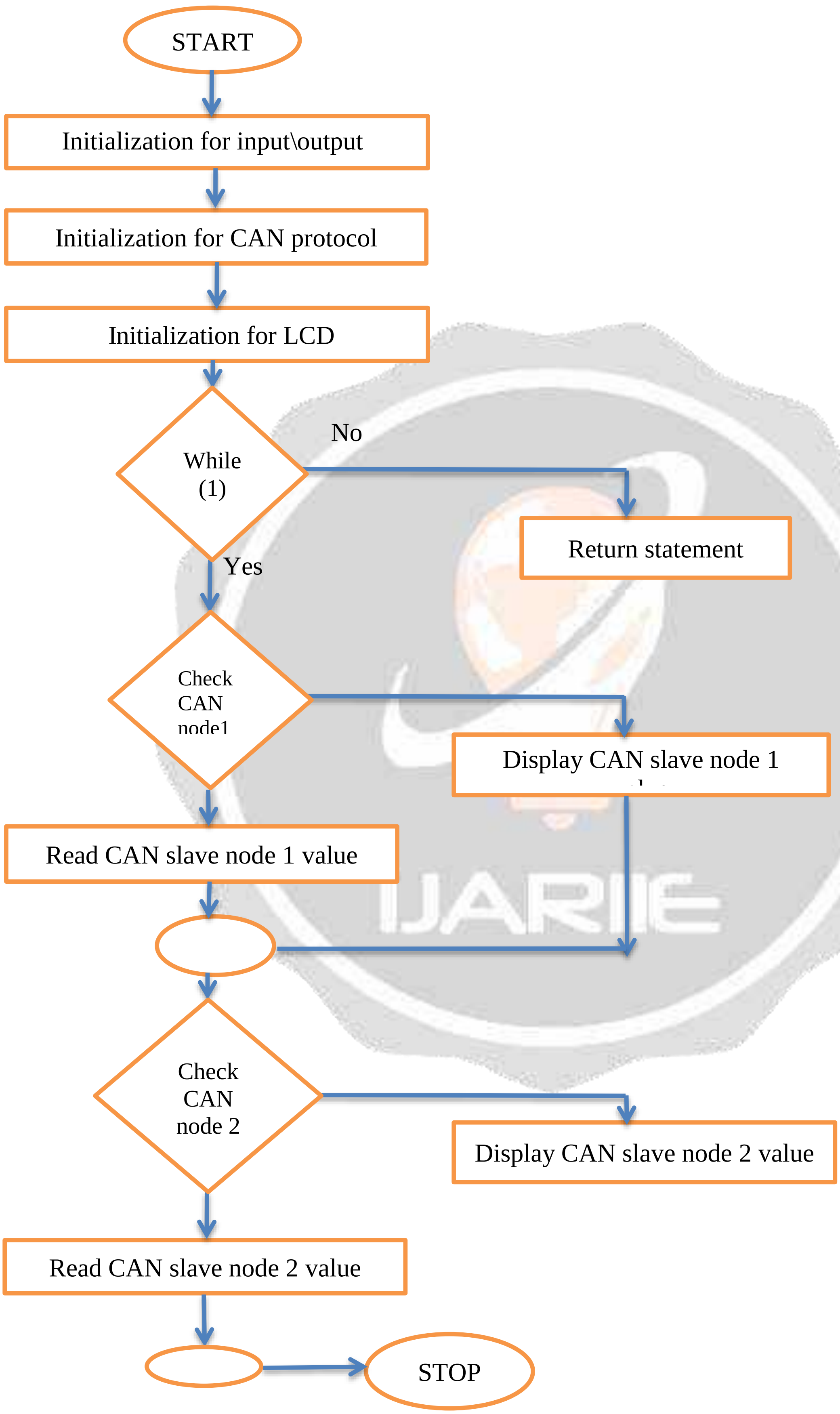


Fig.1 Block Diagram

PROGRAM FLOW DIAGRAM



Vehicles are complex machines with a huge number of components that need to communicate with each other. That's why a Controller Area Network was invented. Tom Denton explains how the technology works**.** These days, all modern vehicles, from conventional combustion-powered cars to the latest EVs, feature a Controller Area Network (CAN) bus. It's the electronic communications system that allows different parts of the vehicle to talk to each other, including the engine, the transmission and the brakes. In effect, it's a car's central nervous system. Invented by Bosch and first used on the Mercedes-Benz S-Class in 1991, the CAN bus initially linked five engine control units (ECUs) in an effort to improve performance and safety by enabling the faster flow of real-time data around the car. The CAN bus network was designed to combine (or multiplex) those messages, thereby reducing the amount of electrical wiring (and weight) required. It was a step up from what had come before, which had consisted of two-way receivers and transmitters which simply couldn't cope with several things communicating at once.

A CAN bus works by allowing any device in the network to create a "data frame", the standard message format, and transmit it sequentially. If more than one device transmits at the same time, the highest priority device continues while the others wait. Frames are received by all ECU nodes in the network and consist of an ID, a message and other items such as error correction bits. The physical network on most cars is made up of a twisted pair of thin wires known as CAN high (CAN-H) and CAN low (CAN-L). Coaxial cables and fibre optics can also be used. Using a gateway to control data traffic, most vehicles now have several different networks – for the body, the powertrain and the infotainment system, for example. Unlike the 1991 S-Class, today's vehicles might have dozens of ECUs, including ones for the engine, the transmission control, the airbags, the ABS, the traction control and the stability control. The CAN bus allows these areas to communicate with each other in real time, prioritising the most important information and helping to improve vehicle safety and performance.

5.RESULT

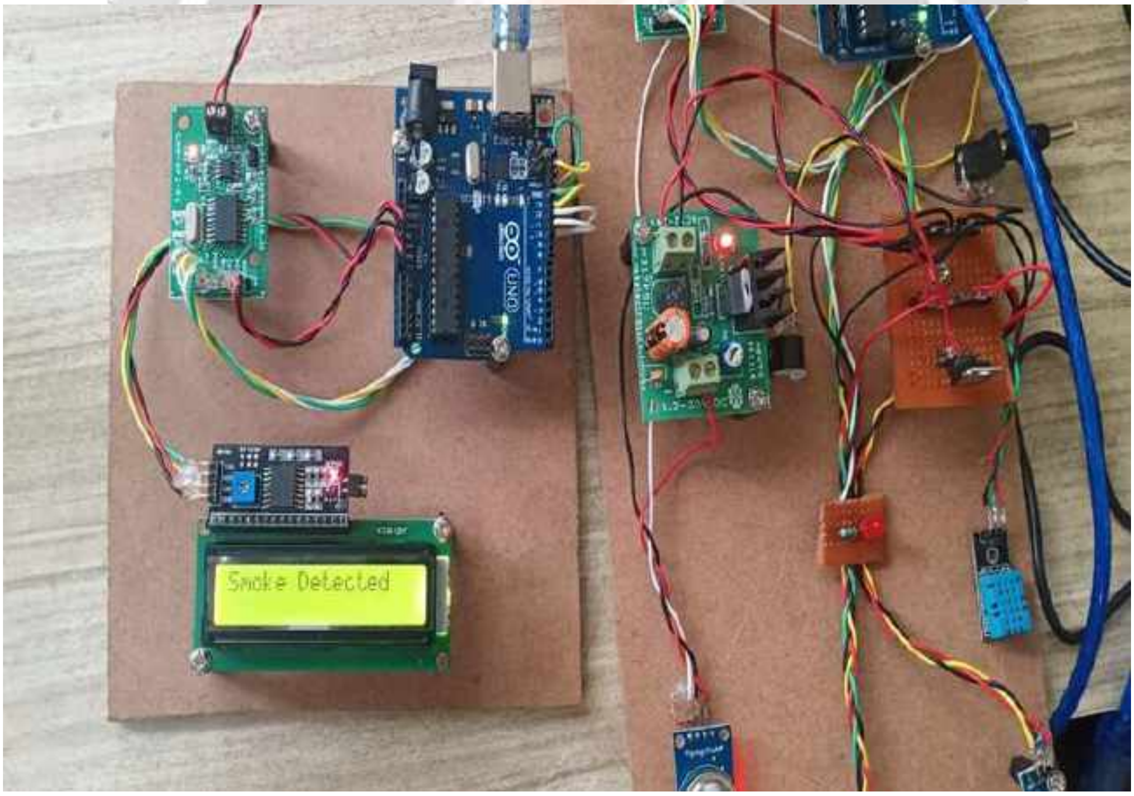


Fig.3 Detection of Alcohol

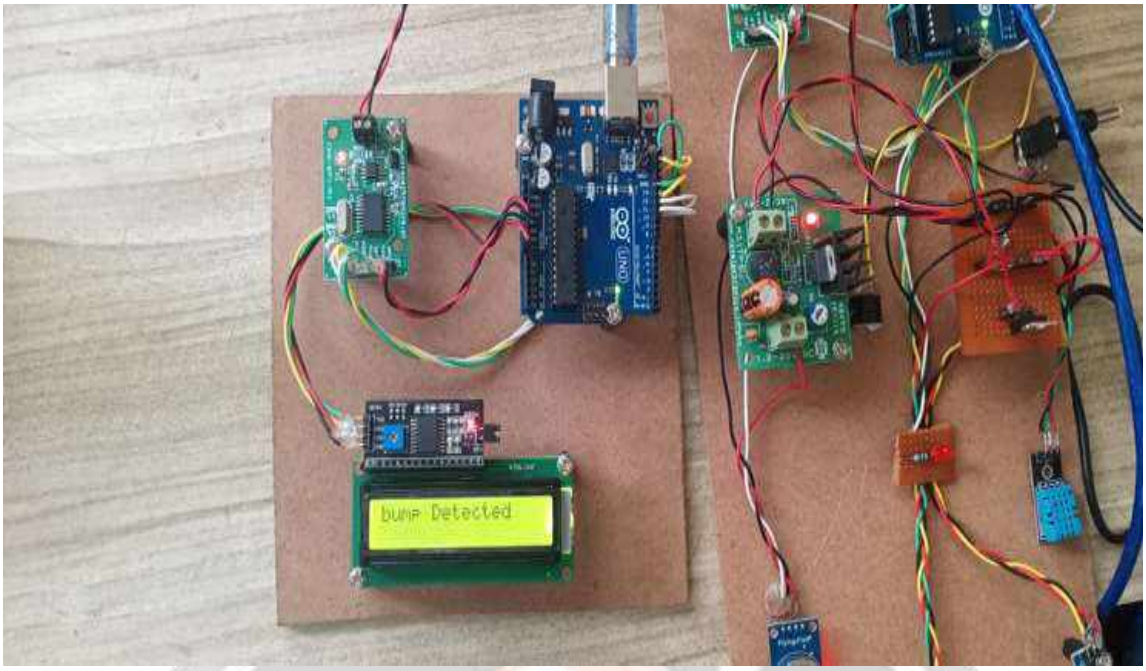


Fig.4 Detection of Obstacle using Bump Sensor

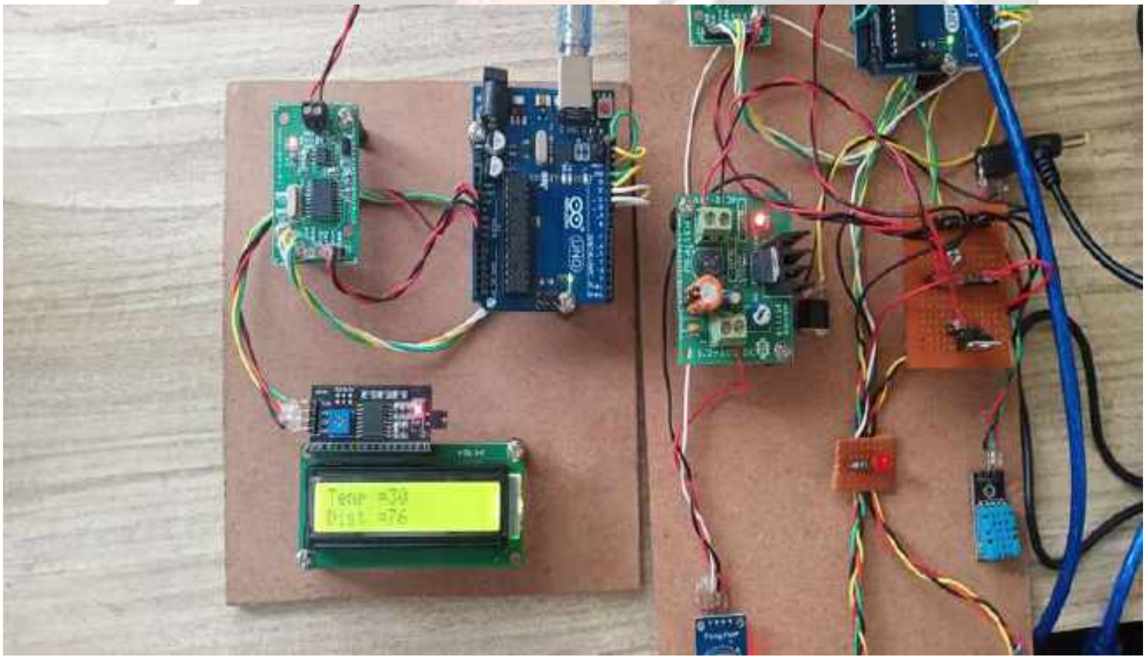


Fig.5 Detection of Temperature and Distance of the object

6.CONCLUSION

This project introduces an embedded system with a combination of CAN bus systems. Digital control of the vehicle is an important criterion of modern technology. With the rapid development of embedded technology, high-performance embedded processor is penetrated into the auto industry, which is low cost, high reliability and other features to meet the needs of the modern automobile industry. The proposed high-speed CAN bus system solves the problem of automotive system applications, also has a certain practical value and significance. With ARM as the main controller and it makes full use of the high-performance of ARM, high-speed reduction of CAN bus communication control networks and instrument control so as to achieve full sharing of data between nodes and enhance their collaborative work. This system features efficient data transfer among different nodes in the practical applications.

7.FUTURE SCOPE

Due to the increasing number of electronic devices, the need for a standardized standard communication protocol came. Of example, of various subsystems, including dashboards, drive controls, engine control systems, and much more, there can be over 7 TCU in a modern vehicle. When all nodes are connected one by one, the speed of communication is very high, but the expense and size of the wires are very small. For example, an individual dashboard needs 8 connections so the CAN is implemented to solve this issue as a centralized solution requiring two wires: the high CAN and the low CAN. Due to its message prioritization, the CAN protocol solution is very powerful and can be added or removed without disrupting the network as a node is versatile.

The CAN protocol was initially developed to fix the communication issue in the vehicles. Nonetheless, it would also be used in many other fields due to its functionality.

The application of the CAN protocol is as follows:

- Automation Building
- Escalators and Elevator
- Mechanical Control and Industrial Automation
- For navigation and aviator Electronic equipment
- The CAN is used for transmission airbags, antilock braking, electric powersteering etc.
- It is used in railways applications such as streetcars, trams, undergrounds light railways, and long distance trains incorporate.
- Every kind of vehicle: motorcycles, automobiles, trucks…
- Heavy-duty fleet telematics
- Airplanes
- Elevators
- Manufacturing plants of all kinds
- Ships
- Medical equipment
- Predictive maintenance systems
- Washing machines, dryers, and other household appliances.

8.ACKNOWLEDGEMENT

We would like to express our gratitude to our guide, Ajay M, Assistant Professor of the Department, Electronics and Communication Engineering, Rajarajeswari college of Engineering, Bengaluru, for his invaluable contributions to our knowledge and for guiding us in an unfamiliar environment, as well as his constant motivation and encouragement.

9.REFERENCES

[1] A Wavelet-Based Intrusion Detection System for Controller Area Network (CAN). This work was supported by the Republic of Turkey Ministry of NationalEducation, 2021.

[2] Review of Researches in Controller Area Networks Evolution and Applications. Department of Computer and Communication Systems, Faculty of Engineering, University Putra Malaysia, UPM Serdang, 43400 Selangor, Malaysia, 2017.

[3] Speed Synchronization Control for Integrated Automotive Motor-Transmission Powertrains Over CAN Through a Co-Design Methodology the National. Key Research and Development Program of China under Grant 2017YFB0103801, 2019.

[4] Kumar, M. A.Verma, and A. Srividya, Response-Time “Modeling of Controller Area Network (CAN). Distributed Computing and Networking, Lecture Notes in Computer Science Volume 5408, p 163- 174, 2009.

[5] Tindell, K., A. Burns, and A.J. Wellings, Calculating controller area network (CAN) message response times. Control Engineering Practice, 3(8):p. 1163-1169, 2005.

[6] Li, M., Design of Embedded Remote Temperature Monitoring System based on Advanced RISC Machine. Electrotechnics Electric, 06, p. 273,2009.

[7] Prodanov, W., M. Valle, and R. Buzas, A controller area network bus transceiver behavioral model for network design and simulation. IEEE Transactions on Industrial Electronics, 56(9): p. 3762-377, 2009.

[8] ISO (1993). Road Vehicles: Interchange of Digital Information: Controller Area Network (CAN) for High Speed Communication. ISO 11898:1993.

[9] B.Gmbh, “CAN specification” vol 1 Version 2.0, 1991.

[10] Pazul, “Controller Area Network (CAN) Basics”, Microchip technology Inc., AN713, May 1999.

POSITION DETECTION FOR WIRELESS CHARGING OF ELECTRIC VEHICLES

[1]Jaswanth Gowda AC, [2]Kaliprasad M, [3]Manoj D, [4]Manjunath Uppar, [5]V Sreepathi,

[1,2,3,4] *Student, Dept. of ECE, Rajarajeswari College of Engineering, Bangalore, Karnataka*

[5] *Asssociate Professor, Dept. of ECE, Rajarajeswari College of Engineering Bangalore, Karnataka*

Abstract

For a number of years, wireless charging for electric cars (EVs) has been under research in anticipation of the increased usage of these vehicles. EVs may now be charged effectively and conveniently using wireless charging devices. from a similar ground source, originating from several classes and at a variety of power levels. The method to identify the aligned position of the transmitter and receiver coil, they are utilised in wireless charging for electric vehicles is presented in this study. The use of a retroreflective photoelectric sensor can improve the precision and dependability of a traditional position detecting system. With the suggested technique, the system runs continuously at its most effective efficiency and more accuracy. The technology of wireless power transmission (WPT) is gaining popularity and finding use in a variety of fields. Without the need for interconnections, power is transmitted from a source to an electrical load. Where physical wiring is impractical or impossible, WPT can be used to power electrical equipment. The suggested system also incorporates Internet of Things (IoT) technology, which enables remote monitoring and control. experimental analysis of the system's effectiveness using and without presented technique are compared to validates the proposed system.

1. INTRODUCTION

These days, the use of electric cars (EVs), which are the vehicles of the future, is increasing. They meet the requirements of the low-carbon society by having zero tailpipe emissions. In comparison to conventional internal combustion engine vehicles (ICEVs), they use less energy. Additionally, the cost of operation and upkeep is significantly reduced. Electric vehicle (EV) charging systems can be either conductive (wired) or wireless. The conductive charger requires the thick mechanical plug and heavy wire.

In contrast, a wireless charger doesn't require physical touch, which ensures user convenience and safety against electric shock or spark. Additionally, it is waterproof, allowing for use in harsh environments [1]–[2]. A typical wireless charging setup for EVs is shown in Figure 1 [3]. The transmitter (TX) coil receives high frequency current generated by an inverter circuit, which produces a high frequency magnetic field. This field induces a voltage when it passes through the receiver (Rx) coil.

This voltage is rectified before being transmitted to the battery to charge it. Resonant networks are connected to both the TX and Rx coils to make up for the reactive power required by the coupled coil. The Tx and Rx coils must be positioned so that they share the same centre in order to get the optimal magnetic coupling. However, as can clearly be observed in Fig. 1, the TX and Rx coil misalignment can occur in actual operation. As a result, the magnetic coupling degrades, which lowers the system efficiency. The position detection system was previously implemented to make sure both coils locate at the aligned location where the system efficiency is maximised research effort. The radio frequency identification (RFID) and magnetic field coupling technique-based location approach is described in [4]. Despite achieving excellent accuracy, the accompanying circuit and control are rather complex. The misalignment-sensing coils that were utilised to take advantage of magnetic-field symmetry and provide a measurement of the direction and magnitude of the misalignment are described in [5]. This approach is challenging to use and needs additional circuits, such as rectifier and filter. Using a tunnelling magneto resistive (TMR) sensor, a coil-misalignment detection method is introduced in [6]. Due to nonlinearity and saturation, this sensor's restriction prevents it from being employed in high magnetic fields.

In this study, a retroreflective photoelectric sensor is used to find the aligned position between the TX and Rx coils. The system is monitored and operated online via IoT platform and after the aligned position is recognised, the controller begins charging the EV's battery. The proposed method is simple, accurate, and trustworthy. Through MIT programmes, real-time battery status is accessible from anywhere at any time [7]. The user receives the notification automatically once the battery is fully charged. Experimental measurements from micro EVs with 12 V batteries.

2. PROBLEM STATEMENT

In recent years, electric vehicles (EVs) have drawn a lot of interest as a green means of transportation that can aid in lowering greenhouse gas emissions. The requirement to often recharge EVs is one of the main difficulties faced by EV owners. The majority of EVs now use plug-in charging systems, which necessitate that the driver physically attach the vehicle to a charging station. This procedure might be annoying, especially for people who leave their cars in public parking lots or on the street.

EV wireless charging systems have come to light as a potential fix for this issue. These systems transmit electrical energy wirelessly from a charging pad to the vehicle's battery via electromagnetic induction or resonant magnetic coupling. While wireless charging is practical and simple to use, there are a number of issues that need to be resolved.

The effectiveness of the charging system is one of the major issues. In comparison to plug-in systems, wireless charging solutions are often less efficient, which can lead to longer charging times and more energy losses. Installing wireless charging infrastructure can be more expensive than plug-in solutions, which presents another difficulty.

3. PROPOSED SOLUTION

Inductive charging: Inductive charging involves transferring energy between two items, such as a charging station and an electric vehicle, using an electromagnetic field. When a car is parked on the charging pad, power is wirelessly delivered to the car's battery. The charging pad is wired to a power source. It is easy to apply inductive charging in a number of locations, including parking lots and garages.

Standardisation: One of the main barriers to the adoption of this technology is the absence of a standardised wireless charging mechanism. The adoption of various technologies and standards by manufacturers makes it challenging for users to locate charging stations that are compatible. Wireless charging system standardisation helps ensure compatibility and lower costs for manufacturers.

Efficiency: Compared to conventional cable charging, wireless charging is typically less efficient. This occurs as a result of energy losses that take place during wireless power transmission. Increasing the effectiveness of wireless charging systems can reduce energy waste and enhance the technology's overall performance.

In general, cooperation and creativity are needed among automakers, technological firms, and regulatory agencies to address these difficulties. We can overcome these obstacles and make wireless charging for electric vehicles a practical and widely used technology by cooperating.

System Design

The proposed wireless charging system for electric vehicles uses a DC voltage source, full-bridge inverter, and transmitter coil. A retroreflective photoelectric sensor is used to detect the relative position between transmitter and receiver coil. A 12 V battery with 1.2 Ah capacity is adopted for the EV. Wireless communication between charging station and EV can be achieved by using the Node MCU ESP32 microcontroller unit. Charging of the EV's battery can be controlled in both constant current (CC) and constant voltage (CV) mode.

We connect the google fire base by Arduino ide. Google fire base are use to store the data. Data are coming from while operate the vehicles using mit app. L293d motor driver are used to drive the motor in electric vehicles. Transmitting coil we are supplying power 12v.

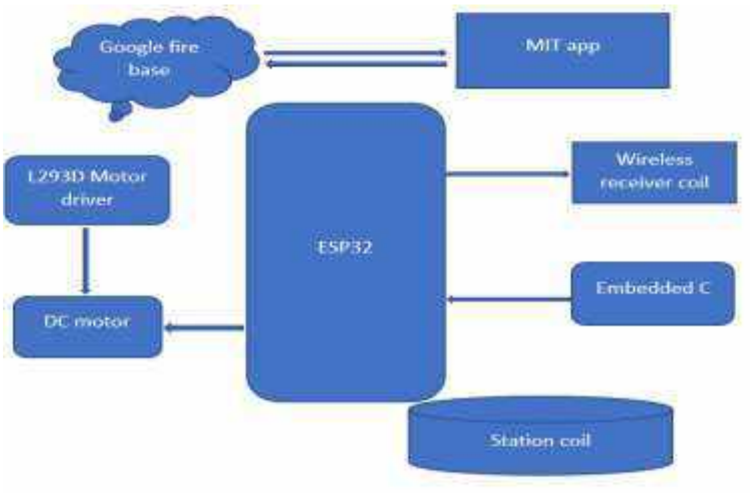


Fig1.Block diagram

Methodology

First we connect the Node Mcu esp32 using Arduino ide with connection of wi-fi then we operate vehicle using mit app by moving forward, backward, right, left to identify transmitter and receiver coil are in align position when the transmitter and receiver coil are in align position electric vehicle get charged. After vehicle get full charged then vehicles are started to move.

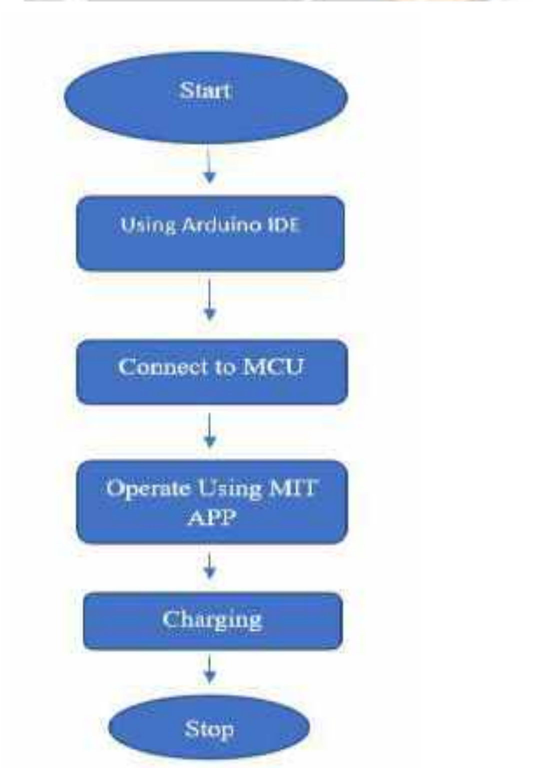


Fig2.Flow diagram

A technology called wireless charging for electric vehicles (EVs) enables EVs to recharge their batteries without coming into direct touch with a charging cable or plug. The process for wirelessly charging EVs involves the stages listed below:

1.Establish the required charging power for the EV as the first stage in the wireless charging process. This depends on the battery's capacity, how quickly it charges,

2. Create the charging system: The wireless charging system must be made when the required charging power has been determined. This entails building the charging pad and the power transfer system.

3. Decide on the charging frequency: The wireless power transfer rate from the charging pad to the EV is determined by the charging frequency. The effectiveness of the power transfer mechanism should be taken into account while choosing the frequency.

4. Put the charging pad in place: The charging pad is put in place so that an electric vehicle (EV) can park on top of it and receive a wireless charge. To obtain the power required to charge the EV, the charging pad is connected to the electrical grid.

5. Align the EV with the charging pad: For wireless charging to work, the EV must be precisely positioned on the charging station. Using sensors, this can be carried out automatically or manually.

6. Start the charging procedure: The charging procedure can start after the EV is positioned in relation to the charging station. Magnetic induction or resonant coupling are used to wirelessly transfer electricity from the charging pad to the EV's battery.

7. Keep an eye on the charging process: The charging system needs to be kept an eye on to make sure the power transfer is secure and effective. Any problems should be quickly identified and fixed.

8. Stop charging: Once the EV's battery is fully charged, you can halt the charging process. The EV can be driven away after being unplugged from the charging station.

In conclusion, the methodology for wirelessly charging electric vehicles (EVs) entails figuring out the necessary charging power, designing the charging system, choosing the charging frequency, installing the charging pad, aligning the EV with the charging pad, starting the charging process, watching the charging process, and stopping the charging process.

4. RESULT

The widespread use of wireless charging technology may face restrictions and difficulties as it is still in the early stages of development. For instance, wireless charging devices might be less effective over greater distances, and electromagnetic radiation's potential effects on human health and the environment might be a cause for concern.

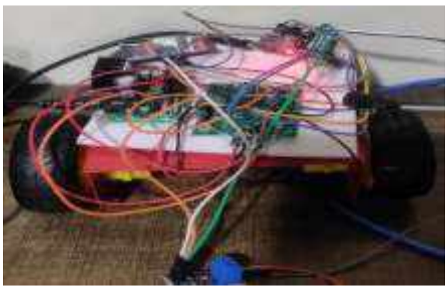


Fig3.circuit connection

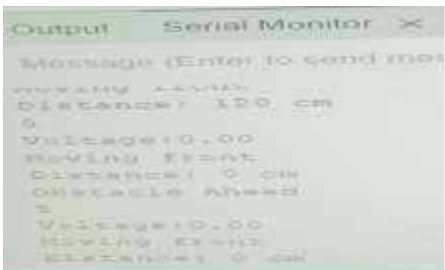


Fig4.output on serial monitor

5. CONCLUSION

This paper describes the method for detecting the aligned position of the transmitter and receiver coils used in wireless charging of electric automobiles. Adoption of the retroreflective photoelectric sensor The experimental findings demonstrate that the suggested technique can boost system efficiency.

6. REFERENCES

[1] "A comprehensive study of implemented international standards, technical challenges, impacts, and prospects for electric vehicles," IEEE Access, vol. 6, no. 6, pp. 13866–13890, 2018.

[2] A. Ahmad, M. S. Alam, and R. Chabaan, "A thorough review of wireless charging technologies for electric vehicles," IEEE Trans. Transport. Electrific., vol. 4, no. 1, March 2018, pp. 38-63.

[3] "Optimised Electric Vehicle Wireless Chargers With Reduced Output Voltage Sensitivity to Misalignment," A. Ramezani and M. Narimani, IEEE Journal of Emerging and Selected Topics in Power Electronics, vol. 8, no. 4, Dec. 2020, pp. 3569–3581.

[4] W. Kim and I. Cortes, "Lateral Position Error Reduction Using Misalignment-Sensing Coils in Inductive Power Transfer Systems," IEEE/ASME Transactions on Mechatronics, vol. 23, no. 2, April 2018, pp. 875-882.

[5] "Marker-Free Coil-Misalignment Detection Approach Using TMR Sensor Array for Dynamic Wireless Charging of Electric Vehicles," IEEE Transactions on Magnetics, vol. 54, no. 11, pp. 1–5, Nov. 2018, by X. Liu, W. Han, C. Liu, and P. W. T. Pong.

[6] W. Kim and I. Cortes, "Lateral Position Error Reduction Using Misalignment-Sensing Coils in Inductive Power Transfer Systems," IEEE/ASME Transactions on Mechatronics, vol. 23, no. 2, April 2018, pp. 875-882.

[7] "Optimised Electric Vehicle Wireless Chargers With Reduced Output Voltage Sensitivity to Misalignment," A. Ramezani and M. Narimani, IEEE Journal of Emerging and Selected Topics in Power Electronics, vol. 8, no. 4, Dec. 2020, pp. 3569–3581.

[8] G.Buja, N.Zabihi, and M. Bertoluzzo "Overview on Battery Chargers for Plug-in Electric Vehicles," Proceedings of the 15th International Power Electronics and Motion Control Conference (EPE-PEMC 2020 ECCE), 2020, pp. 1–7.

[9] M.C. Kisacikoglu, B. Ozpineci, and L.M. Tolbert, "Examination of a PHEV bidirectional charger system for V2G reactive power compensation", in Proc. of IEEE Applied Power Electronics Conf. and Exposition, 2018, pp. 458–464.

[10] "Inductive Power Transfer for Electric Vehicles," Proceedings of the IEEE, vol. 101, no. 6, June 2017, pp. 1554–1564. T. Akinaga, A. Matsuo, H. Uehara, and K. Nishikawa.

ENCRYPTION OF DATA USING AES 256 IN VERILOG

Swetha[1], Trikaleshwar[2], Tejas I Telkar[3], Thakshith B K[4], Vijaya S M[5]

[1]*Student, Electronics and Communication Engineering, Rajarajeswari College of Engineering, Karnataka, India*

[2]*Student, Electronics and Communication Engineering, Rajarajeswari College of Engineering, Karnataka, India*

[3]*Student, Electronics and Communication Engineering, Rajarajeswari College of Engineering, Karnataka, India*

[4]*Student, Electronics and Communication Engineering, Rajarajeswari College of Engineering, Karnataka, India*

[5]*Associate Professor, Electronics and Communication Engineering, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

The Advanced Encryption Standard (AES) algorithm is one of the most widely used symmetric block cipher algorithms in the world. This algorithm has a unique structure for encrypting and decrypting sensitive data and is used in hardware and software around the world. It is very difficult for a hacker to get the actual data when it is encrypted with the AES algorithm. There is currently no evidence that this algorithm has been cracked. AES can handle three different key sizes like AES 128, 192, and 256 bits, and the block size for each of these ciphers is 128 bits. This project will design the hardware architecture and implement the Advanced Encryption Standard (AES) algorithm based on a Field Programmable Gate Array (FPGA) using High Level Language (HLL). This design focuses on maximizing the use of available resources. Therefore, we minimize hardware resource usage and power consumption, and perform global optimization of PPA (power, performance, area) parameters to the best of our knowledge.

Keyword: -*Cipher Text, Key expansion, Byte Substitution, Mix Columns, Shift Rows, Round Keys, ALTERA, Sub Bytes, S-Box, Rcon, XOR, Galois Field, data, SubKey_a, Subkey_b, Cadence, Quartus II Programmer, FPGA (Field Programmable Gate Array)*

1.INTRODUCTION

AES is an advanced encryption standard developed in 1998 by two members, Joan Daemen and Vincent Rijmen. This AES is used to ensure the security of transmitted data. Various keys can be used to operate this AES. B. AES 192.128.256 bit key. With the advancement of technology, there are many new applications and products, even the Internet of Things (IOT), and there is even a need to give security to data and information, so this AES encryption plays an important role and can be decrypted. They can be implemented in field programmable gate arrays and embedded systems. An HDL language is required to implement this AES in an FPGA. In this document you can learn about AES 256-bit key encryption. The proposed architecture is used for 256-bit keys.

2. BACKGROUND AND RELATED WORKS

The ciphering algorithm AES is used to encrypt and decrypt data. This article uses AES-256 bit encryption, which offers higher security than earlier iterations. 15 cycles must be completed in order to process the data according to the 256 specification and produce the cypher text. Different AES key lengths are supported by various hardware. We use an FPGA to implement AES-256 bit in this paper.

3. AES OVERVIEW

There are four primary algorithms used by AES, and they are as follows:

SubBytes: This technique applies non-linear operations to each byte of plain text. LUTs (Look Up Tables) created specifically for this S-box method are used in this procedure. Depending on the request, choose the appropriate rows and columns from this S-box and continue. This offers solid defence against cryptanalytic assaults.

Shift Rows: this operation includes cyclically shifting the bytes of rows to corresponding columns and is performed after subBytes.

MixColumns: This algorithm performs a matrix multiplication to mix the columns of the input data. The plaintext is dispersed throughout the cypher as a result of this procedure.

AddRoundKey: Adding a round key to the supplied data is the responsibility of this algorithm. The initial encryption key serves as the basis for the round key, which is created during the key expansion phase. Each byte of the incoming data is XORed with a corresponding byte of the round key in the AddRoundKey step.

4. METHODOLOGY

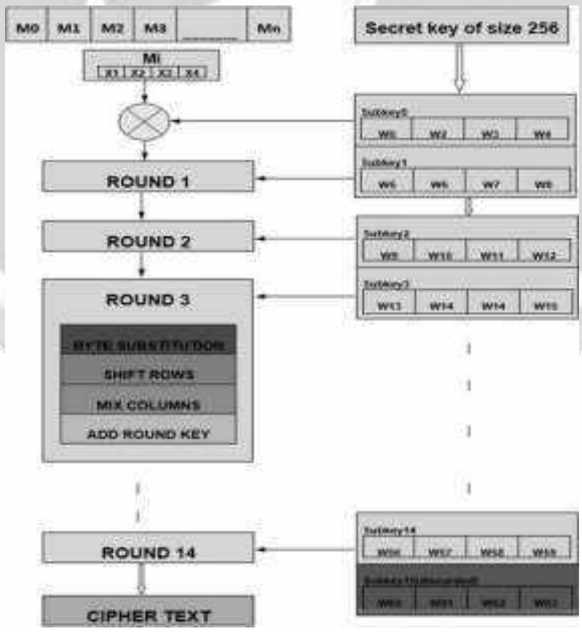


Fig: Methodology

4.1 Key Expansion

The key has to be expanded into a key schedule as the first stage. For each round of encryption, the key expansion procedure is repeated in order to achieve this. The initial key is combined with round constants, other values, and a series of operations to create the key schedule.

4.2 Initial Round

The first round involves XORing the first 16 bytes of the extended key schedule with the 16-byte block of plaintext.

4.3 Rounds

AES-128, AES-192, and AES-256 each have a total of 10 rounds, 12 rounds, and 14 rounds, respectively. Four operations—Byte Substitution, Shift Rows, Mix Columns, and Add Round Key—are carried out for each round. By selecting the proper round key from the key schedule, these procedures are carried out on the data block that is being encrypted.

4.4 Final Round

The block of data being encrypted is subjected to the Byte Substitution and Shift Rows operations in the last step. The block is XORed with the final round key instead of doing the Mix Columns function.

4.5 Output

The encoded message is the data block that is the result from this process.

5. RESULT

Encryption

DATA	876E46A6F24CE78C
SECRET KEY	B374A26A71490437AA024E4FADD5B497
CIPHER TEXT	61d3e2c3899db93d4364d1b893204059fe42b004d03ae5ff7950265acb8a15d6

Verification

CIPHER TEXT	61d3e2c3899db93d4364d1b893204059fe42b004d03ae5ff7950265acb8a15d6
SECRET KEY	B374A26A71490437AA024E4FADD5B497
DECRYPTED DATA	876E46A6F24CE78C

6. CONCLUSIONS

The Advanced Encryption Standard (AES) algorithm is a widely used encryption technique that provides a high level of security for data transmission and storage. AES 256 is considered one of the most secure encryption techniques available today due to its key size and multiple encryption rounds. This project focused on reducing area parameters while implementing AES 256 on his FPGA. We were able to achieve this by streamlining the design and developing a unique architecture that was optimized for the specific needs of the project.

However, there is always room for improvement and future work could focus on investigating different techniques to further optimize the design and further reduce the area parameter. Additionally, while AES 256 offers a high level of security, it has potential vulnerabilities and attacks that may be developed in the future, so it is important to continue researching and improving encryption techniques. Overall, this project demonstrated the importance of encryption techniques such as AES 256 in ensuring data security and privacy in today's connected world.

7. REFERENCES

[1]. Wenfeng Zhao, Yajun Ha, Massimo Alioto - AES Architectures for Minimum-Energy Operation and Silicon Demonstration in 65nm with Lowest Energy per Encryption 2015.

[2]. Christian Equihua, Esteban Anides, Luis García, Eduardo Vázquez, Gabriel Sánchez, Juan-Gerardo Avalos, and Giovanny Sánchez - Low-Cost and Highly Compact FPGA-Based Encryption/Decryption Architecture for AES Algorithm , VOL. 19, NO. 9, SEPTEMBER 2021.

[3]. KUN-LIN TSAI, FANG-YIE LEU, ILSUN YOU, SHUO-WEN CHANG SHIUNG-JIE HU - Low-Power AES Data Encryption Architecture for a LoRaWAN , Digital Object Identifier 10.1109/ACCESS.2017.Doi Number.

[4]. Rei Ueno, Sumio Morioka, Noriyuki Miura, Kohei Matsuda, Makoto Nagata, Shivam Bhasin, Tarik Graba, Jean-Luc Danger- High Throughput/Gate AES Hardware Architectures Based on Datapath Compression, VOL. 69, NO. 4, APRIL 2020.

[5]. Ayano Nakashima, Rei Ueno, Naofumi Homma - AES S-Box Hardware With Efficiency Improvement Based on Linear Mapping Optimization, VOL. 69, NO. 10, OCTOBER 2022.
[6]. Shotaro Sawataishi, Rei Ueno, Naofumi Homma - Unified Hardware for High-Throughput AES-Based Authenticated Encryptions

FOREST FIRE DETECTION USING OPTIMIZED SOLAR POWERED WIRELESS SENSORS NETWORKS AND LORA TECHNOLOGY

Vani S Badiger [1], Rahul M R [2], Sujay G S [3], Madesh N [4]

[1] Vani S Badiger, Assistant Professor, Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India
[2] Rahul MR, Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India
[3] Sujay GS, Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India
[4] Madesh N, Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

A novel approach for forest fire detection using image processing technique is proposed. A rule-based color model for fire pixel classification is used. The proposed algorithm uses RGB and YCbCr color space. The advantage of using YCbCr color space is that it can separate the luminance from the chrominance more effectively than RGB color space. The performance of the proposed algorithm is tested on two sets of images, one of which contains fire; the other contains fire-like regions. Standard methods are used for calculating the performance of the algorithm. The proposed method has both higher detection rate and lower false alarm rate. Since, the algorithm is cheap in computation it can be used for real time forest fire detection. An effective forest- response is critical for minimizing the losses caused by forest fires.

Keyword: - *Forest-fire management, deep learning, Bayesian neural network, object detection.*

1. INTRODUCTION

Forests are important in the ecosystem on earth. It is inseparable from the function of the forest itself, namely as a producer of oxygen to mankind even bearing the predicate as the lungs of the world. The problem is that when the forest experiences a fire, there will be a lot of harm to humans, ranging from air pollution and the destruction of natural ecosystems in the forest itself, starting from animals that will die a lot and to living animals can lose their place of residence. Another thing that becomes a problem is that in the event of a forest fire, the authorities are slow in handling the forest fire, one of the reasons is the lack in information of forest fire. Therefore, we conduct a study that aims to detect fires and inform the authorities in the event of a fire. The project is intended to cultivate a robotic vehicle that can sense metals ahead of it on its path similar to detecting land mines.

1.1 Motivation of the Task

Now a days, wild animals and forest department are facing so many problems. Wild animals move towards urban area. Since forest woods has destroyed from human being day by day in the forest. The forest area reduced, so animals struggle for their existence in the forest. A survey found that 75% of forest burns due to fire. This loss of forest is very dangerous for wild animal lives. In early time, if the forest fire detected, forest area makes very safe and secured. Our proposed experiment conducted for safe guard of forest and wild life's against fire.

1.2 Problem Statement

It is critical to have a system to detect fire and report it to the forest officers. Monitoring of fire in forest is at most important to save the environment and wild life. Animal Detection in boundaries is very vitalProtecting the trees from the wood cutters is a major factor to save forest.

1.2 Proposed System

In this proposed system instead of analyzing characteristics parameters of fire i.e colour, area, motion, smoke individually, all the parameters are examined simultaneously to reduce the false alarm rates which was present in a previous detection system. The main part of this system is the flow that will be used to estimate the amount of motion undergone by an object while moving from one frame to another. The proposed system will give the combine result at the output whether smoke and fire is present or not. The system performance can be improved with the use of optimal algorithms for detecting motion and area and extracting features of fire. The enhanced system will performed well than the existing system in terms of detection rate. In this project we have developed a system to detect an occurrence of fire.

1.3 Objectives of the Task

A low cost and simple assistive system to monitor the forest. To design forest fire and conservation detection system with the help of LORA.Intimation to concerned person in case of fire through LORA.

To send Notification to farmers and Forest Officials

An intimation alert is sent to farmer about animal presence. We Use Twillio Messenger to send intimation alert to farmer

To Detect Fire in forest and Intimate

Detect Fire Using Fire Sensor and intimate through Message to concerned Person

2. LITERATURE REVIEW

PAPER1: Content-based Retrieval and Real Time Detection from Video Sequences Acquired by Surveillance Systems.

In this paper, a surveillance system devoted to detect abandoned objects in unattended environments is presented to which image processing content-based retrieval capabilities have been added for making easier inspection task from operators. Video-based surveillance systems generally employ one or more cameras connected to a set of monitors. This kind of systems needs the presence of a human operator, who interprets the acquired information and controls the evolution of the events in a surveyed environment. During the last years efforts have been performed to develop systems supporting human operators in their surveillance task, in order to focus the attention of operators when unusual situations are detected. Image sequences databases are also managed by the proposed surveillance system in order to provide operators with the possibility of retrieving in a second time the interesting sequences that may contain useful information for discovering causes of an alarm. Experimental results are shown in terms of the probability of correct detection of abandoned objects and examples about the retrieval sequences.

PAPER2: Robust Real-Time Periodic Motion Detection

We describe new techniques to detect and analyse periodic motion as seen from both a static and a moving camera. By tracking objects of interest, we compute an object's self-similarity as it evolves in time. For periodic motion, the self-similarity measure is also periodic and we apply Time-Frequency analysis to detect and characterize the periodic motion. The periodicity is also analysed robustly using the 2D lattice structures inherent in similarity matrices. A real-time system has been implemented to track and classify objects using periodicity. Examples of object classification (people, running dogs, vehicles), person counting, and nonstationary periodicity are provided.

PAPER 3: Study of Motion Detection Method for Smart Home

Motion detection surveillance technology give ease for time-consuming reviewing process that a normal video surveillance system offers. By using motion detection, it saves the monitoring time and cost. It has gained a lot of interests over the past few years. In this paper, a proposed motion detection surveillance system, through the study and evaluation of currently available different methods. The proposed system is efficient and convenient for both office and home uses as a smart home security system technology.

In motion detection, there is process of detecting a change in various objects relative to its surroundings or change in surrounding relative to an object. There are many methods to obtain a motion detection using mechanical and electronic techniques. E.g. Infrared (Passive and active sensors), Optics (video and camera systems), Radio Frequency Energy (radar,
microwave and tomographic motion detection), Sound (microphones and acoustic sensors), Vibration (triboelectric, seismic and inertia-switch sensors), Magnetism (magnetic sensors and magnetometers).

PAPER 4: Motion Detection for Security Surveillance

This paper deals with the design and Implementation of Smart surveillance monitoring
system using Raspberry pi and CCTV camera. This design is a small portable monitoring system for home and college security. This system will monitor when motion detected, the Raspberry Piwill control the Raspberry Pi camera to take a picture and sent out image to the user according to the program written in python environment. The proposed home security system captures information and transmits it via a Raspberry towards pc. Raspberry pi operates and controls motion detectors and CCTV camera for remote sensing and surveillance, streams live records it for Future playback. Python software plays an important role in this project. Motion detection systems are a necessity in the modern times. Although some people object the idea of being watched, surveillance systems actually improve the level of public security,
allowing the system operators to detect threats and the security forces to react in time. Surveillance systems evolved in the recent years from simplest systems into complex structures, containing numerous cameras and advanced monitoring centres, equipped with sophisticated hardware and software. However, the future of surveillance systems belongs to automatic tools that assist the system operator and notice him on the detected security threats. This is important, because in complex systems consisting of tens or hundreds of cameras, the operator is not able to notice all the events.

3. METHODOLOGY

- Forest fires are one of the most common disasters occurring during the dry season. Fires contain a variety of potential hazards for humans, property and the environment.
- To overcome the problem, we conduct research so that forest fires can be quickly detected. Forest fires are one of the main environmental problems in the entire world.
- In a context where low power is increasingly common to the rise of Internet of Things (IoT) architecture, the interest in providing solutions to monitor scenarios and fire prevention based on these technologies is huge.
- This paper presents a low cost Long Range (LoRa) and solar based network able to evaluate level of fire risk and the presence of a forest fire.

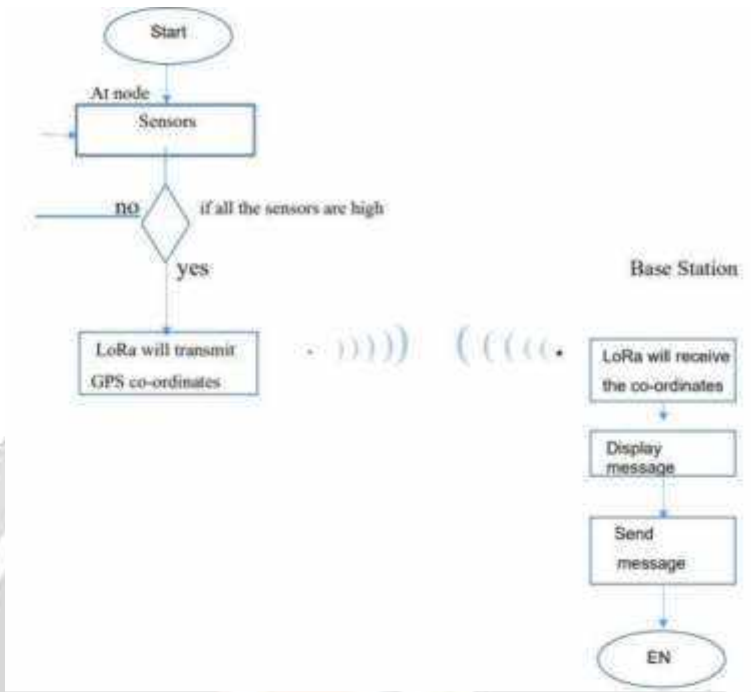


Fig -1: Steps involved in methodology

3.1 ARCHITECTURE OF THE SYSTEM

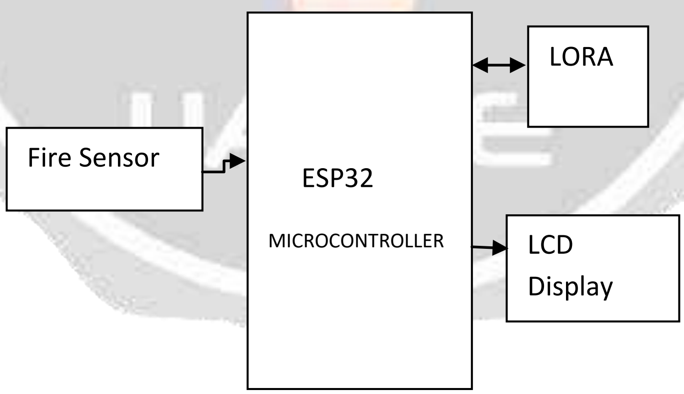


Fig -2: Architecture of proposed System

Forest fires are one of the most common disasters occurring during the dry season. Fires contain a variety of potential hazards for humans, property and the environment. To overcome the problems, we conduct research so that forest fire can be quickly detected. Forest fires are one of the main environment problems in entire world. In a context where low power is increasingly common to rise of internet of things (IOT) architecture, the interest in providing solutions to monitor scenarios and fire prevention based on these technologies is huge. This paper presents a low cost Long Range (Lora) and solar based network able to evaluate level of fire risk and the presence of a forest fire

3.2 Experimental Setup

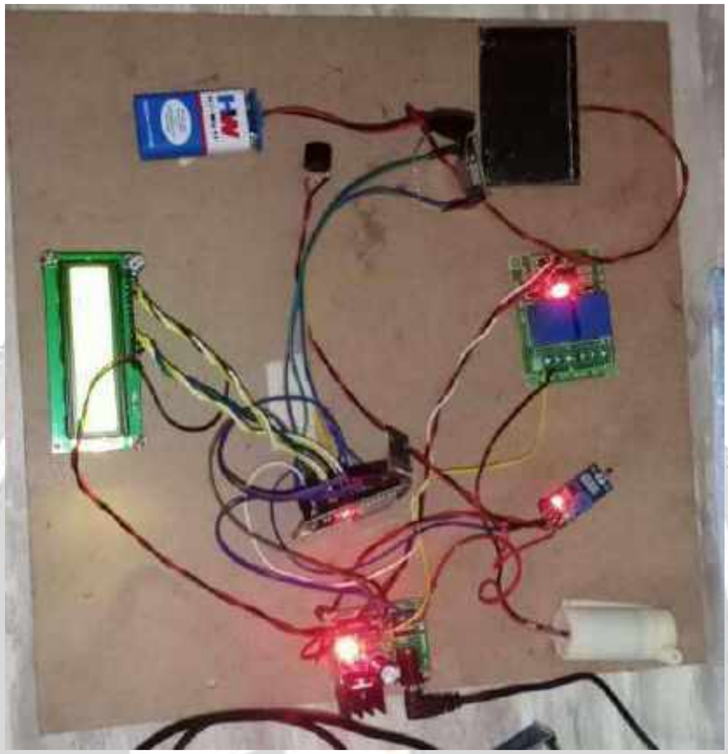


Fig - 3: Circuit

4. RESULTS AND ANALYSIS

4.1 Experiment Results

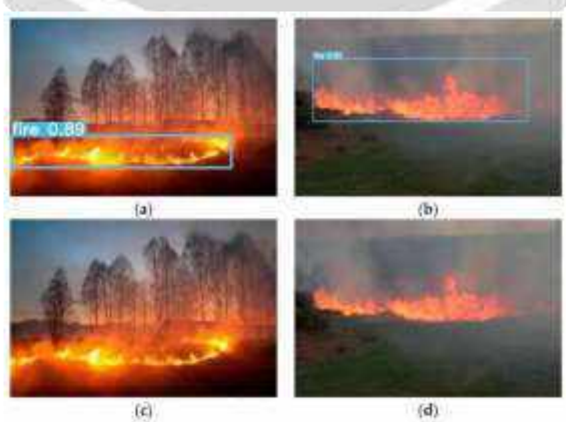


Fig 4: Forest fire Detection

Fig - 5: web Based Visualization

At the end of this project, we aim to build an operational model that demonstrates fire detection and tree cutting detection using image processing and using AT Mega 328 P microcontroller.

Fig6: weapon detection output

4. CONCLUSIONS

It is easier to suppress a fire in its starting stage than in the later stages. Hence, the most important goal is quick, reliable detection and localization of the fire. The proposed fire alert system overcomes the need of a human intervention to continuously monitor the forest area. Monitoring and detecting is done by the sensors installed and message alerts are used to alert the required authorities. It gives instantaneous information on location of the fire to the authorities and help block the fire before it reaches cultural heritage sites.

5. REFERENCES

[1]Korea Forest Service, Daejeon, Republic of Korea, 2021. [Online]. Available:https://english.forest.go.kr/kfsweb/kfs/subIdx/Index.do?mn=UENG.

[2] R. S. Priya and K. Vani, ``Deep learning-based forest _re classification and detection in satellite images," in Proc. 11th Int. Conf. Adv. Compute. (ICoAC), Dec. 2019, pp. 61_65.

[3] D. Jung, V. Tran Tuan, D. Q. Tran, M. Park, and S. Park, ``Conceptual framework of an intelligent decision support system for smart city disaster management," Appl. Sci., vol. 10, no. 2, p. 666, Jan. 2020. [6] M. Park, D. Q. Tran, D. Jung, and S. Park, ``Wild forest-detection method using Dense Net and Cycle GAN data augmentation-based remote camera imagery," Remote Sens., vol. 12, no. 22, p. 3715, Nov. 2020.

[4] M. Park, D. Q. Tran, S. Lee, and S. Park, ``Multilabel image classification with deep transfer learning for decision support on wilder response," Remote Sens., vol. 13, no. 19, p. 3985, Oct. 2021.

[5] Q.-X. Zhang, G.-H. Lin, Y.-M. Zhang, G. Xu, and J.-J. Wang, ``Wildland Forest _re smoke detection based on faster R-CNN using synthetic smoke images," Proc. Eng., vol. 211, pp. 441_446, Jan. 2018

EV CHARGER USING SOLAR ENERGY

Dr.D.Sobya[1], Poorva Pai[2], Roopa R[3], Sneha G[4]

[1]Associate Professor, ECE,Rajarajeswari college of engineering, Karnataka, India
[2,3,4]UG Scholars,ECE,Rajarajeswari college of engineering, Karnataka, India

ABSTRACT

Today energy is the main inspiration for socio-economic development. But due to incremental rate of environmental concern renewable energy provide a significant interest. This alternative power source is continuously achieving greater popularity due to continuous reduction in fossil fuels. It is the energy comes from sun, wind, rain etc. Among the non-conventional, renewable energy sources, solar energy affords great potential for conversion into electric power. Maximizing power output from a solar system is desirable to increase efficiency. In order to maximize power output, needs to keep the panels aligned with the sun. This paper deals with the electricity generation using solar power. The proposed system ensures the optimization of the conversion of solar energy into electricity by properly orienting the panel in accordance with the position of the sun. The operation of the paper is based on a Stepper motor intelligently moves a panel according to the light intensity of the sun sensing by light sensor.

1. INTRODUCTION

The creation of battery charging station structures is critical to lessen the power request of the framework. Subsequently, sustainable powers sources emerge with develop innovation furthermore, focused on cost. In this work is proposed the design of a system to create and handle Electric Vehicles (EV) charging procedures, based on intelligent process. Due to the electrical power distribution limitation, Electric Vehicles charging should be performed in effective way. This proposed Smart Electric Vehicle Charging station having many advance features like it will automatically maintain the power from different source and automatic switch the source based on availability of the source. However, the massive penetration of EVs brings the big challenge of EV recharge–related issues. Therefore, to provide electrical energy for EVs, charging stations and battery technology considering actual EV field trips are attracting more and more attention from researchers.

Road transport is undoubtedly the most common and affordable form of commute for people around the world. However, recently, it has faced much criticism due to its dependence on fossil fuels and its relativelylow operational inefficiency. This has opened the doors for the electric mobility industry, and the world has witnessed a drastic surge in the acceptability of EVs. As India aims to decrease its carbon footprint like other nations and step into the world of sustainability, the government is consistently introducing transport sector reforms that aim at the electrification of all effective forms of commute. As a result, according to a study conducted 2020 to 2027. The average annual growth rate for the EV sector in India is estimated to be around 44%. Articles published by various research scholars and authorities mainly focus on the importance of shifting towards EVs, the technical aspects of charging stations, and the governments' policies to develop the necessary infrastructure for EVs.

Topics such as the need for India to move away from its crude oil imports, fighting climate change to reduce its carbon footprints, and reducing pollution have been discussed in detail, and conclusions regarding India moving into the EV space following its global peers have been made. Moreover, new energy storage and transfer technologies that can be used to implement the charging infrastructure have been studied according to the necessary requirements.

2. LITERATURE SURVEY

A New Method to Implement the Constant Current Constant Voltage Charge of the Inductive Power Transfer System for Electric Vehicle Applications. The remarkable increase in the use of electric vehicles (EVs) has resulted in a massive rise in demand for electric energy across the globe. The global electric vehicle market has grown significantly. The number of EVs on the road in 2010 was a few hundred; this number rose to approximately three million in 2017 and approximately six million in early 2019 [1] A Topology of Charging Mode Control Circuit Suitable for Long-Life Li-Ion Battery Charger. Battery exchange station (BES) is a system that EV drivers can replace their discharged battery with a fully charged battery at BES. The implementation of BES can provide several benefits, such as its very fast exchanging time. For example, Tesla, a well-known electric vehicle maker, swap EV batteries in 90s. One more critical issue about BES benefits is avoiding charging during peak demand [2]. The effective use of solar Charging Station for Electric Vehicles .The traditional charging stations affect the grid's stability with issues such as harmonics, fluctuations, and voltage outages [3,4]. Besides, it requires less power conversion levels than those in alternating current (AC)-based facilities. Development of Solar Charging System for Plug-in Hybrid Electric Vehicles and Electric Vehicles [5]. Design and Implementation of Solar Power as Battery Charger using Incremental Conductance Current Control Method.The electric vehicle battery specifications are 12V, 7Ah and is given C5 charge rating by the manufacturer [6]. Efficient charging of battery and production of power from solar energy.Evaluation of Genetic Algorithm based Solar Tracking System for Photovoltaic Panels [7].Fast charging stations (FCSs) can solve the charging time issue, which is a crucial element in adopting and deploying EVs . The fast charging works on recharging the EVs quickly, similarly to the conventional vehicles at solar stations[8]. Fast-charging plays a vital role in increasing EVs' travelling distance by having FCS along the way. The off-board fast charging module is the important to fast-charging stations whose output is 35 kW. The current and voltage values are 20–200 A and 45–450 V, respectively . As they are both so high, such infrastructures have to be deployed in supervised centers or stations[9,10]. Solar-powered batteries can fulfill unreliable grid electricity demands, which are strong charge, discharge, and intermittent full-charging periods. A range of battery World Academics Journal of Engineering Sciencestypes fulfills these specific criteria. The major battery storage subgroups reviewed for solar energy include a lead-acid battery, lithium-ion battery, and flow battery [11]. To save the additional energy produced by photovoltaics, a central controller is required to redirect the generated power to the battery. Many scholars have investigated the sequence of controllers that are used in photovoltaics [12]. When it comes to a solar converter, the PV arrays are integrated to a DC/DC converter that allows for full power point tracking control. The AC/DC converter is in charge of converting DC/AC power in a bidirectional fashion [13].Electricity is obtained and the output is shown using LCD.A Calibration Algorithm for Solar Tracking System [14].Operation and control of battery storage system improving stability,economy and system overall efficiency[15]A Microcontroller-Based MultiFunction Solar Tracking System [16].Storage in supporting grid for operational needs and a versatile microprocessor- based controller for solar tracking [17,18,].If any incentive policy to accelerate the expansion of DC charging stations influences RES in electricity market and on the role of renewable energy policies and EV deployment incentives for a greener sector coupling [19].

2.1 Existing Problem

Electricity generation is the process of generating electric energy from other forms of energy. The fundamental principles of electricity generation were discovered during the 1820s and early 1830s by the British scientist Michael Faraday. His basic method is still used today. Electricity is generated by the movement of a loop of wire, or disc of copper between the poles of a magnet.

Electricity is most often generated at a power station by electromechanical generators, primarily driven by heat engines fuelled by chemical combustion or nuclear fission but also by other means such as the kinetic energy of flowing water and wind. There are many other technologies that can be and are used to generate electricity such as solar photovoltaic and geothermal power.

2.2 Proposed Solution

The benefits of having your own solar power EV charging station are undeniable and with new incentives from the Inflation Reduction Act, the cost of pairing an EV with solar charging is on its way down. India will reduce its dependency on fossil fuels for driving electric vehicles. The solar panel array will feed the battery energy storage system and the entire power needs are drawn from this storage system. Essentially, we need a solar inverter that can convert the solar panel's AC output to usable DC for the EV. Also, we require a battery to store the energy produced by your solar panels if you are planning on charging your EV during the night.The transformation of light into electrical energy, as in solar cells is done in the photoelectric effect. Solar tracking allows more energy to be produced because the solar array is able to remain aligned to the sun. Maximizing power output from a solar system is desirable to increase efficiency. In order to maximize power output from the solar panels, one needs to keep the panels aligned with the sun. As such, a means of tracking the sun is required. This is a far more cost effective solution than purchasing additional solar panels.

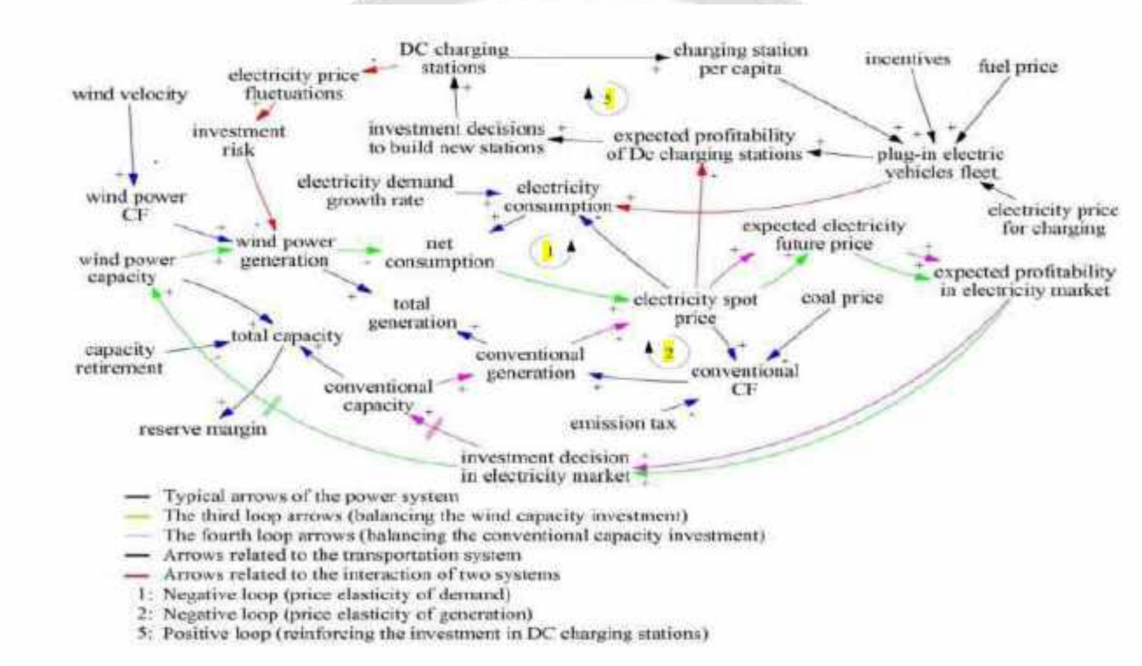


Fig 2. Conversion of solar energy into electrical power

2.3 How solar energy is converted into current?

Solar cells are systems that are composed of semiconductor materials and which convert solar energy directly into current. The amount of electrical energy which will be obtained is directly proportional to the intensity of sun light that falls on the photovoltaic (PV) panel. When light falls on the device the light photons are absorbed by semiconducting material and electric charge carriers are generated. The relation between incident photon energy and frequency is

$$\mathbf{W = h.\mu}$$

where h= Planck constant and μ= frequency.

Silicon is the most abundant element available on the earth surface and mostly of the solar cells fabricated using them.

3. NEED FOR SOLAR POWER SYSTEM

A few invited professors who where in Béthune in 2006 May, have decided to establish an international collaboration within the framework of the renewable areas. The main objective is to run appropriate projects through student enrolment (internship program or short period of studies) and capitalisation of scientific results of run research. The main assumptions of the project are as follows - the projects are organised in such a way that all participants will be remotely in touch through Internet. Projects are carried out in common. Modern information exchange tools like Internet forums will be installed for current information exchange. The collaboration has been given the acronym I.C.E.E. (International Collaboration in Engineering Education). Each participating institution should conduct a common project on a given subject under the supervision of a local teacher or researcher [3 - 4]. A power system which could be decomposed in a few subsystems is one possible technical application of the project. The system is a production and management unit of an agricultural utility using different types of renewable energies. Fig. 1 depicts a general view of the system considered Within the framework of sustainable development several manners are used for electric energy production and storage: photovoltaic panels, wind turbine and hydraulic turbine. Energy loads are also considered as a part of this power system. Water pumpage automatic system is a part of the energy management system. Unused energy is stored in a battery storage system and will be sold later on after having set up an appropriate connection to the power distribution system.

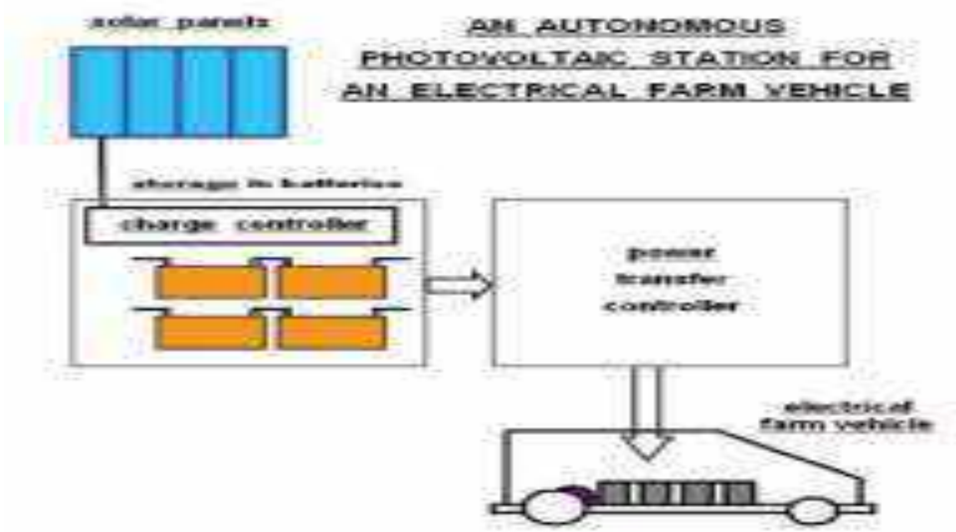


Fig 2. An Autonomous Photovoltaic Station

The increasing demand for energy, the continuous reduction in existing sources of fossil fuels and the growing concern regarding environment pollution, have pushed mankind to explore new technologies for the production of electrical energy using clean, renewable sources, such as solar energy, wind energy, etc. Among the nonconventional, renewable energy sources, solar energy affords great potential for conversion into electric power, able to ensure an important part of the electrical energy needs of the planet. Solar energy is free, practically inexhaustible and involves no polluting residues or green gases emissions.The energy and heat from the sun is free and unlimited.Solar power is non-polluting. Solar power usage does not emit any greenhouse gases or harmful waste.Solar power is perfect and saving for power generation in remote areas or where the cost of expansion utility grid is high. Solar power is versatile. It can be used for low-power purpose as well as larger ones - from hand-held calculators, watches, and solar powered garden lights to water heaters, cars, buildings and satellites.Utilizing solar energy to charge the electric car reduces the overall carbon footprint,making it ecofriendly.
As India aims to decrease its carbon footprint like other nations and step into the world of sustainability, the government is consistently introducing transport sector reforms that aim at the electrification of all effective forms of commute. As a result, according to a study conducted 2020 to 2027. The average annual growth rate for the EV sector in India is estimated to be around 44%. Articles published by various research scholars and authorities mainly

focus on the importance of shifting towards EVs, the technical aspects of charging stations, and the governments' policies to develop the necessary infrastructure for EVs.

4. METHODOLOGY

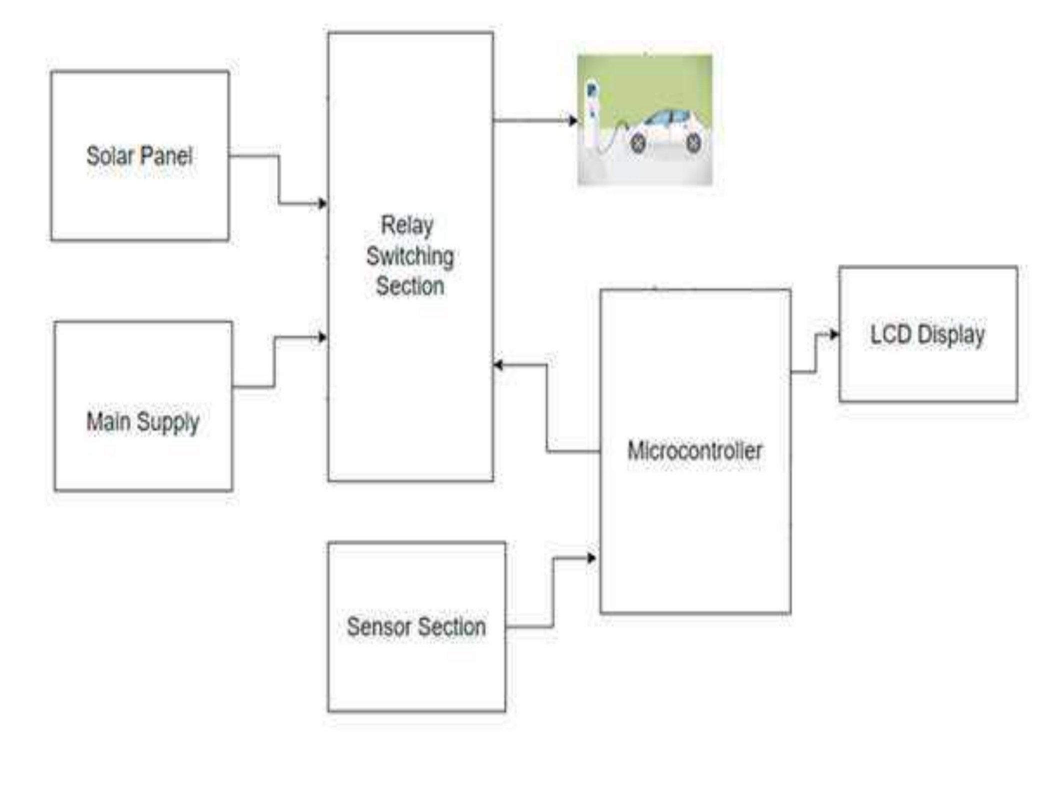


Fig 3. Block diagram

Solar panel for EV charging station allows solar cell to convert sunlight to useable electrical energy. Sunlight is converted when negatively charged electrons push solar energy.A solar inverter works by taking in the variable direct current from your solar panels and transforming it into alternating current.Main Supply is used to give the power through photovoltaic panel or through mirrors that concentrate solar radiation.Sensor section is used to convert sunlight into electricity is a non mechanical device and coverts sunlight to electricity.Microcontroller is controlled the system by programming. Here also use an inverter, node MCU, battery, solar charge controller. The main objective of this research is to use solar source for load control and monitor through internet.LCD display is to display whether the station is on or off and output is shown.

Relay switching section consists of two relays, resistors, LED , and diode. When the supply is given from the solar relay 1 will be ON and relay 2 will be OFF. When the supply is given from main supply vice versa.Sensor section consists of LDR sensor.Main supply is connected to a rectifier bridge and step down transformer to convert input AC to DC.All the control system and sensors are interfaced with a microcontroller. Here, Microcontroller is main heart of the system. The switching action between different sources happen to be automatic using relay, the triggered signals are sent from microcontroller.This all process will control by microcontroller and we are using embedded c code for this implementation. Finally, information is displayed on LCD.

5.RESULT AND DISCUSSION

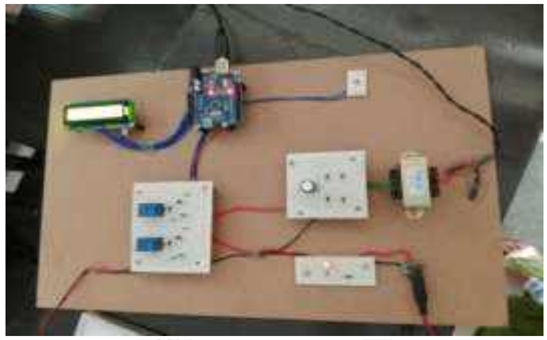


Fig 4. Main control boardMain Control board of the system

The main control board of the system consists of a step down transformer for reducing the voltage from main supply, next which is connected to a full wave rectifier which converts ac to dc. Further pulsating dc obtained from rectifier is passed through the filter I order to get 12V pure dc. On the other hand one more supply is given from solar panel where led is placed for indication. Solar supply and main supply connected to relay for automatic switching, the triggered signals are sent from microcontroller.

LCD Display

Fig 5LCD display

LCD displays whether the supply is from solar panel or main supply.

Fig6.Our EV Charging system

In the existing system, the electricity is produced by the electricity generators which are a non renewable source. The cost is high in this system.Our system uses solar energy which is a renewable source. Installation of this system is cheaper when compared to the existing systems.Topics she need for India to move away from its crude oil imports, fighting climate change to reduce its carbon footprints, and reducing pollution have been discussed in detail, and conclusions regarding India moving into the EV space following its global peers have been made. Moreover, new energy storage and transfer technologies that can be used to implement the charging infrastructure have been studied according to the necessary requirement

6. CONCLUSIONS

This project is microcontroller-based energy flow control designed for effectively and efficiently use of energy sources in a hybrid energy generation system including solar, and main supply. The main purpose of our project is to provide continuous power supply to load, by automatic selecting the supply from any of the available sources namely solar, or mains. Thus, there is requirement for an alternate arrangement of power supply. When a Solar fail, the supply automatically shifts to next priority source. The main stages of choosing power source of available with help of control section and sensor section. The relay switch is used for automatic switching from one source to another source. A prototype of charging station for electrical vehicle has been studied and implemented by the staff and the students at I.U.T Béthune. The efficiency of the station is satisfying. Charging and discharging control functions are integrated in the charging system. Also Wi-Fi communication between the different modules with a supervision function included was studied and implemented. The system can be easily adapted to different voltage levels. The converter can be improved from the point of view of energy efficiency. Real application will need an exact calculation of the photovoltaic panel number, the battery capacity and the electronic components calibration according to the expected power and the utilisation ratio of the charging station itself

7. REFERENCES

[1] Syamsiah Mashohor, Khairulmizam Samsudin, Amirullah M. Noor and Adi Razlan, A. Rahman, “Evaluation of Genetic Algorithm based Solar Tracking System for Photovoltaic Panels”, ICSET, IEEE 2008.

[2] Miguel Romero, Rafael Lemuz, Irene O. AyaquicaMart´ınez, Griselda Salda˜na-Gonz´alez, “A Calibration Algorithm for Solar Tracking System”, 10th Mexican International Conference on Artificial Intelligence, IEEE 2011.
[3] Kassem , M. Hamad ,” A Microcontroller-Based MultiFunction Solar Tracking System”, IEEE 2011.
[4] A.K.Saxena, V. Dutta, “A versatile microprocessor- based controller for solar tracking”, IEEE 1990.
[5] Md. Tanvir Arafat Khan, S.M. Shahrear Tanzil, Rifat Rahman, S M Shafiul Alam,” Design and Construction of an Automatic Solar Tracking System”, 6th International Conference on Electrical and Computer Engineering ICECE ,IEEE 2010.
[6] B. Koyuncu, K. Balasubramanian, “A microprocessor controlled automatic sun tracker”, IEEE 1991.
[7] O. Bingol, A. Altinta, Y. Oner, “Microcontroller based solar tracking system and its implementation”, IEEE 2006.
[8] M. F. Khan, R. L. Ali, “Automatic sun tracking system”, IEEE 2005.
[9] Aleksandar Stjepanović, Sladjana Stjepanović, Ferid Softić, Zlatko Bundalo, “Microcontroller Based Solar Tracking System”, TELSIKS, IEEE2009.
[10] Lwin Lwin Oo, Nang Kaythi Hlaing,” MicrocontrollerBased Two-Axis Solar Tracking System”, Second International Conference on Computer Research and Development, IEEE 2010.
[11] Han Shunjie, Han Yue, Han Meng,” Research and Implementation of The Dual Mode Solar Automatic Tracking System”, IEEE 2012.
[12] Xia Zhao, “Research on Automatic Tracking Solar Power System”, IEEE 2011.
[13] S.Anwar, P.Favier, K.Mikszath « Design and implementation of a PIC microcontroller based firing controller for a triphase thyristor rectifier » Technology Interface Journal 7(1) Octobre 2006, http://technologyinterface.nmsu.edu/Fall06/
[14] S.Anwar, P.Favier, P.Vida « Design and implementation of a microcontroller-based ignition system ». Technology Interface Journal 8(1) 2007, http://technologyinterface.nmsu.edu/Fall07/
[15] 15.S.Anwar, P.Favier, D.Jouglet, « A project-based international collaboration in engineering education », ASEE 2008 Annual Conference Proceedings session 2160
[16] P.Favier, S.Anwar « An International Collaboration in Engineering Education. », Kando Kalman Institute, Kando Conference 2008, 6-7 November 2008, Budapest
[17] .F.Maeght, PY.Cresson, P.Favier «station de charge solaire pour véhicules électriques», REE n°11 décembre 2009 p92-99
[18] Gang Ding, Zafer Sahinoglu, Philip Orlik, Jinyun Zhang, Bharat Bhargava « Tree-based data broadcast in IEEE 802.15.4 and ZigBee Networks » IEEE transactions on mobile computing, vol 5 , N° 11, november 2006
[19] Jean Pierre Blanc, « ZigBee, système de communication sans fil entre Bluetooth et Wifi » techniques de l’ingénieur, décembre 2008

FIRE DETECTION AND RESCUE SYSTEM BY CAMERA USING ARTIFICAL INTELLIGENCE

Dr.D Sobya[1], Kavya C[2], Kushala V K[3], Padmitha S[4], P V Sai Lakshmi [5]

[1]*Associate Professor, Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[2,3,4,5] *Electronics and Communication Engineering, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

In this work, we build and create a real-time camera and water pump surveillance system powered by artificial intelligence for large-scale fire detection and rescue.The Raspberry Pi, a potent open source microcontroller, an inexpensive camera with a water pump, and other components are used in this arrangement.We used the RGB colour model to convert it to HSV and get edge detection.This system can be installed practically anywhere for the purpose of detecting fires, including shopping centres, office buildings, and many other public areas.The accuracy, latency, and detection area of traditional fire detection techniques using smoke and heat detectors are disadvantageous. Using an unmanned aerial vehicle with an integrated visual detection system, we propose and demonstrate a real-time fire detection solution for large-area surveillance in this work.

Keyword: - *Artificial Intelligence, Raspberry Pi, Edge Detection, Fire rescue*.

1. INTRODUCTION

The 21st century has seen a development trend in the field of artificial intelligence (AI). With dramatic revolutions influenced by both ideas and methodologies, the evolution of AI has promoted the development of human society in our day and age. However, due to its multidisciplinary nature and rapid expansion, AI is a field that is challenging to fully comprehend. We discover that the region is undergoing sustainable growth, and its effects are growing. The reduction in self-references suggests that the AI is becoming more and more flexible from the perspective of reference behaviour. The growth of the field's outline markers may be seen in the fire detection and rescue system employing cameras and artificial intelligence. The concept put forward in this essay seeks to enhance safety measures implemented in public areas or commercial structures by utilising automated fire detection and rescue systems. This innovation sheds light on public safety while also offering profound insights into the most recent scientific trends.

1.1 Motivation of the Task

Over time, we have discovered fundamental fire safety principles that can be consistently applied globally, such as prevention, detection and communication, occupant protection, containment, and manual extinguishment, that can be used to prevent fire events and manage their impact. However, having a rescue system with automated fire suppression is ideal.

1.2 Problem Statement

We presently have a system that can detect fire and notify us when a fire emergency occurs anyplace, but it is not equipped to do rapid rescues; they must be carried out manually. For instance, if the sensors are used to detect fire, rescue efforts would be hindered if the fire was located distance from the fire.

1.3 Proposed System

The system that is suggested in this paper has a camera, a Raspberry Pi, a servo motor, and a pump as hardware components. The Yolo v5 algorithm and MQTT protocol are key components of the suggested idea since they help with real-time fire detection. The proposed method makes use of a camera to identify fire based on the frames it takes. Therefore, we don't require any additional sensors to detect fire. Images are utilised to identify fires, even those that are remote from the system. It will promptly respond by spraying water if it notices a fire. .By doing this, manual rescue is not required, saving time. Here, we're employing image processing to create it, which can react instantly when it sees a little fire and anticipate tragedy very early on. The primary benefits of an AI-powered camera fire detection and rescue system include early detection rather than early warning, and even immediate rescue. To find fire, we don't need any sensors. In order to identify flames, the system processes the camera input first. Images are used to identify heat signatures and fire illumination patterns so that appropriate action can be taken if there is a fire. When a fire is detected, the system pump will activate and spray water.

1.4 Objectives of the Task

An image processing-based fire detection system's main objective is to detect fires early and provide help quickly. The importance of employing video cameras for fire detection has increased alongside general monitoring using CCD cameras. This method uses a camera to find fires. Therefore, we don't require any additional sensors to find the fire. Since the camera can start pumping water as soon as a fire is spotted in a picture taken, the response time for fire detection is sped up. This is because the camera does not have to wait for the smoke or heat to clear. The camera can watch a vast area and act as a volume sensor as well as a traditional point, boosting the likelihood of detecting fires.

2. LITERATURE REVIEW

[1] T. Celik and Hasan Demirel improve a system that employs a statistical colour model with Fuzzy logic for fire pixel categorization in this study. The suggested system creates two models, one for brightness and one for chrominance. Instead of using colour systems such as RGB, fuzzy logic separates luminance from chrominance using the YCbCr colour space. Existing historical rules are replaced with Fuzzy logic to improve the classification's robustness and effectiveness. This model gets up to 99.00% correct fire detection with a false alarm rate of 9.50%.

[2] R. Gonzalez-Gonzalez et al. proposed a method for detecting fire using smoke detection based on wavelet in this study. Image processing on video signals is proposed in this smoke detection system. The SWT transform is used to detect the region of ROIs. This approach is divided into three phases.Preprocessing is done in the first phase, and the image is shrunk and converted to grayscale. Finally, indexation was used to index the image. The second phase involves removing high frequencies from an image using SWT and reconstructing the image using inverse SWT. The fundamental goal of image indexation is to group the intensity colours that are close to each other. Histogram analysis is used to determine the indexation levels. After that compare the image with a non-smoke frame and selecting those pixels that are change from one scene to another. The final stage consists of smoke verification algorithm in order to determine whether ROI is increasing its area and to reduce the generation of false alarm.

[3] Hidenori Maruta et al. proposed another approach for smoke detection based on support vector machine in this study . The support vector machine is used in this technique to present a robust and unique smoke detection system. Preprocessing begins with the extraction of moving objects from pictures. Image subtraction and accumulation, image binarization, morphological operation, extraction of Feret's areas, and picture mask construction are the five phases in preprocessing. Image subtraction is used to remove moving object regions. Binarization and morphological processes are used to remove noise from regions. Feret's region is the location and approximate shape

of an object acquired by recognising Feret's diameter.Following preprocessing, run texture analysis and extract texture features.

[4] Habiboglu et al. proposed another method for detecting fires using covariance descriptors in this study Colour, spatial, and domain information are merged in this method by employing covariance descriptors for each spatio-temporal block. The blocks are created by dividing the flame-colored region into three-dimensional parts. A covariance matrix was employed in this method to detect flames. Using an SVM classifier, regions containing flames and flame-colored objects are examined. The chromatic colour model is utilised to classify pixel colours, and fire coloured pixels are analysed. Covariance descriptors are used for object recognition and texture categorization.

[5] Mehdi Torabnezhad offered another method for detecting smoke in this study, which used an image fusion methodology. Combine visual and thermal information in this method to improve the rate of fire detection. The invisibility of smoke in LWIR images allows smoke to be distinguished from smoke-like things. Infrared imaging do not detect smoke, but they can identify smoke-like objects. Smoke can be identified by combining visual and infrared photos. A possible smoke mask is developed based on the properties of optical and thermal smoke images. PSM is further analysed by disorder measurements and energy calculations to reduce false alarms. A visible and infrared image fusion method is utilised to identify short-range smoke.

[6]A Single Shot MultiBox Detector for Visual Real-Time Fire Detection for UAV-based Fire Surveillance is described in this study . A. Q. Nguyen, Huy X Pham, H. T. Nguyen, V. C. Tran, and J. Pestana. It is critical to detect and report fires as soon as possible in order to mitigate the damage caused by fire. Traditional fire detection approaches using smoke and heat detectors have poor accuracy, latency, and detection area.In this study, an unmanned aerial system-based real-time fire detection solution for large-area surveillance is proposed and implemented.

[7] "An automated water dispensing system for controlling fires in coal yards," International Journal of Coal Science and Technology (2022). Jeevan Jayasuriya1 and Irene Moser2 are the authors. Despite recent efforts to wean the world off of fossil fuels, coal remains the primary source of energy in many countries. Coal yards are prone to spontaneous combustion, which is an issue in any country that stores or transports coal. Depending on the environment-temperature, ventilation, and coal rank-heating and self-ignition can be a longer or shorter process, but it should never be completely ruled out. Many studies have been conducted to model this oxidation behaviour and propose countermeasures.

[8]This research titled "A Visual Real-time Fire Detection Using a Single Shot MultiBox Detector for UAV-based Fire Surveillance" was published in the Journal of the American Society for Fire Research. H. T. Nguyen*, V. C. Tran*, Huy X Pham t, and J. Pestana* Early fire detection and warning are critical for reducing fire-related losses. Traditional fire detection technologies employing smoke and heat detectors have shortcomings in terms of accuracy, latency, and detection area. We propose and construct a real-time fire detection method for large-area monitoring employing an unmanned aerial vehicle equipped with an integrated visual detection and alarm system in this study. The Single Shot Multi Box Detector (SSD) algorithm is used as the system's heart to enable real-time detection..Here the Mobile Nets base model is used, which more efficient for mobile.

3. METHODOLOGY

Methodology refers to the specific ways or processes used to become aware of, select, process, and analyse facts about a subject. The technique section of a research study allows the reader to critically analyse an observer's overall validity and reliability. The technique portion of the publication describes how the investigations are carried out, the research methodologies employed, and the reasons for selecting those approaches. It should define the participants as well as the research methods employed, such as surveys/questionnaires and interviews. Discuss various important research.

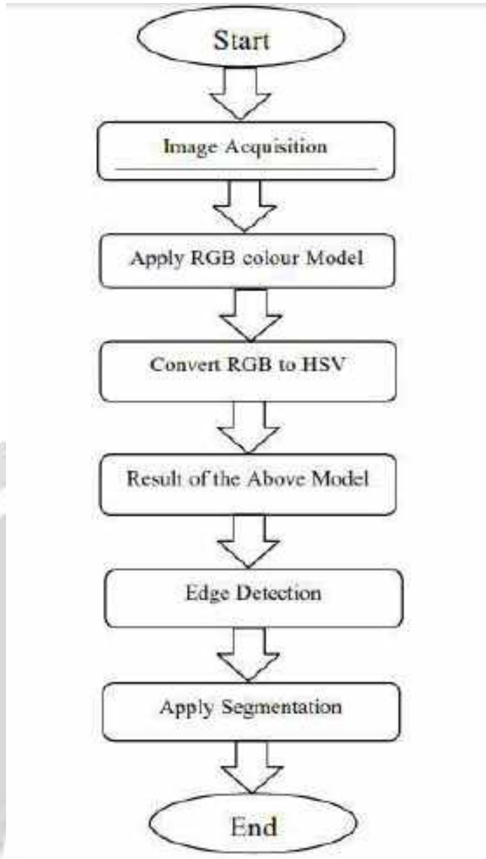


Fig -1: Steps involved in methodology

The proposed methodology's block diagram is illustrated above. The Raspberry Pi is employed as the microcontroller in this scenario, which is quite adaptable to varied situations. The first block is the power supply, which is essential for any system to function properly. The second block contains the camera block, which is utilised to detect and perceive fire. The third block contains the servo motor and driver. In this situation, the servo motor functions as a storing agent, while the driver is employed to correctly set the angles. The water pump, which holds the water, is the fourth block.

3.1 ARCHITECTURE OF THE SYSTEM

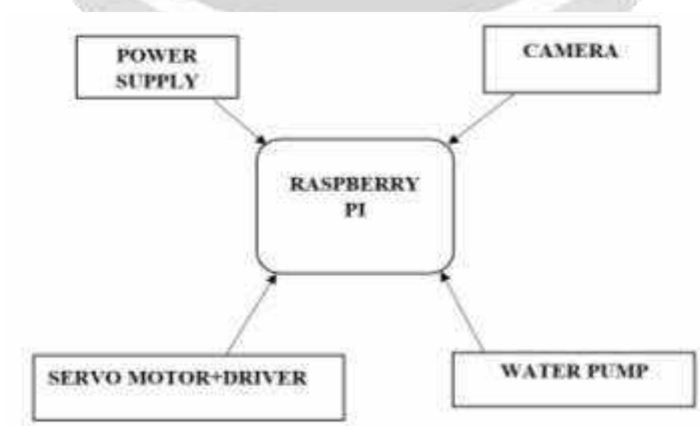


Fig -2: Architecture of proposed System

The proposed methodology's block diagram is displayed as above. The Raspberry Pi, which is particularly adaptable to operate in a variety of situations, is employed here as the microcontroller. The initial building block is the power supply, which is necessary for any system to carry out the necessary action. The camera block, which is used to find the fire, is in the second block. The servo motor and driver are located in the third block, where the driver is utilised to precisely fix the angles while the servo motor serves as a storing agent. The water pump, which pumps the water, is the fourth block.

3.2 Experimental Setup

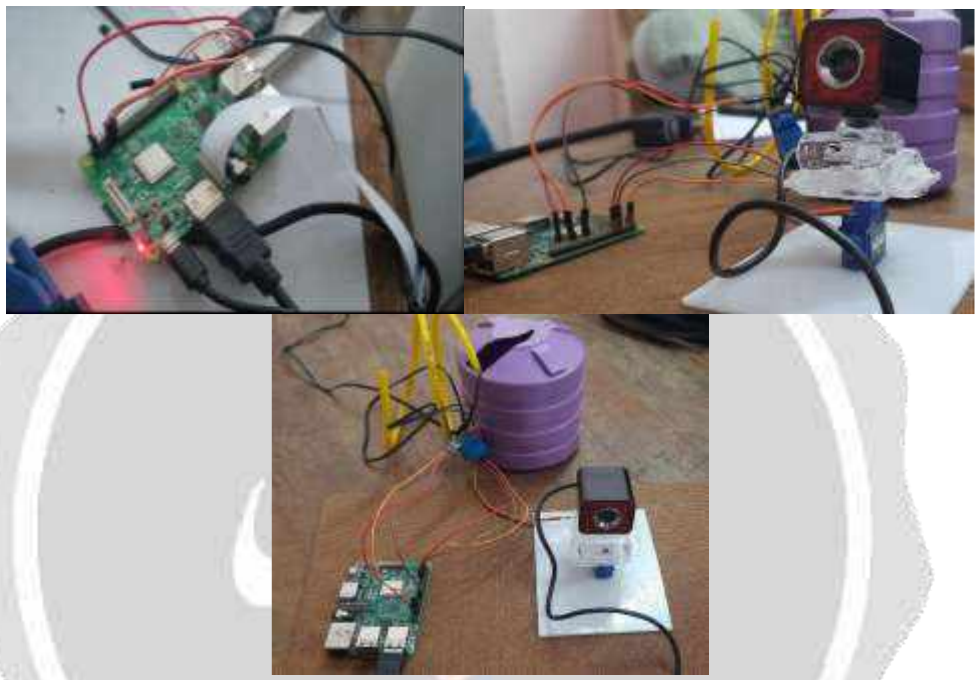


Fig - 3: Experimental setup

4. RESULTS AND ANALYSIS

4.1 Experiment Results

The proposed system produces a model to detect fire through a camera and rescue by sprinkling water at the conclusion of this project. The fire can be put out using the water pump that is attached to the servo motor once the fire has been identified by the camera through live streaming and the trained datasets that collect the frames to process picture. Edge detection and the Yolo v5 algorithm are used by the system to identify fire when it is taken by a camera. A message is then sent to the receiver by the network formed using the MQTT messaging protocol.

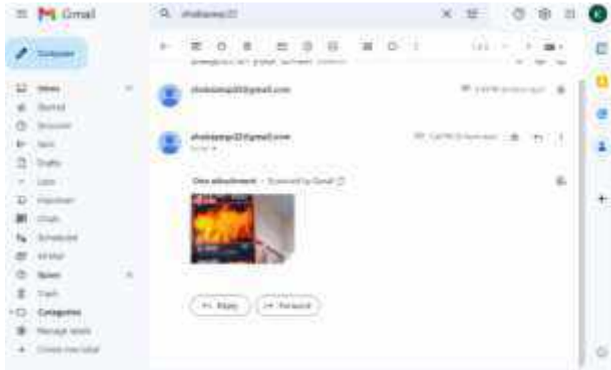


Fig - 4: G-mail notification of fire detection

Fig-5 :By Edge detection process fire is detected

4. CONCLUSIONS

Existing fire detection and rescue systems should always have manual assistance. However, when tasks are completed manually, the workload increases and maintenance becomes difficult and overdue. This strategy encourages technological advancement in public place safety measures. Instead of utilising an existing system, the project sought to detect fire using a novel method. The technologies that are now in use, such as sprinkler water discharge systems and smoke detectors, are excellent and very beneficial. But these systems do have some drawbacks. The goal of the thesis is to improve the existing system. As technology advances, in order to keep up and reduce constraints as well, a new system has been developed. Because in this system the camera acts like a human eye, as it detects a fire, the video is captured, and the image is processed using the software to alert the user through email, these limitations can be reduced by using Artificial Intelligence technology for fire detection. The device effectively detects fire and initiates water-pump rescues. The thesis provides a review, analysis, system design, algorithm, test, and outcome.

5. REFERENCES

[1] Mengxin li, Weijing xu, ke xu, Jingjing fan, Dingding hou(2013): Review of fire detection technologies based on video image, Vol. 49, pp. 701-705.2021

[2] Vipin V(2012): Image Processing Based Forest Fire Detection, vol. 2, pp. 89-92. 2020

[3] DHT11 humidity and temperature sensor pdf //http:www.droboticsonline.com . 2020

[4] Turgay Çelik, Hüseyin Özkaramanlı, and Hasan Demirel, Fire and Smoke Detection without sensors: Image Processing Based Approach, 15th European Signal Processing Conference (EUSIPCO 2007), Poznan, Poland, September 3-7, 2019

[5] Hemangi Tawade , R.D. Patane (2015): Optimized Flame Detection using Image processing based Techniques, Volume 4, pp. 21 .2018

[6]. Huy X Pham, A. Q. Nguyen, H. T. Nguyen, V. C. Tran, and J. Pestana, " A Single Shot MultiBox Detector for Visual Real-Time Fire Detection for UAV-based Fire Surveillance ", Third International Conference on Internet of Things and Applications, University of Isfahan, Isfahan, Iran, 2019. 2017

[7]. Aktham Hasan Ali1, Ahmed Hussein Duhis, Nabeel Aad Lafta Alzurfi, Mohannad Jabbar Mnati,"Smart monitoring system for pressure regulator based on IoT", International Journal of Electrical and Computer Engineering (IJECE), Vol. 9, No. 5, October 2019.

[8]. Authors Jeevan Jayasuriya1 · Irene Moser2 “An automated water dispensing system for controlling fires in coal yards” , International Journal of Coal Science & Technology (2022) ”, International Journal of Embedded Systems and Applications (IJESA), 2018.

VIRTUAL STYLING ROOM USING A LIVE VIDEO

Vijayalaxmi Joshi[1], Dr. Nehal Singhal[2], S. Vishnu Sharma[3], Rohan.H[4], Sanjai Kumar. R[5]

[1] Assistant Professor, ISE Department, Rajarajeswari College of Engineering, Karnataka, India.
[2]Associate Professor & HOD, Information Science and Engineering, RajaRajeswari College of Engineering, India
[3] Information Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India
[4] Information Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India
[5] Information Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

A platform called Virtual Styling Room allows users or consumers to choose from a large selection of clothing designs before replicating those ensembles on virtual humans. This creates an entertaining, interactive, and very realistic virtual system. We have proposed a technique that facilitates the synchronisation of daily clothes in this study. The Virtual Styling Room with Live Video Feed project may change how someone shops for clothing and how they try on outfits, just like they would in a trial room. By utilising "Virtual Reality," customers may try on a variety of things without really wearing them, which shortens the shopping process. The quantity and style of clothing worn may differ depending on physical stature, gender, as well as social and geographic considerations. Real-time fittings for customers are possible, but they take too long when there aren't enough trial rooms.
Our objective is to develop a virtual system that is dynamic, engaging, and astonishingly realistic and that enables users or clients to choose from a wide range of clothing designs before putting those outfits on virtual humans.
We have proposed a technique that facilitates the synchronisation of daily clothes in this study. How a person shops for and attempts on clothes may change as a result of the virtual styling room initiative employing live video feed.

Keyword: - *Virtual Styling Room, Virtual Styling Room with Live Video Feed, replicating, Virtual Reality, entertaining, interactive, and very realistic virtual system, synchronisation.*

1. INTRODUCTION

There are two universes: the real world and the virtual world. When people first learned how to use computers, they started to live digital lives. Virtual reality is a software that combines the virtual and physical worlds.
Numerous devices that allow users to simultaneously experience the real and virtual worlds have been made possible by smart technologies.
Consider how quickly online shopping evolved. People are more used to using online shops, auction sites, etc. to purchase the items they are interested in.
The inability for customers to try on clothing before buying it is a disadvantage of online apparel shopping. How a client feels after dressing affects whether or not they decide to purchase the things.

1.1 Motivation of the Task

It enables customers to choose more carefully. The main objective of the project is to establish an actual relationship between the user and virtual clothing.
Provides shoppers with a way to try on various articles of clothes without touching them in order to make a purchase.
Reduces the need for manual or physical clothing fitting, which also reduces the risk of getting sick.
While using virtual fitting rooms, there are fewer security issues than there are when using trial rooms in person, such as worrying about hidden cameras.

1.2 Problem Statement

By creating a virtual style room utilising a live video feed, a software was created to save people time and improve their online shopping experience. This software also offers a virtual space where customers may try on clothing before making a purchase.

1.3 Proposed System

The main objective of this project is to make users' online shopping experiences better and simpler. It aims to create a "Augmented Reality" fitting room based on user needs in order to save time. Provides shoppers with a way to try on various articles of clothes without touching them in order to make a purchase. Reduces the need for wearing physical garments, which also reduces the risk of contracting infections. It enables customers to choose more carefully. The project establishes a real link between the user and virtual attire. Modifying designs to meet customer needs and recommending other clothing styles.

1.4 Objectives of the Task

The main objective of the project is to establish an actual relationship between the user and virtual clothing. Allows shoppers to try on various pieces of apparel without touching them before making a purchase. Reduces the need for manual or physical clothes putting on, lowering the likelihood of catching covid.

2. LITERATURE REVIEW

In the first paper “Implementation of Virtual Fitting Room Using Image Processing”, written by Srinivasan K. Vivek S where they explained about an intuitive, user-friendly, and stylish body motion-based GUI for user use .And the main drawback of this paper is that time complexity was very high so it has to be improved.

In the second paper” Image Processing Design Flow for Virtual Fitting Room Applications used in Mobile”,written by Cecilia Garcia, Nicolas Bessou, Anne Chadoeuf and Erdal Oruklu where they explained the suggested programme has a lot of entertaining and practical features for users to use developed for mobile use. And the major drawback of this paper is that the validation accuracy of the model achieved is less than 50%.

In the third paper “A Virtual Trial Room using Pose Estimation and Homograph”,written by Kshitij Shah, Mridul Pandey, Sharvesh Patki, Radha Shankarmani where they explained about the a single RGB-D Kinect sensor is used to measure the user's bodily parameters, including 3D measurements of the knee, hip, thigh, and waist perimeters.And the major drawback of this paper is when several things are in front of the camera, the system is ineffective.

In the fourth paper “Virtual styling room using segmentation method”, written by A. C. Gallagher and T. Chen where they explained that for identity recognition, a graph-cut based method of clothing segmentation was developed, and a graph-cut based method of upper body clothing segmentation was also proposed. And the main drawback of this paper is that It is necessary to reduce the pose detection's time complexity.

In the fifth paper “Virtual Trial Room Using Augmented Reality”, written by Shreya Kamani, Neel Vasa, Kriti Srivastava where they explained about the ARDressCode project tackles the difficulties of creating a lightweight multipoint motion tracking system mixed with real-time animation of an integrated 3D clothing overlay in AR. And the main drawback of this paper is optimization of coherent clothes model is needed.

In the sixth paper “Virtual Dressing Room Application with Virtual Human Using Kinect Sensor”,written by Muhammed Kotan and Cemil Oz where they explained about Using the Kinect, generate human measurements based on the user's position in front of the sensor. And the main drawback of this paper is that variations in the Kinect sensor's capacity as a sensor, so this was very effecting in detecting the user image.

In the seventh paper "Virtual dressing room using image", written by Y. Wang and G. W. Cottrell where they explained about the Convolutional Neural Network is used to recognise the social styles of individuals in an image, both individually and as a whole. And the main drawback of this paper is that body measurement error which means that the detection of the user image depends on the environmental settings and the background light so that the measurement of body gets affected.

3. METHODOLOGY

Methodology is the precise approaches or techniques used to become aware of, choose, procedure, and analyse facts approximately a subject. In a research paper, the technique segment permits the reader to significantly examine an observer's overall validity and reliability. The method section of document information how the studies become performed, the studies methods used and the motives for choosing those methods. It should define: the participants and studies techniques used, e.g. surveys/questionnaire, interviews. Discuss with different relevant research.

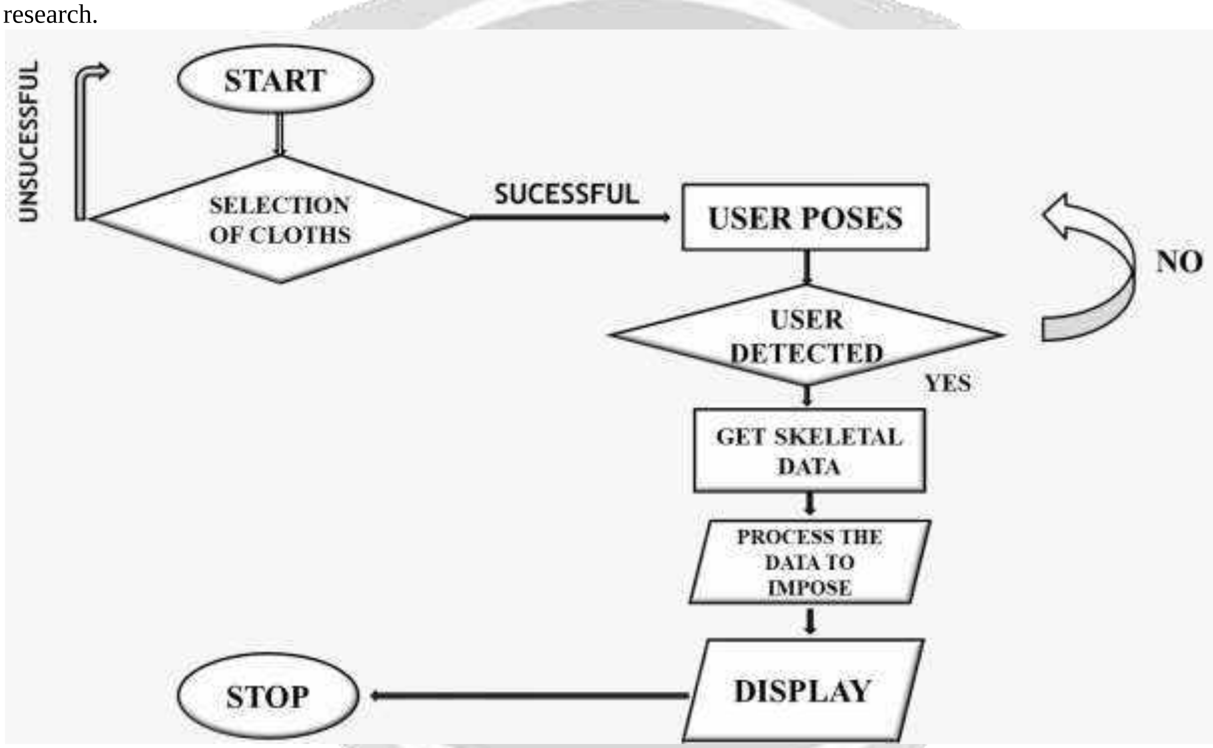


Fig -1: Steps involved in methodology.

The user is initially presented with a wide range of clothing options to choose from. If the selection process is unsuccessful, the user is directed back to the starting step. Once the user has successfully selected their desired clothing, they must strike a pose in front of a camera-equipped device or laptop, which will then detect their pose. If the user's pose is detected, the process moves to the next step. However, if the pose detection is unsuccessful, the process returns to the previous step. The system then obtains skeletal data through the use of the Haar cascade algorithm and processes this data to superimpose the user's image on the screen, allowing them to view the selected clothing. Finally, the process concludes.

3.1 ARCHITECTURE OF THE SYSTEM

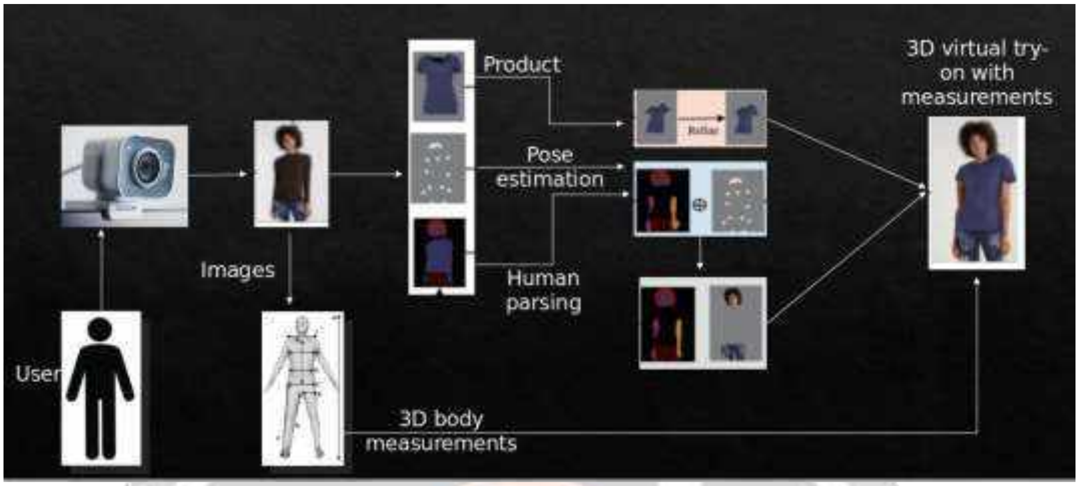


Fig -2: Architecture of proposed System

Step 1: Depending on the name of the figure, the user must stand in front of the device's computer screen or LED screen.
Step 2: The device's camera will interact with the user's body in a way that is skin to how it recognises the structure of the user's body and, with the help of particular alignments, permits the addition of a particular product to the user's body.
Step 3: Because this project is real-time, OpenCV and its many modules will react to the user's alignment and assign it to the user in an appropriate way.
Step 4: The NumPy framework will consider the user's location and the size of the human body. The calculation's outcomes will be shown on the LED screen when the user is testing a particular item.
Step 5: The project's database is obtained from the source (through the Internet).
Step 6: The product is now accessible for testing by the user following database-based calculations and alignment.
Step 7: The entire procedure is viewable on the system's LED screen.
Step 8: At this point, the project is prepared to be tested.

4. RESULTS AND ANALYSIS

4.1 Experiment Results

For the human face detection, we will be using the Haar cascade algorithm which is machine learning object detection algorithms that are used to identify faces in an image or a real-time video. The Viola and Jones research paper "Rapid Object Detection Employing Boosted Cascade of Simple Features" proposes edge or line detection features, which the Haar Cascade technique uses.

- In general, Haar cascade algorithm has the following steps
- Importing OpenCV
- Importing XML file
- Importing test Image
- Converting the image to greyscale
- Detecting Multi-scale faces
- Mentioning sides of the rectangle for face detection
- Displaying the detected image

Figure 3: -Main page

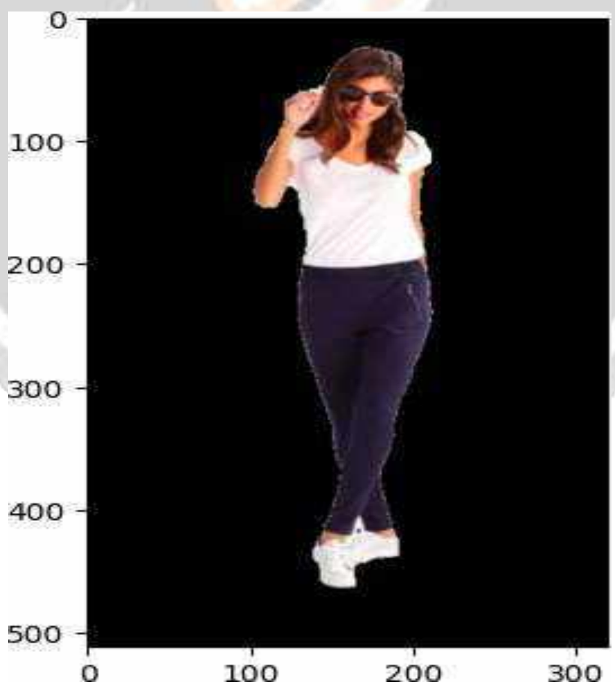


Figure 4: Resizing and rescaling the person image. Background elemination is done using opencv

Figure 5: Cloth mask creation and resizing the image using opencv

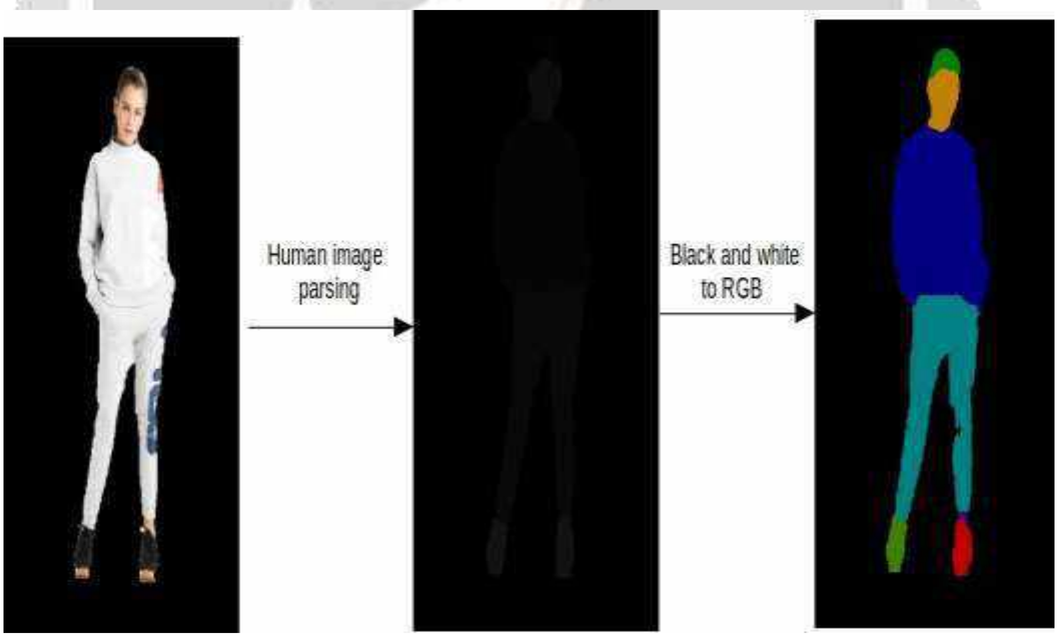


Figure 6: Human parsing is done using deep learning where the human body parts is differentiatedwith RGB colors.

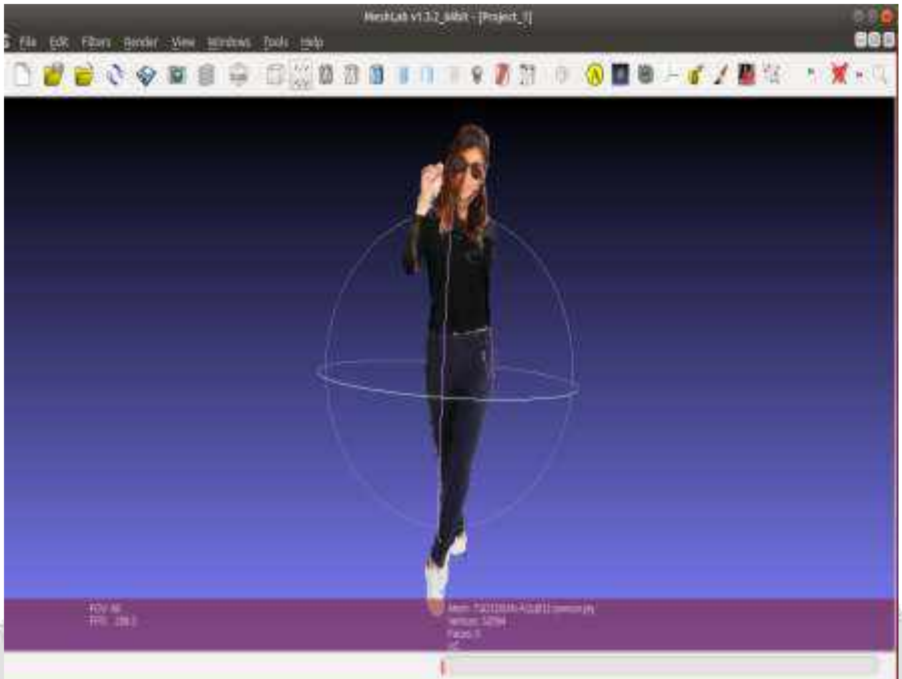


Figure 7: MeshLab

In the segmentation models the image is divided into different parts called as image objects. Segmentation helps to extract the region of interest (ROI) from the image using a Python library using Neural Networks for Image Segmentation based on the TensorFlow architecture. It is the technique of dividing an image into various regions. The components that make up an image are known as Image Objects.

For programmers trying to create scalable, instantaneous computer vision applications, it is a great tool.

4. CONCLUSIONS

In order to enable users or clients to choose from a wide range of clothing designs before replicating those clothes on virtual humans, our team is developing an interesting, dynamic, and amazingly realistic virtual system.

Using the concept of "Virtual Reality," customers can try on a variety of items without wearing them. Our team is creating an engaging, dynamic, and incredibly realistic virtual system that will allow users or clients to select from a broad variety of clothing styles before recreating those outfits on virtual people.

Customers can virtually try on various things without really wearing them because to the idea of "Virtual Reality."

5. REFERENCES

[1] Bartol, Kristijan, et al. ”A review of body measurement using 3D scanning.” Ieee Access 9 (2021).

[2] Oikonomou, Konstantinos, et al. ”Snapwear: A Snapchat AR filter for the virtual tryon of real clothes.” 2021 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct). IEEE, 2021.

[3] Heming Zhu, Yu Cao. “Deep Fashion3D” European Conference on Computer Vision.

[4] Yangyiqiao Gao. “Online Virtual Try-On System Based On Personalized Avatar” .iplab.

[5] Kamrul Hasan Foysal, Hyo-Jung, Francine Bruess, Jo-Woon Chong. “Body Size Measurement Using a Smartphone”,

A SURVEY ON GRAPE FRUIT DISEASE DETECTION AND MONITORING SYSTEM

Mrs.M.Jeniga Gemsy Thepora [1], Muktha S [2], Mitali Sharma [3], Manoj Gowda UK [4], Mohammed Sayed S [5]

[1] *Assistant professor, Department of CSE, RRCE, Karnataka, India*
[2] *BE Student, Department of CSE, RRCE, Karnataka, India*
[3] *BE Student, Department of CSE, RRCE, Karnataka, India*
[4] *BE Student, Department of CSE, RRCE, Karnataka, India*
[5] *BE Student, Department of CSE, RRCE, Karnataka, India*

ABSTRACT

Due to the ongoing demand for food and food products, agro-based industries are evergreen. It is essential to cultivate crops effectively and efficiently to boost overall yield due to the rising demand for agro-based industrial products. We must keep an eye on the crops during their growth and development in order to accomplish this goal. One of the main issues facing farmers in the agricultural industry is crop disease. Therefore, efficient disease detection and prevention techniques must be created. The development of a precise and economical framework for crop monitoring and early disease diagnosis makes use of deep learning algorithms and image processing techniques.

.**Keywords** – *Detection of disease, Monitoring System, illnesses that affect grapes, Deep Learning, Convolutional Neural Networks (CNN), K-Means Clustering, and Image Processing Powdery mildew and downy mildew.*

1. OVERVIEW

It is well known that agriculture is the foundation of our nation and that it provides a living for around 90% of Indians. In India, agriculture accounts for around 19.9% of the country's GDP. For crop selection and production, farmers have access to a wide range of options, including fruits, vegetables, paddy, legumes, and others. In the current climate, it is crucial for farmers to be aware of the illnesses harming their crops and the preventative steps that should be done. For field monitoring, farmers should also be knowledgeable about contemporary farming techniques. After citrus fruits and bananas, grapes are one of the most significant crops grown in India; they are also exceptionally nutrient-dense and high in vitamin C. One of the most often used commercially

2. THE METHODOLOGY

2.1 Artificially intelligent systems

By "artificial intelligence," we mean the use of computers to do tasks that would normally need human intellect. Any artificial system having cognitive capacities on par with the human brain might be called a "cognitive machine." AI's strength is in its capacity to calculate and choose actions that have the highest chance of success. The foundation of artificial intelligence is the hypothesis that machines may learn to think and reason like humans. The purpose of AI research is to develop computer programs with cognitive abilities comparable to those of the human brain. Progress is being made in accurately replicating cognitive processes including learning, thinking, and perception by scientists and engineers. Some people assume that success in the future will be shared among those who come up with novel approaches to old challenges.

2.2 Computer Learning

The study and development of "learning" systems that use data to enhance performance on targeted tasks is at the heart of machine learning. It's often understood to fall under the realm of AI. On the basis of sample data (called training data), machine learning algorithms automatically generate a model to make predictions or judgements. Because it is hard or impossible to create conventional algorithms capable of accomplishing these tasks, machine learning algorithms are used in numerous disciplines, including voice recognition, email filtering, computer vision, and medicine. There is a close link between machine learning and computational statistics, even if not all machine learning relies on it. Accurate prediction is the focus of computational statistics, a subfield of machine learning. Mathematical optimization research has much to teach machine learning in terms of methodology, theory, and future uses. Analyzing the data exploratorily Data mining is a subfield of computer science with a primary emphasis on unsupervised learning. Some machine learning systems are able to simulate the way the human brain learns by using data and neural networks. Machine learning, often known as predictive analytics, is increasingly being used to solve complex business challenges.

2.3 The convolutional neural network

In order to evaluate visual input, deep learning methods such as convolutional neural networks are often used. It consists of stacked layers of synthetic neurons. Each layer of the convolutional networks performs analysis on the input picture and then passes on a set of activation functions to the layer below it. As it moves through the layers, it starts by recognising simple traits before moving on to more complex ones like faces and objects. UnitedModel, DR-IACNN, DICNN, Faster-R-CNN, ResNet 50, Faster-RCNN, and VGG16 are a few of the models displayed.

2.4 Deep learning

Deep learning, which is recognised as a branch of machine learning, mainly focuses on the algorithms that are inspired by how artificial neural networks function and are created. It can have hundreds of layers, as the name suggests, and as it gradually learns to identify images, these layers combine to form a deeper network.
The SegNet architecture can be used to implement this kind of technique. When assessing image data, a few models are widely used: Inceptionv3, ResNet50, VGG-16, and EfficientNet. The most popular techniques or strategies for diagnosing and classifying plant diseases are picture capture, preparing images for processing, segmenting them, extracting features from them, and classifying them.

2.5 Using K-Means Clustering

Iteratively analyzing a dataset over time, K-Means is an unsupervised learning approach. Data points are clustered together in order to reduce the average distance to the cluster centers. The center of each group of data points is represented by the centroid of the clusters. The information is then partitioned into k nonoverlapping clusters or subgroups with the goals of preserving the physical separation between them and making the data points inside each cluster as similar as possible.

2.6 Python programming

Python is a general-purpose, high-level, multiparadigm programming language that is interpreted. Python gives programmers the ability to create simple or complex programmes using a range of programming techniques, get results faster, and produce code that almost perfectly resembles human language. Python compiles code in the background; therefore, running an interpreted programme in this language does not require compiling the code first. Python is a high-level programming language that isolates many difficult factors from the programming code.
Python programmers have the option of using imperative, functional, object-oriented, or reflective programming to perform their tasks. Python has a wide range of applications, including numerical programming, game development, and access to serial ports.

2.7 An open CV

Library is a term for a collection of code used in computer vision and machine learning. Using OpenCV, a common Established framework for use in computer vision applications; this will hasten the incorporation of AI into commonplace items. OpenCV's BSD license encourages widespread adoption and customization by businesses. Over 2,500 optimal algorithms, from both traditional and cutting-edge computer vision and machine learning fields, are included in the collection.

Images may have red-eye removed from flash pictures, eye movements detected, landscapes identified, overlay tags made, and comparable images stored and recognized with the help of these algorithms.

They can be used to make 3D point clouds from stereo cameras, stitch pictures together to make high-resolution photographs of complete scenes, extract 3D models of things, detect faces and objects, categorize human behaviors in films, and track and follow the camera. Things on the go. More than 47,000 individuals are using OpenCV, and it has been downloaded over 18 million times. The library serves primarily as a resource for government, corporations, and schools.

2.8 TWILIO

OTT, MMS, and SMS messages can be sent and received globally using the Twilio Messaging API. To guarantee that messages successfully reach end users wherever they are, it makes use of clever sending features. More than 180 nations can access SMS-enabled phone numbers through Twilio. The method is made to reliably identify diseases that affect grape leaves. The trained dataset includes both healthy leaves and leaves with the illnesses powdery mildew and downy mildew.

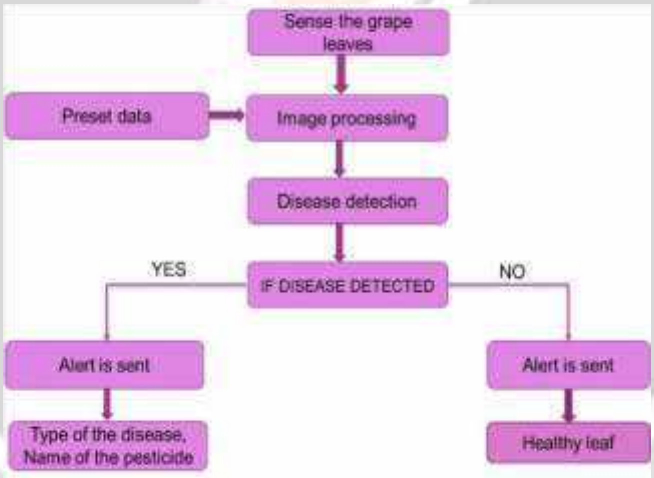


Fig-1: System Design

Python is used to create a data training approach for a CNN model. Both normal and diseased leaves are used in the training process. The data set is then tested and confirmed when training is finished.

Python code that is similar to the one used by the research team has been put to good use in this investigation. The testing code uses image processing and the k-means clustering method to distinguish between healthy and sick leaves. The input image is divided and classified many times to ensure accurate classification of sick and unaffected leaf parts. In order to recover the leaves' unique properties, image processing makes use of a variety of color models. The color contrast between healthy and sick leaves allows us to distinguish between them,

Based on this procedure, the leaves are divided into two groups: leaves that are healthy and leaves that have downy or powdery mildew.

The sort of pesticide to be injected can be decided on the basis of whether the plantation is disease-free or infected. For various infections, several pesticide types must be infused. Chlorothalonil and mancozeb are infused into the plantations plagued by Downy mildew, whereas potassium bicarbonate is infused into the plantations affected by powdery mildew.

The Twilio platform is utilised to create an alert system. The created alert system is used to give the farmer an SMS on the state of the plantations in the field, including whether they are healthy or afflicted by illnesses and the type of pesticides to use to be infused for various illnesses

3. IMPLEMENTATION

It is necessary to train the given method on a dataset that includes images of both healthy and unhealthy grape leaves. While the exact amount of training data used to build a CNN model will change from trial to experiment, typically it is about 80%. A CNN model is trained using this data in an effort to learn new information. The input and the predicted output are both included in the training data. The CNN model is tested on a subset of the whole dataset (about 20%). After receiving appropriate instruction, the form is utilized to conduct the evaluation.

When training efficiency is high yet performance drops when tested on fresh data, overfitting or misfitting occurs and may be mitigated via data validation. To avoid efficiency issues while adjusting parameters, a 10% validation set was developed.

For this, we utilised automated dataset validation, which offers a fair model assessment and decreases then obtain the grape's evaluation-required image. Image processing will be performed on the image. Then, using completely different pre-processing techniques, this image will be processed to remove noise from the image or to remove alternative objects. Image clipping, or cropping, is the process of selecting the desired area of an image. The smoothing filter has completed its job of enhancing image smoothness. Image sweetening is used to make grayscale and monochrome images stand out more from RGB images.

Image segmentation will come after image conversion. An image is segmented when it is split up into many segments that have similar or identical options.

Numerous techniques, including the otsu methodology, the kmeans clump, and the conversion of RGB images into HSV models, can be used for segmentation. For segmentation, the RGB image is reborn into the HSV model. Finding the diseased area of the leaf is made easier with boundary detection and spot detection. The border detection rule is used, and the eight attributes of pixels are taken into consideration. The identification of an object depends heavily on feature extraction. The use of feature extraction in image processing is widespread. The characteristics that can be employed in the detection of plant diseases include colour, texture, morphology, edges, and others.

Fig-2: RGB to gray/monochrome image conversion

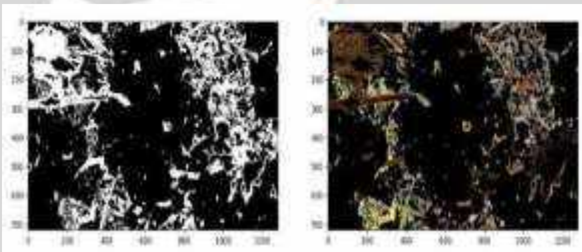
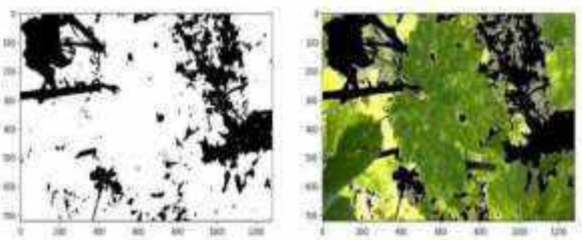


Fig-3: convert an image from RGB to HSV.



Primary aspect of proposed piece is the colour of the leaves, and brown and green portions from the RGB and HSV elements were taken into consideration. Following feature extraction, a victimisation neural network classifies the training information pictures. In CNN, these feature vectors are compared to neurons. The somatic cell's output is the result of a weighted addition of the inputs. The sick part was extracted using the HSV format, whereas the healthy part was extracted using the grey image. Colour image processing can segment diseases. If the diseased area has a distinct colour from the unaffected area, the colour percentage ratio has been shown to be a successful tool for detecting disease. Based on the colour and characteristics of various leaves, it is possible to distinguish between the healthy and diseased parts of the leaves. The machine learning method is applied to get extremely precise results. The image will be categorised as downy or powdery mildew based on the retrieved information. After the disease is discovered, a warning message informing the farmer of the condition of the leaf and the pesticides that must be applied to the diseased leaf will be sent.

4. RESULTS

The system's major objective is to accurately identify grape leaf disease, and to do this, the main emphasis is on assessing the disease detection system's accuracy. High accuracy testing and validation of healthy or diseased leaves is made possible by the training data. The testing information is useful in determining the sorts of healthy and sick leaves.
The amount of times the system has been trained will affect its accuracy. Images of both healthy and sick people make up the data set. By repeatedly training the photos, the accuracy was evaluated.
The graph demonstrates that the accuracy of the system grows as the number of times the dataset is trained increases.

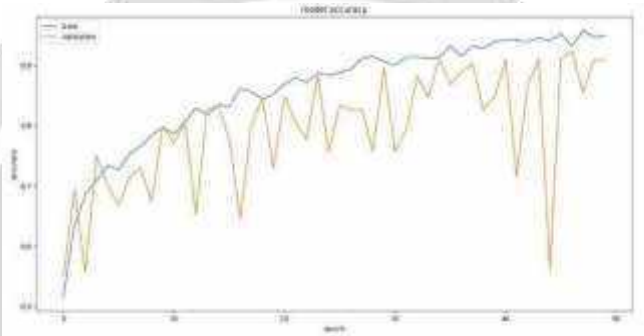


Fig. 6: Validation and train data accuracy Loss is the cost of a poor forecast; more specifically, loss is a measure of how poorly the model predicted.

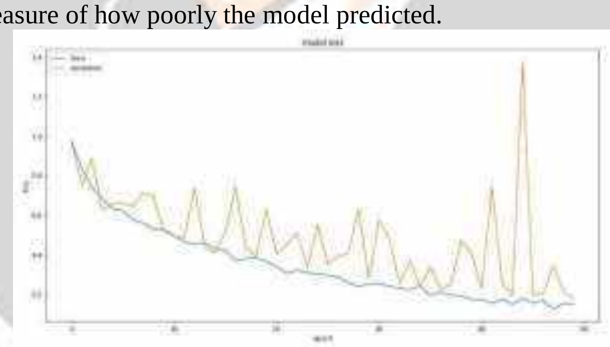


Fig-7: loss model for the proposed system

5 .BOTTOM LINE

Numerous techniques can be used to find the grape disease and classify it. In this essay, we've discussed the numerous methods that scientists have employed to identify and detect grape fruit illnesses in an accurate and efficient manner. Images are captured and diseases are identified using image processing techniques.

The key steps in the image processing technique include image acquisition, image pre-processing, picture segmentation, feature extraction, and image classification. The image acquisition source is a digital camera. The pre-processing procedure also includes image augmentation, background removal, picture resizing, and picture contrast improvement. Image segmentation is accomplished using K-means clustering.
On basis of the shape, colour, and texture, features are extracted. Disease categorization is carried out via Convolutional Neural Networks (CNN) and Image Processing.

The project's goal is to create a framework that relies on remote monitoring of grape fields, according to the literature review. The goal is to use AI and image processing to create a flexible system for managing grape diseases at a much earlier stage. The suggested approach forgoes the use of pesticides and herbicides when not necessary, minimising both the environmental impact and the financial burden on farmers. The suggested system claims to provide great information to grapefruit growers, automate the identification of grape illnesses, and notify farmers of problems with disease appearance in grape farms in real time.

6. UPCOMING WORK

1. A dataset of healthy leaves and two grape leaf illnesses served as the foundation for the proposed system. For more research, different datasets related to grape leaf disease might be investigated.

2. Several datasets on plant diseases of varied sizes may be utilised to improve the model's performance.

3. RNN, LSTM, Bi-LSTM, and hybrid models like CNN + LSTM, CNN + RNN, and others can all be used as deep learning models in the future.

4. We divided diseases into two groups in the disease module. For a more in-depth analysis, different illness classes can be looked at.

5 .Developing and implementing a framework for precision farming based on machine learning and deep learning techniques.

7. REFERENCES

[1]. Niharika S., N. V. Sahana., and Prof. Girija J., "A review on grape disease detection and classification using image processing", volume 8, number 9, International Research Journal of Engineering and Technology (IRJET), September 2021.

[2] Marcel Salathe, David P Hughes, and Sharadha P Mohanty, "Using deep learning for image-based plant disease detection", Frontiers in Plant Science, 2016.

[3] Kowju Gayathri "Image processing and pattern recognition-based plant leaf diseases identification and classification", Journal of Physics: Conference Series, 2021

[4] Navin Rajpal Kirti, "Black rot diseases detection in grape plant (Vitis vinifera) using color-based segmentation & machine learning", 2020 Second International Conference on Advances in Computing, Communication Control and Networking (ICACCCN).

[5.] Early diagnosis of grape illnesses using machine learning and the internet of things, 2016 Second International Conference on Cognitive Computing and Information Processing (CCIP), Suyash S. Patil, Sandeep A. Thorat.

[6]. "Detection of grapes disease (downy mildew) based on IOT and image processing", ICRTET-2018, International Journal for Research in Engineering Application & Management (IJREAM). Authors: Daksha mutha, Monika kothari, Lakisha Jain, and Dr. Mahesh Singhavi.

[7]. Lei Zhang, Qiufeng Wu, Miaomiao Ji, Information Processing in Agriculture, 2019. "Automatic grape leaf diseases identification via unitedmodel based on multiple convolutional neural networks."

[8]. Xiaoyue Xie, Yuan Ma, Bin Liu, Jinrong He, Shuqin Li, and Hongyan Wang, "A deep-learning-basedrealtime detector for grape leaf diseases using improved convolutional neural networks", Frontiers in Plant Science, 2020.

[9]. Early-stage detection of downy and powdery mildew grape disease using atmospheric factors by sensor, Kainjan Sanghavi, Mahesh Sanghavi, and Archana M. RajurkarMArtificial Intelligence in Agriculture (2021), 223-232.

[10] "Image processing for smart farming: Detection of disease and fruit grading", IEEE-2013 Second International Conference on Image Information Processing (ICIIP-2013). Monika Jhuria, Ashwani Kumar, and Prof. Rushikesh Borse.

[11]. Hule Pooja A, Mankar, and Khaire Tushar Grape Leaf Diseases Detection Using Improved Convolutional Neural Network, Shruti D. and Kolse S.R., International Research Journal of Engineering and Technology (IRJET), volume 9, issue 1, January 2022.

[12]. Yang Meng is the author of "The Damaging Truth about Chinese Pesticide and Fertiliser Use".Chinadialogue.net. Web. 1 April 2016. N.P., 2012.

[13]. System Architecture for Wireless Sensor Networks, by Jason Lester Hill.Doctor of Philosophy dissertation, 2003.

[14]. "Internet Of Things: 5 Applications in Agriculture," by Ryan Huang, HWTrek Blog, n.p., 2014, accessed April 1, 2016.

[15]. Katz, E., Zhang, Y., Sukkar, R

"Disease progression modelling using hidden Markov models", Engineering in Medicine and Biology Society (EMBC), August 2012, Raunig, D., and Wyman, B.T.

[16]. Qingsong Guan, Wenjiang Huang,

"New Optimised Spectral Indices for Identifying and Monitoring Winter Wheat Diseases" by Juhua Luo, Jingcheng Zhang, Jinling Zhao, Dong Liang, Linsheng Huang, and Dongyan Zhang was published in the IEEE journal of selected topics in applied earth observation and remote sensing's Volume 7, No. 6 in June 2014

[17].Computer Visionimage Enhancement For Plant Leaves Disease Detection by Dr. K. Thangadurai and K. Padmavathi, 2014 World Congress on Computing and Communication Technologies.

[18]. "Image Processing for Smart Farming: Detection of Disease and Fruit Grading", Proceedings of the 2013 IEEE Second International Conference on Image Information Processing (ICIIP-2013), Monica Jhuria, Ashwani Kumar, and Rushikesh Borse

[19] Abdul Hallis Bin Abdul Aziz, Zulkifli Bin Husin, Ali Yeon Bin MdShakaffRohani, Binti S Mohamed Farook 2012 Third International Conference on Intelligent Systems Modelling and Simulation, "Feasibility Study on Plant Chilli Disease Detection Using Image Processing Techniques."

[20]. International Journal of Advanced Research in Computer Science and Software Engineering, Volume 2, Issue 3, March 2012, Mrunalini R. Badnakhe and Prashant R. Deshmukh, "Infected Leaf Analysis and Comparison by Otsu Threshold and k-Means Clustering."

SMART HEALTH MONITORING WITH IoT: AN AUTOMATED AND INTELLIGENT SYSTEM FOR HEALTH MANAGEMENT

Dr. R Balakrishna[1], Meghana S[2], Masood Manzoor Ahmed[3]

[1] *Principal, Rajarajeswari College of Engineering, Karnataka, India*
[2] *Student, Dpt. Of Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[3] *Student, Dpt. Of Computer Science, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

In order to gather and analyze patient data in hospitals, this study suggests a cutting-edge health monitoring solution that makes use of IoT technologies. A suite of sensors, a Node MCU, and a camera are included in the suggested system, and they are used to gather critical medical data such as the patient's pulse rate, oxygen saturation level, and room temperature and humidity. Additionally, the camera is used to capture internal images of the patient following surgery. Once the images are captured, they are transmitted to a medical server over the Internet and stored there for future analysis by doctors. The suggested system is designed to offer patients with real-time monitoring and to notify medical staff when sensor results point to an aberrant health condition. The proposed system is intended to provide real-time monitoring of patients and to alert medical professionals when sensor values indicate an abnormal health condition. In urgent medical situations, healthcare providers have the ability to remotely monitor patients and offer medication guidance using an IoT kit that can be managed through an Android app., which automatically dispenses the medicine through drips connected to the patient's body. By providing continuous monitoring and predictive alerts, the proposed health monitoring system aims to improve patient care and recovery while reducing the cost of medical treatment. By enabling the capture of post-surgery images of a patient's internal state, the system empowers medical professionals to quickly detect and address any potential complications, leading to more efficient treatment and improved patient outcomes. This feature has significant potential to elevate the quality of healthcare services

Keyword - Health Monitoring, IoT technology, Node MCU, Sensors, etc..

1. INTRODUCTION

A crucial component of patient care is health monitoring, especially for individuals who are recuperating after surgery or those with long-term medical issues. Technology advancements have made it possible to remotely track patients' vital signs and give doctors feedback in real time, improving patient outcomes. The Internet of Things (IoT) has arisen in this setting as a potential tool for health monitoring, providing a practical and affordable method of gathering and analyzing patient data. To gather and analyze patient data in hospitals, this study introduces a revolutionary health monitoring system that makes use of Internet of Things technologies. The system is intended to enable real-time patient monitoring and to notify medical staff when sensor results point to an unusual health condition. Through an Android app-controlled IoT kit that automatically dispenses medication through drips connected to the patient's body in emergency situations, medical professionals can remotely monitor patients and give medication instructions while also monitoring them. The significance of this study rests in its potential to raise the standard of healthcare and boost patient outcomes. The suggested health monitoring system intends to enhance patient care and recovery while lowering the cost of medical care by offering continuous monitoring and predictive alarms. The system's capacity to get inside images of the patient following surgery can assist medical professionals in spotting any issues and offering prompt and efficient treatment. Overall, this method has the potential to transform healthcare by giving patients more individualized and effective care. The creation of a health monitoring system that integrates IoT technology with machine learning algorithms to detect aberrant health states is one of the paper's primary accomplishments.

2. Related works

"A Wearable IoT-Based Healthcare System for Monitoring Respiratory Diseases"(2019): This study presents a wearable IoT-based healthcare system for monitoring respiratory diseases, such as asthma and chronic obstructive pulmonary disease. The system uses various sensors, including a pulse oximeter and a respiratory sensor, to collect and monitor patient data. The study concludes that the system has the potential to improve the quality of healthcare for respiratory disease patients.[1]

"A Real-Time IoT-Based Remote Health Monitoring System"(2019): This paper presents a real-time IoT-based remote health monitoring system that can be used to monitor various patient health parameters, such as heart rate and blood pressure. The system uses an IoT platform to collect patient data, which can be accessed by doctors and healthcare professionals remotely. The study concludes that the system can improve patient outcomes and reduce the cost of healthcare.[2]

"An IoT-Based Wearable Health Monitoring System for Cardiac Patients"(2020): This study presents an IoT-based wearable health monitoring system for cardiac patients. The system uses various sensors, including an electrocardiogram (ECG) sensor and a blood pressure sensor, to monitor patient health parameters. The study concludes that the system can improve the quality of healthcare for cardiac patients and reduce the risk of adverse events.[3]

"A Blockchain-Based IoT System for Secure Health Data Management"(2021): This paper presents a blockchain-based IoT system for secure health data management. The system uses blockchain technology to ensure the secure and private storage and sharing of patient health data. The study concludes that the system can improve the security and privacy of patient health data and enhance the quality of healthcare.[4]

"An IoT-Based Smart Healthcare System for Elderly Care"(2022): This study presents an IoT-based smart healthcare system for elderly care. The system uses various sensors, including a fall detection sensor and a medication reminder sensor, to monitor the health and well-being of elderly patients. The study concludes that the system can improve the quality of healthcare for elderly patients and reduce the burden on caregivers. [5]

Table:1 Comparison of Sensors and technology used [1,2,3,4,5]

Title	Technology Used	Features	Advantages	Disadvantages
Wearable IoT-Based Healthcare System(2019)	Wireless sensor networks, cloud-based data storage	Real-time monitoring, wireless communication, cloud-based data storage	Early detection of respiratory problems, continuous monitoring, ease of use	Limited battery life, device compatibility issues
Real-Time IoT-Based Remote Health Monitoring System(2019)	IoT, cloud computing	Real-time monitoring, remote access, alerts for abnormal readings	Remote access to patient data, real-time monitoring, immediate alerts for abnormal readings	Limited scope of monitoring, dependence on internet connectivity
IoT-Based Wearable Health Monitoring System for Cardiac Patients (2020)	IoT, ECG monitoring	Real-time monitoring, ECG monitoring, alerts for abnormal readings	Early detection of cardiac problems, continuous monitoring, alerts for abnormal readings	Limited battery life, device compatibility issues
Blockchain-Based IoT System for Secure Health Data Management (2021)	Blockchain, IoT	Data encryption, secure data storage, decentralized data access	Enhanced data security, decentralized data access, secure data sharing	High implementation costs, complexity of blockchain technology
IoT-Based Smart	IoT, machine	Real-time	Enhanced safety	Limited scope of

Healthcare System for Elderly Care (2022)	learning	monitoring, fall detection, medication reminders, emergency alerts	and support for elderly patients, early detection of falls, medication reminders	monitoring, dependence on internet connectivity

3.Proposed System

The sensors, IoT module, and server for data processing and storage are all part of the suggested solution for this health monitoring system. The Green Easy Pulse Sensor Heart Beat Sensor HRM2511E, an oximeter to detect the amount of oxygen in the blood, and the DHT11 temperature and humidity sensor are among the sensors utilised in the system. The Node MCU IoT module transforms the signals produced by the sensors into readable data.

The data collected from the sensors must be combined and processed by the Node MCU. The processed data is transferred via communication with the server as well. The server is in charge of storing the data, utilising the KNN machine learning algorithm to process it, and offering predictions based on the processed data.

The camera will be used in conjunction with the ESP32 module to offer real-time patient monitoring. Wi-Fi will be used to send the data gathered from the sensors and camera to the medical server through the Internet. The data will be stored on the medical server, and the doctor will have access to it for ongoing review and analysis.

The system may remotely access the patient's data to provide a quick and accurate diagnosis in the event that the patient's health begins to behave abnormally. The doctor will receive an emergency alarm in this situation via a notice on their smartphone or other alerting devices.

Doctors will be able to remotely give medication with the proposed technology. A device that will allow the doctor to order and dispense medications in an emergency

Medicine is pumped into drip bottles using a DC motor pump that is relay-controlled. Using a flow controller, the medication flow is managed. The automated stopping of the medication flow occurs after the goal value is attained.

Additionally, moisture sensors are inserted into drip bottles so that carers will be informed by a buzzer sound if medications are running low.

Overall, the proposed cutting-edge health monitoring solution will provide an efficient and cost-effective way to monitor the patient's health in real-time, enabling doctors to make quick and accurate decisions for better treatment and care.

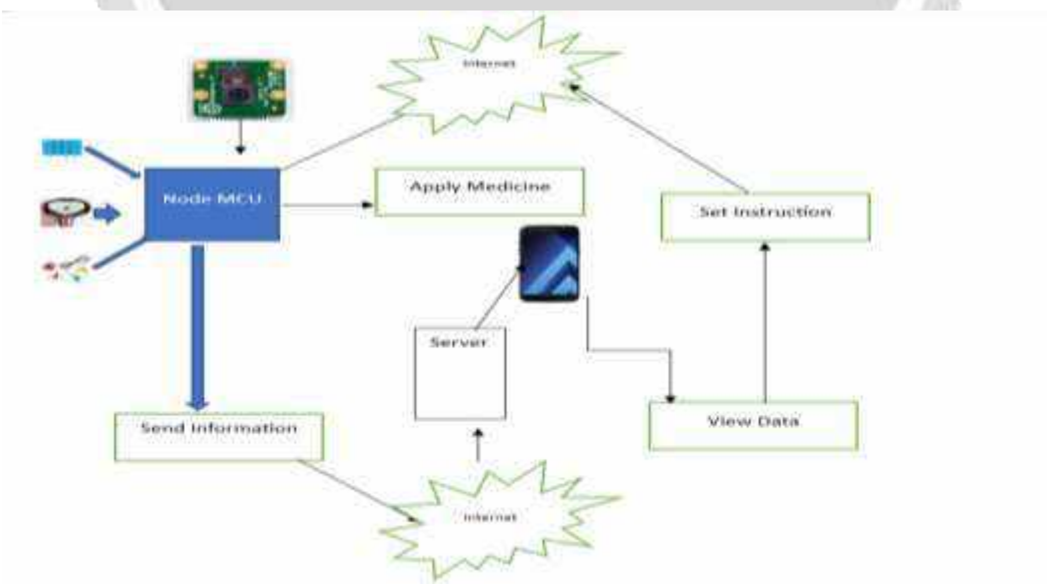


Fig1. Proposed System Architecture

4.IMPLEMENTATION
4.1Algorithm

KNN Algorithm :

Using K-Nearest Neighbour (KNN), a straightforward and approachable supervised machine learning algorithm, classification and regression issues are tackled. A new data point is classified using KNN based on the class that appears the most frequently in the K nearest neighbours, which are the K closest data points in the training dataset.

When using KNN, averaging the K nearest neighbours' values produces the desired outcome for the new data point. The user frequently selects the value of K, an important parameter that has an impact on the algorithm's effectiveness.

The predicted value of a new data point is based on the labels of its closest neighbor’s since the method is based on the assumption that data points with similar attributes tend to have comparable labels. The comparability of two data points is determined using distance metrics such the Euclidean distance, Manhattan distance, or Makowski distance.

The ease of usage, application, and suitability of KNN for both classification and regression problems are only a few advantages. However, it does have some drawbacks, including the need for a sizeable training dataset and the challenging nature of computing the K nearest neighbor’s.

The KNN method is an effective and well-liked machine learning technique that has been used in a number of industries, including image identification, finance, and healthcare. Its ability to learn from the data and make accurate predictions has made it a desired choice for numerous applications.

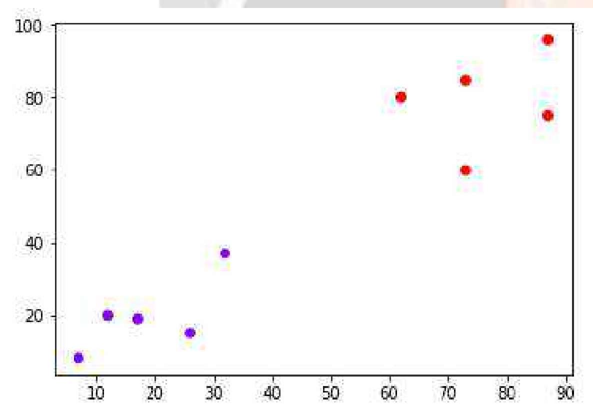


Fig-2 Poltting Of Datapoints

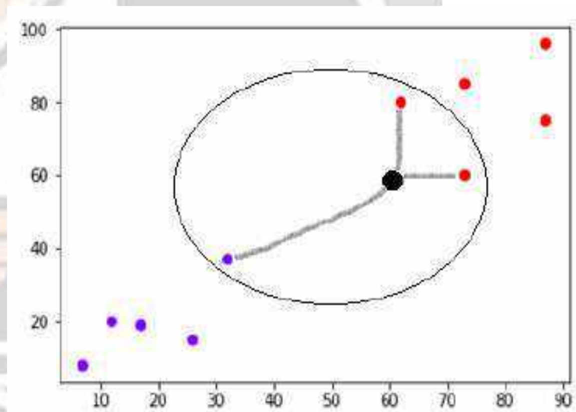


Fig-3. KNN Clustering

The Node MCU IoT module collects and processes several sensor data for the proposed health monitoring system. The patient's room's temperature, humidity, and oxygen levels are among the sensor data. These sensor readings are used to generate a feature vector, or, more simply put, a collection of numbers that represent the patient's current state of health.

We can use the history data gathered from prior patients as a training dataset to use the KNN algorithm in this system. The feature vectors of patients will be included in the history dataset, together with labels indicating whether or not they had any health problems. The KNN algorithm will be able to categorize a new incoming feature vector as "normal" or "abnormal" based on this training dataset.

The KNN algorithm, for instance, will discover the k feature vectors that are the closest to a new feature vector if it receives a new feature vector with readings for high temperature and low oxygen levels. The algorithm will then predict whether the new vector is "normal" or "abnormal" based on the labels of those nearby feature vectors. The device will immediately alert the medical staff so they may take the appropriate measures if it is deemed "abnormal."

By employing KNN algorithm in this manner, the health monitoring system can efficiently identify aberrant patient health situations in real-time and notify the medical staff, enabling them to take the appropriate actions right away. Better patient care and quicker healing times may result from this.

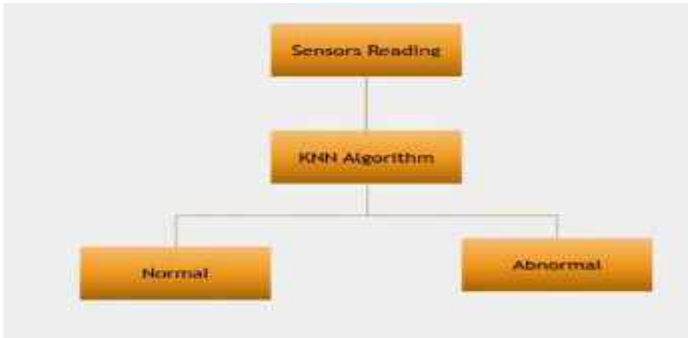


Fig.4 KNN Algorithm Working

5. RESULT

The implementation of the advanced health monitoring system that is suggested, utilizing IoT, with the integration of several sensors, cameras, and machine learning algorithms, has the potential to enhance patient care and lower healthcare expenses. Doctors can make accurate diagnoses, offer prompt interventions, and avert medical emergencies with the assistance of real-time monitoring and analysis of patient data. Predictive analytics can be used to identify possible health risks before they become serious by combining IoT technologies with machine learning algorithms. This proposed approach has the capacity to revolutionize healthcare and enhance patient outcomes with additional research and testing.

6. CONCLUSIONS

In conclusion, the proposed health monitoring system utilizing IoT technology is a valuable approach to provide continuous monitoring and analysis of patient data . The system is crafted to detect and alert medical professionals of any abnormal health conditions, enabling timely medical intervention and improving patient outcomes.
The outcome of our study indicate that the crafted health monitoring system is accurate and reliable in collecting and analyzing patient data. With its cost-effective and efficient means of health monitoring, the system has the ability to alleviate the workload of medical staff and enhance the standard of care provided to patients.
Additionally, our project addressed a few of the disadvantages of the still-used health monitoring systems, such as the need for physical wiring and complicated setups. Our suggested approach makes use of the Node MCU and Arduino boards, which can connect wirelessly using Wi-Fi and are simply configurable.
We believe that the outcome of this study will for help further research and development in this field, ultimately leading to more personalized and efficient healthcare for patients.

7. REFERENCES

[1] A. Gharaibeh, M. A. Salahuddin, S. J. Hussini, A. Khreishah, I. Khalil, M. Guizani, and A. Al-Fuqaha, “Smart Cities: A Survey on Data Management, Security and Enabling Technologies,” IEEE Communications Surveys Tutorials, vol. PP, no. 99, pp. 1–1, 2017.
[2] S. P. Mohanty, U. Choppali, and E. Kougianos, “Everything You wanted to Know about Smart Cities,” IEEE Consumer Electronics Magazine, vol. 5, no. 3, pp. 60–70, July 2016.
[3] P. Sundaravadivel, E. Kougianos, S. P. Mohanty, and M. K. Ganapathiraju, “Everything You Wanted to Know about Smart Health Care,” IEEE Consumer Electronics Magazine, vol. 8, no. 1, pp. x–y, Jan 2018.

[4] L. Catarinucci, D. de Donno, L. Mainetti, L. Palano, L. Patrono, M. L. Stefanizzi, and L. Tarricone, "An IoT-Aware Architecture for Smart Healthcare Systems," IEEE Internet of Things Journal, vol. 2, no. 6, pp. 515–526, Dec 2015.
[5] F. Bellard, "The BPG Image Format," http://bellard.org/bpg/, last Accessed on 09/20/2015.
[6] E. Kougianos, S. P. Mohanty, G. Coelho, U. Albalawi, and P. Sundaravadivel,
"Design of a High-Performance System for Secure Image Communication in the Internet of Things," IEEE Access, vol. 4, pp. 1222–1242, 2016.
[7] M. Zhang, A. Raghunathan, and N. K. Jha, "Trustworthiness of Medical Devices and Body Area Networks," Proceedings of the IEEE, vol. 102, no. 8, pp. 1174–1188, Aug 2014.
[8] C. Li, A. Raghunathan, and N. K. Jha, "Hijacking an Insulin Pump: Security Attacks and Defenses for a Diabetes Therapy System," in Proceedings of the 13th IEEE International Conference on e-Health
Networking, Applications and Services, 2011, pp. 150–156.
[9] R. Khatoun and S. Zeadally, "Cybersecurity and Privacy Solutions in Smart Cities," IEEE Communications Magazine, vol. 55, no. 3, pp. 51– 59, March 2017.
[10] S. P. Mohanty, "A Secure Digital Camera Architecture for Integrated Real-Time Digital Rights Management," Elsevier Journal of Systems Architecture (JSA), vol. 55, pp. 468–480, 2009.
[11] A. Darji, A.N. Chandorkar, S.N. Merchant, and V. Mistry, "VLSI Architecture of DWT Based Watermark Encoder for Secure Still Digital Camera Design," in Proceedings 3rd International Conference on Emerging Trends in Engineering and Technology (ICETET), 2010, pp. 760 – 764.
[12] L. Tian and H. M. Tai, "Secure Images Captured by Digital Camera," in Proceedings International Conference Consumer Electronics, 2006, pp. 341 – 342.
[13] S.C. Ramesh and M. M. I. Majeed, "Implementation of a visible watermarking in a secure still digital camera using VLSI design," in Proceedings AFRICON, 2009, pp. 1 – 4.
[14] T. Winkler and B. Rinner, "TrustCAM: Security and Privacy-Protection for an Embedded Smart Camera Based on Trusted Computing," in Proceedings of the 7th IEEE International Conference on Advanced Video and Signal Based Surveillance, 2010, pp. 593–600.
[15] I. Haider, M. Hberl, and B. Rinner, "Trusted Sensors for Participatory Sensing and IoT Applications based on Physically Unclonable Functions," in Proceedings of the 2nd ACM International Workshop on IoT Privacy, Trust, and Security, 2016, pp. 14–21.
[16] S. Ullah, B. Rinner, and L. Marcenaro, "Smart Cameras with Onboard Signcryption for Securing IoT Applications," in Proceedings of the Global Internet of Things Summit (GIoTS), 2017, pp. 1–6.
[17] M. Bramberger, J. Brunner, B. Rinner, and H. Schwabach, "Real-time video analysis on an embedded smart camera for traffic surveillance," in Proceedings 10th IEEE Real-Time and Embedded Technology and Applications Symposium, 2004, pp. 174 – 181.
[18] Z. N. K. Wafi, R. Ahmad, and P. M.P, "Highways Traffic Surveillance System (HTSS) using OpenCV," in Proceedings IEEE Control and System Graduate Research Colloquium (ICSGRC), 2010, pp. 44 – 48.
[19] R. Khoshabeh, T. Gandhi, and M. Trivedi, "Multi-camera Based Traffic Flow Characterization & Classification," in Proceedings IEEE Intelligent Transportation Systems Conference ITSC, 2007, pp. 259 – 264.
[20] X. Lu, C. Ye, and J. Y. andYaying Zhang, "A Real-Time Distributed Intelligent Traffic Video-Surveillance System on Embedded Smart Cameras," in Proceedings Fourth International Conference on Networking and Distributed Computing (ICNDC), 2013, pp. 51 – 55.

SHOPPING TROLLEY WITH CONTROLLED MOVEMENT AND AUTOMATIC BILLING SYSTEM

VM. SaravanaPerumal[1], Anusha B Amargatti[2], Anusha V[3], Gaddapara Kokila[4], Keerthana H S[5]

[1] Assistant professor, Dept of CSE, RajaRajeswari College Of Engineering, Karnataka ,India
[2] Dept of CSE ,RajaRajeswari College Of Engineering, Karnataka, India
[3] Dept of CSE , RajaRajeswari College Of Engineering, Karnataka, India
[4] Dept of CSE, RajaRajeswari College Of Engineering, Karnataka, India
[5]Dept of CSE ,RajaRajeswari College Of Engineering, Karnataka, India

ABSTRACT

Shopping in large malls has become a common occurrence in major cities. On holidays and weekends, there is a tremendous crowd in the malls, and as a result, there is a long queue of people waiting to pay. An intelligent and secure trolley prototype for a retail store is now required in order to solve this issue. Hardware, software, and data transfer layers are this system's three primary components. A RFID reader, an ESP32 microcontroller, an OLED display, a buzzer, and an ultrasonic sonar are all included in the hardware system. As software, this project utilises embedded C and the Arduino IDE (Integrated development environment). The information from the microcontroller is kept on Google Fire Base. The trolley is controlled using a mobile app. To write and upload the programme, use the Arduino IDE, which is pre-made software . The programme was developed using embedded C. It took five processes to design and build the intelligent trolley system. The first phase is designing the system architecture, the second is creating the flowchart for the smart trolley, the third is creating the software system, the fourth is creating the database, and the fifth is testing the hardware and software system together. The created rfid-based smart shopping system improves business productivity and decreases consumer wait times at the billing counter.

Keyword : - *ESP32,RFID ,OLED, Ultrasonic sonar, Buzzer, DC Motor*

---

1. Introduction

The Internet of Things (IoT) has made it possible for physical items to interact with one another. Now that everyday products are capable of having computational power and communication capabilities, anything can be connected to one another. This has resulted in a new revolution in the systems that govern industry, finance, and the environment, as well as significant difficulties in data management, wireless communication, and real-time decision-making. IoT research focuses on a variety of applications. One of the most popular Internet of Things applications is the smart cart.. The Smart Shopping system includes the Smart, an embedded device with an RFID reader for reading product RFID tags. A wi-fi module is included into the esp32 microcontroller to allow for data manipulation and wireless communication with a server. When they are shopping at a large shopping centre, people frequently go over their allotted spending limit. Additionally, they experience lengthy lines at the checkout as they wait for the merchandise to be scanned and billed. The aforementioned issues are easily solved by the Smart Shopping Cart. It assists the consumer in making sure that he stays within his predetermined budget and only purchases the necessities that he actually needs. It also works to reduce long lines at the payment counter. As the items have already been scanned and the customer only needs to pay the bill through the mobile application, it also helps to eliminate lengthy lines at the billing counter.

The Google Firebase Cloud stores the information about the product scanned by the RFID scanner on the Smart Shopping Cart and transmits it to the mobile app. The customer then pays the bill using one of the available methods. The system offers a feature that allows customers to delete any item from their cart in addition to seeing the entire cost of the goods they have in their cart. The tiresome process of scanning the items at the counter is also done by the consumer while they are shopping, therefore the Smart cart eliminates this step as well. The product is also advantageous for shopping malls because it aids them in maximising their entire workforce, which generates revenues in the long run.

Traditional shopping carts are simply carts with a steel frame that move on wheels and are used in markets. Electronics have not yet been incorporated in order to benefit customers and improve the shopping experience. Although there have been numerous attempts to modernise shopping carts, the goal of all of these initiatives is to use web servers and other tools to locate products in the market more quickly. This system aims to accomplish all of the above economically so that real-time implementation is doable. There have been several changes made to the traditional retail system.

1.1 Existing System

The systems that are now in use employ the conventional barcode scanning technique. Each product must be scanned using the barcode scanner, which makes the process incredibly slow. A barcode reader is a component of an electronic device that reads barcodes. Because there is no automated billing system in place, customers must wait in lengthy lines to be billed. As a result, the barcode process billing approach is complicated. This finally leads to the lengthy lines. We adopted various forms of technology, such as an RFID-based billing system, to avoid the procedure. The user may use one of the methods to pay the sum. However, it is the billing process that takes up the most time. Therefore, the waiting period serves a purpose. As a result, there is a longer wait to pay the bill. The RFID-based smart trolley system is suggested as a way to get around the time-consuming process.
The Radio frequency ID reader automatically detects the item by scanning the tag while the consumer is still holding the product in the smart trolley. Additionally, an automatic electronic product code number is generated for it. The item pricing and total billing information are stored in the microcontroller memory using the OLED display. The product's name and price are included in the electronic product code.

1.2 Problem Statement

The goal of the prototype system is to develop a system that is both user-friendly and high performing by getting rid of as many system annoyances as feasible. Consumer convenience, overall time efficiency, and excellent performance would be the system's goals. The system built using RFID technology could help achieve this objective. At the billing section of supermarkets today, time consumption is a major issue. Consumers are unaware of the current promotions in supermarkets. Shopping can occasionally go above a customer's budget, With all of these factors in mind, a system that offers customers a user-friendly interface as well as a means for sellers to promote more goods alongside their existing offerings and make a high profit is required. The RFID technology, which is still in its early stages, might be used to do this. In order to know the overall products/highest selling products in supermarkets at the end of the day, vendors have incorporated ESP32 and RFID. The vendor can load supermarkets with the goods early thanks to this.

1.3 Proposed System

The suggested process involves automatically paying a customer while they shop, largely using RFID and supported by other basic technologies. Instead of barcodes, products at supermarkets and shopping centres are given RFID tags. The shopping carts are equipped with an RFID reader, a load cell (the hx711), a buzzer, an OLED, an ultrasonic sonar, an L293D driver, a dc motor, a google fire base, a mobile application, and an esp32 microcontroller. Customers receive smart RFID cards to help them identify themselves specifically.

- The goal of the project is to create a helpful smart shopping cart for consumers.
- An ESP32 Wi-Fi module is the microcontroller utilized to carry out the necessary functions.
- The ESP32 and Arduino IDE integrate remarkably well thanks to the installation of the ESP32-Arduino Core on the ESP32.
- The data about the goods in the shopping center is kept on Firebase, a Google database platform. Additionally, it makes it possible to message customers.
- The consumer can now begin their purchase by scanning each RFID card that is affixed to a product against the RFID reader individually.
- Every time the system notices a product approaching its expiration date, a buzzer is set off.
- The ESP32 sends the card details to the main database (Firebase cloud) as soon as the product is identified by the RFID reader.

- The ESP32 checks the data with the database and returns the product's cost, which is wirelessly relayed back to the cart.

2.Literature Survey

The authors[2] were successful in building a low-cost, clever, and fully working system to improve customers' shopping experiences. Due to its effective tracking capabilities and security features, they used RFID technology. The system implemented functionality including setting a budget, adding and removing products, recommending products, and adding and subtracting the cost of the product based on whether it was in the basket or not.

By adding RFID readers[5] to the shopping cart and utilising ZigBee wireless technology to connect them to a centralised server, the creators of created a smart shopping cart. By scanning the merchandise, it enabled automatic bill production, which was then sent to a central department for billing. The system's flaw was that it only permitted payments made in person, which diminished the user experience.

The authors[4] imagined a high-tech trolley with RFID tags and readers on each trolley on each merchandise. After the product has been scanned, Customers can view all important product information on the LCD screen. The intention was to assist customers in avoiding lengthy lines, but it also presented the risk of theft and crashes.

3. Methodology

3.1 Functioning Of RFID

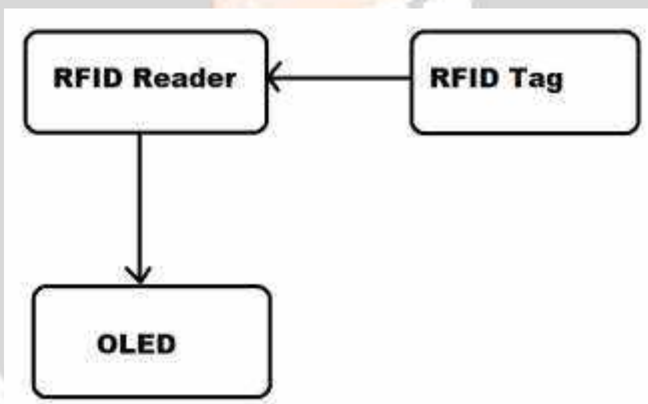


Fig 3.1: Illustration of RFID

The RFID system, which consists of a transponder-equipped RFID tag and an RFID reader, is shown in operation in Fig. 3.1. When a product is dropped and comes into contact with a reader, a tag that is connected to it transmits information. The computer receives and properly transmits all of the item's data before storing it.

A) RFID Reader

The information is taken from the tag that the RFID reader, which uses radio waves to acquire the data in digital form, has connected to the item. Reader serves as the transmitter, asking tags for information, and tags serve as the receiver, passing reader the necessary data.

The RFID Reader may operate at different frequencies. First, the low frequency range (125 kHz - 134 kHz) at a distance of 10 cm - 30 cm, then the high frequency range (13.56 MHz) at a distance of 1 m, and finally the ultra high frequency (865 - 928 MHz) at a distance of 1.5 m - 2 m.

B) RFID Tags

Active tags and passive tags are the two types of RFID tags. Active tags generate their own energy thanks to a self-contained battery, but passive tags, as their name implies, rely on external energy to function. Passive tags are typically utilised because they are inexpensive and come in a variety of shapes.

C) ESP32 Microcontroller

Espressif Systems developed the ESP32 line of inexpensive system-on-chips (SoCs). It is an upgrade over the widely used ESP8266, which is popular in IoT projects. The ESP32 contains Wi-Fi and Bluetooth capabilities, making it a well-rounded chip for the creation of embedded systems and IoT projects in general. The ESP32 and Arduino IDE integrate remarkably well thanks to the installation of the ESP32-Arduino Core on the ESP32. After installing the ESP32-Arduino Core, you have access to a wide range of development kits built around the ESP32 and a tonne of sample sketches.

D) OLED

Each item scanned by a Radio FID reader is presented, together with details like the product name, weight, and price, as well as the overall cost.

E) DC MOTOR

A DC motor, also known as a direct current motor, is a type of electrical device that uses direct current to create a magnetic field to convert electrical energy into mechanical energy. A magnetic field is produced in the stator of a DC motor when it is energised. Magnets on the rotor are drawn to and drawn away by the field, which rotates the rotor. The commutator, which is connected to brushes and the power source, supplies current to the motor's wire windings in order to keep the rotor turning continuously. And it is automatically managed by an APP. which benefits seniors

F) APP

The Massachusetts Institute of Technology (MIT) now manages MIT App Inventor, a web application integrated development environment (IDE) that was initially made available by Google. It enables those who are new to computer programming to produce software applications (apps) for the Android and iOS operating systems. It employs a graphical user interface (GUI) extremely reminiscent of the programming language Scratch.

3.2 Difference Between Existing And Proposed Methodology

Parameter	BARCODE	RFIDS
Line Of Sight	It can scan one tag at time	It can scan 100 tags at time
Operation	Barcode can read data	RFIDS can read and write data
Material	It is made of paper so can't be reused	It is made of plastic hence reusable
Data	Small amount of data	Large Amount of data
Read range	Can read data at distance of inches	Can read data at distance of feet
Technology	Optical(laser)	Radio frequency
Tags	Not Everlasting	Everlasting
Cost	Reasonable	Expensive

3.3 Algorithm

STEP 1: Launch the application
STEP II: Setting up the system by putting values on the flags
STEP III: Look for RFID tags; if any are discovered, read the data from memory; if not, repeat the process.
STEP IV: When all tags that are displayed on OLED are discovered
STEP V: When things are added, the cost is cumulative unless otherwise stated. When the upload key is pushed,
STEP VI: Data is delivered to the counter.When an obstruction is discovered

STEP VII, the user hears a buzzer.
STEP VIII: Using an app, DC motors may instantly start, stop, and reverse.
STEP IX : Send the product's total cost to the billing system
STEP X: Finish the entire task.

3.4 Pictorial Representation

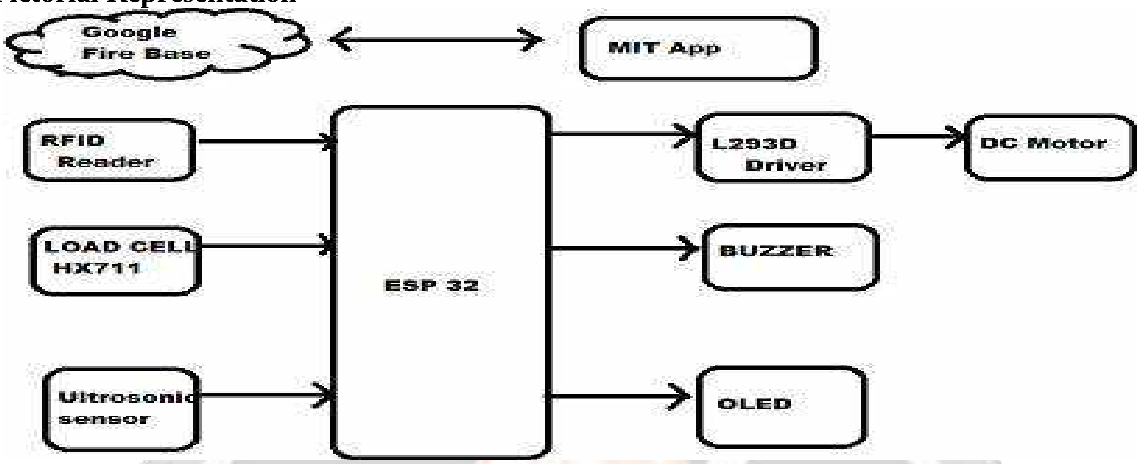
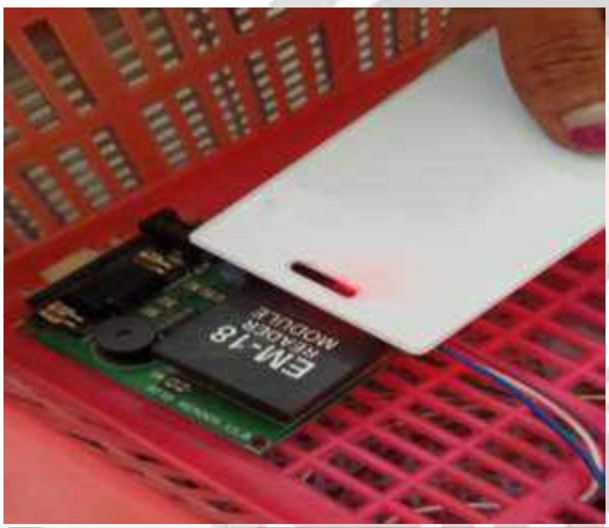


Fig 3.2 :Architecture Of Model

4. RESULTS AND DISCUSSION

All the experimental components were covered above, and the suggested system's use of OLED to display product information in terms of price was also covered. The suggested model is simple to use, doesn't need specific training, and is readily available. The user will spend less time in the billing queue thanks to the reduction in staff. The ability to service multiple users at once benefits both customers and retailers. This intelligent billing system guarantees both time and financial efficiency. By enabling customers to create a shopping session that lasts until the client asks it to be cleared and preserving the data of each item in the basket by employing RFID tags to make the entry, the smart trolley aims to streamline the billing process. By showing the buyer the whole price, it also helps them stay inside their budget when purchasing. The growing popularity of online shopping, which reduces inconvenience, along with in-store shopping's adoption of eco-friendly smart carts and smart baskets, not only help retailers reduce crowds but also save money by reducing the amount of paper used, the number of employees needed, and unnecessary time wasted printing out receipts. Therefore, the use of RFID-based smart trolleys is extremely significant, important, and beneficial to society. The system is made much more compatible by the ESP attached to it, which provides all of the information about the shopping options available on Android mobile devices.

OLED Display of the Processes Presented Customers' purchases are displayed on liquid crystal displays along with their cost, weight, and item names. In some situations, the display will warn you that a product is out of date, in which case you should exercise caution. The process continues as when items are added and the number of items is cumulative in action as the RFID Reader scans the items from RFID tags and displays the item name, cost, and weight. Due to item expiration or item disliking, the sum will be deducted once the items are withdrawn. Using direct current, a DC motor, sometimes referred to as a direct current motor, creates a magnetic field that transforms electrical energy into mechanical energy. When a DC motor is powered up, a magnetic field is created in the stator. The field attracts and repels magnets on the rotor, causing the rotor to rotate. The motor's wire windings get current from the commutator, which is linked to the brushes and the power source and keeps the rotor moving continuously. Allow elderly and disabled people to easily move the tram without having to push it. We utilise an RFID module with an app that allows us to control the wheel.



5.CONCLUSION

The execution of this project will help all those making purchases in the great market and dealing with the inconvenience of waiting in a long queue for very final billing. The tool is incredibly simple to use and requires no assistance. The implementation of the assignment can be cheap, simple, and need less time in the billing area. It is intended to perform the role of a self-accessible process, giving customers the choice of transferring the amount via online payment or hard cash. It is created to be more environmentally friendly and is fully integrated with the shopkeeper's current system. IOT will be used to store the data in the database.

6. REFERENCES

[1]. Jaishree M, Lakshmi Prabhakar, Jeyaprabha s, Mohan k.2021."smart shopping trolley using IOT" .7th international conference on advanced computing and communication systems

[2].. Komal Ambekar, Vinayak Dhole, Supriya Sharma,Tushar Wadekar, Smart Shopping Trolley Using RFID, International Journal of Advanced Research in Computer Engineering & Technology (IJARCET),2021

[3]. Sahare P.S., Gade A., RohankarJ. 2019. A Review on Automated Billing for Smart Shopping System Using IOT, Review of Computer Engineering Studies

[4]. Das, T. K., Tripathy A. K., Srinivasan, K.2020, A Smart Trolley for Smart Shopping, International Conference on System, Computation, Automation and Networking (ICSCAN).

[5]. Dhavale Shraddha D, Dhokane Trupti ,Shinde Priyanka S, IOT Based Trolley for Shopping Mall, IJEDR, 2021

[6]. Shailesh, S., Shrivastava Deb, P., Chauhan R., Tyagi, V.2021. Smart Trolley, International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), 2021.

[7]. Dev, M. K. Kannan, R. Agarshan, M. Karthik S. Lakshmi, K. 2021.Automated Billing Smart Trolley and Stock Monitoring," 5th International Conference on Computing Methodologies and Communication

[8]. Kowshika, S., Madhu mitha, S. S., Madhu Varshini, G., Megha V., Lakshmi, K.2021. IoT based Smart Shopping Trolley with Mobile Cart Application, 7th International Conference on Advanced Computing and Communication Systems (ICACCS)

[9] Shankar,S. K., Balasubramani, S., Basha, S. A., Ariz Ahamed S., Kumar Reddy, N. S. 2021. Smart Trolley for Smart Shopping with an Advance Billing System using IoT, 5th International Conference on Computing Methodologies and Communication (ICCMC), pp. 390-394

[10] Jaishree, M., Lakshmi prabha, K. R. S., Jeyaprabha, Mohan, K.2021. Smart Shopping Trolley Using IOT, 7th International Conference on Advanced Computing and Communication Systems (ICACCS)

UAV-FOR AMBULANCE ESCORT

Dr. P Ebby Darney[1], Akshatha D[2], Nivedha D[3], Suvarna P U[4], Sree Hari K[5]

[1] Professor, Electrical and Electronics Engineering, Rajarajeswari college of Engineering, Karnataka, India
[2] UG Student, Electrical and Electronics Engineering, Rajarajeswari college of Engineering, Karnataka, India
[3] UG Student, Electrical and Electronics Engineering, Rajarajeswari college of Engineering, Karnataka, India
[4] UG Student, Electrical and Electronics Engineering, Rajarajeswari college of Engineering, Karnataka, India
[5] UG Student, Electrical and Electronics Engineering, Rajarajeswari college of Engineering, Karnataka, India

ABSTRACT

The purpose of this project is to develop a drone (quad-drone) to escort the ambulance during its critical or chronic conditions like organ transplantation or serious accident emergencies. In a city like Bangalore, ambulance cannot reach on time due to bad road conditions and traffic jams, risking people's life. To overcome this, drones can be used which is much faster and can be used to clear the traffic and make way for the ambulance. In order to promote the development of renewable energy, we are planning to develop a solar powered UAV. By aiming to increase the flight endurance over the purely electrical or gas powered UAVs, by extracting energy from sun and convert to electrical energy for on board systems that is by achieve self-charging of drone using solar and to achieve crash avoidance system using object detection through camera.

Keyword: - *quad-drone, UAV*

1. INTRODUCTION

An Unmanned aerial vehicle (UAV) usually called as drone, which is an aircraft not operated or driven by any single human where vehicle is lifted with aerodynamic forces. There is no need of crew, pilot or passengers. The Flight conditions of drone is in such a way that the system is either it operated by remote control system that is as Remotely Piloted Aircraft (RPA) or by automatic mode controllers.

Drone seems to have most feasible application in Medical Emergency situations, where it helps to supply the first aid kits, vaccines, blood packs and organ transportation. The time consumed is very less and since it is through aerial ways of travelling the life risks can be reduced as each second will be helpful to save life.

The average emergency rescue can be done with the help of drone. Most of the hospitals are far away from the habitat living. Especially villages and remote areas are not able to reach the hospitals as it take hours to travel which will cause huge threat to life. While in urban areas, cites are prone to dense traffic it becomes major difficulty for the ambulance to reach the hospital during exigency situation.

In this paper, we use the drone for the ambulance escort where drone makes the path for the ambulance to reach the hospital and helping ambulance to reach the hospitals on time.

The purpose of this project is to develop a drone (quad-drone) to escort the ambulance during its critical or chronic conditions like organ transplantation or serious accident emergencies. In a city like Bangalore Mumbai, Chennai, Kolkata, etc., ambulance cannot reach on time due to bad road conditions and traffic jams, risking people's life. To overcome this, drones can be used which is much faster and can be used to clear the traffic and make way for the ambulance.

In order to promote the development of renewable energy, we are planning to develop a solar powered UAV. By aiming to increase the flight endurance over the purely electrical or gas powered UAVs, by extracting energy from sun and convert to electrical energy for on board systems.

The more the number of rotors and propellers, the maximum thrust it can create. So the best choice is to use the quad copter, as the system comprises of four brushless DC motors (BLDC). According to significant development in solar PV technology, potential of smaller scale solar powered UAV are raised up for long endurance operation. Apart from that, some low altitude models are designed for more challenging meteorological conditions such as clouds, rain, wind etc. Low altitude UAVs generally give a number of advantages similar as advanced resolution imaging with reduced pall inhibition, lower complexity in cost of construction and further simplified running.

2. METHODOLOGY

2.1 COMPONENTS USED:

QUADCOPTER: A quad copter is a four-rotor drone, where it is hurled quickly and thrust by four rotors. In this type of UAV like quadrangle helicopter applies two dyads of fixed identical pitched propellers, videlicet clockwise (CW) and counter clockwise (CCW). The drone is control is entirely under the APM 2.8. The power supply to the drone is supplied by Lipo batteries. This APM 2.8 is fed with the Multicopter flight control program. The ESC driver is used to measure the position of rotor by APM 2.8, which is motion tracking device help us to measure velocity, acceleration and orientation of the drone by control the motor speed accordingly. Lipo Battery is connected to the Electronic Speed Control (ESC) which is connected to the BLDC motor. 11.1V, 2200mAH Li-Po battery is Capable of maximum continuous discharge rate. The speed of the BLDC motors is directly proportional to the voltage of the battery. The motor and ESC combination used according to the combination of voltage required. Battery Eliminator circuit (BEC) is a step down voltage regulator which takes the main battery voltage and bucks up the voltage by safely allowing the regulated power supply to the sensors and the receivers which will be working at a low voltage. So BEC helps to operate these devices without disconnecting the device from the battery.

NEO-M8N GPS MODULE: The NEO-M8N module is interfaced with APM 2.8 flight controller. It allows to know the position of the quadcopter by the network of orbiting satellites, which is connected to the signals of the satellites so the drone can be driven autonomous according to the waypoints set manually.

MINI TELEMETRY: The mini telemetry of 915 MHz 100mW is a Radio frequency module which gathers information from the autopilot of drone, sensors like gyroscope, accelerometers and GPS and send back to the operator or to the Ground Control Station (GCS). This telemetry provides the accurate track of UAV status in real time while allowing to monitor the position of altitude to ensure efficient and smooth flight. According to the sensors used, it also provides the data of the components such as RPM of the rotors and battery voltage level.

FS-IA6 RADIO RECEIVER: This compact radio module has 6 channel receiver and has 2.4G modes automatic frequency digital system and has the transmitting less than 20dBm. It has the operating range of 500 meters which is sufficient to escort the ambulance during emergency situation.

FPV CAMERA: The FPV (First Person View) camera is a high definition camera that is used in drones to capture live video footage of the drone flight. The camera sends video signals to the 915 MHz telemetry. This FPV camera used in quadcopter wirelessly transmits video feed to mobile device or the display monitor. While using this FPV camera, the ability to shatter conventional rules of videography. It provides live analog video feed to the display. This video feed from the FPV camera helps the quadcopter to fly.

BUZZER: The buzzer is an audio signaling output device that is used in drones as alarming devices. This buzzer makes us to convey the important messages to public which provides a key communication path to nearby individual or group of people during the ambulance escort that is during critical or lifesaving emergency situations.

SOLAR PANELS: Solar powered drone technology has emerged as an assuring solution, authorizing drones for longer duration of time to fly and their range is expanded. The solar used in drone utilizes solar energy from the sun and converts to electricity. Here we are promoting the use of renewable energy resources considering the global situation. The output of solar panels are connected to the charge controller to maintain the constant output to the Lipo battery. The efficiency of the solar output is still low so to maintain the same voltage, we use six panels in order to get the desired voltage connecting three pairs of panel in series and in turn connecting parallel to the charge controller. Here, six solar panels are used to get the voltage of 12V and 3-4A.

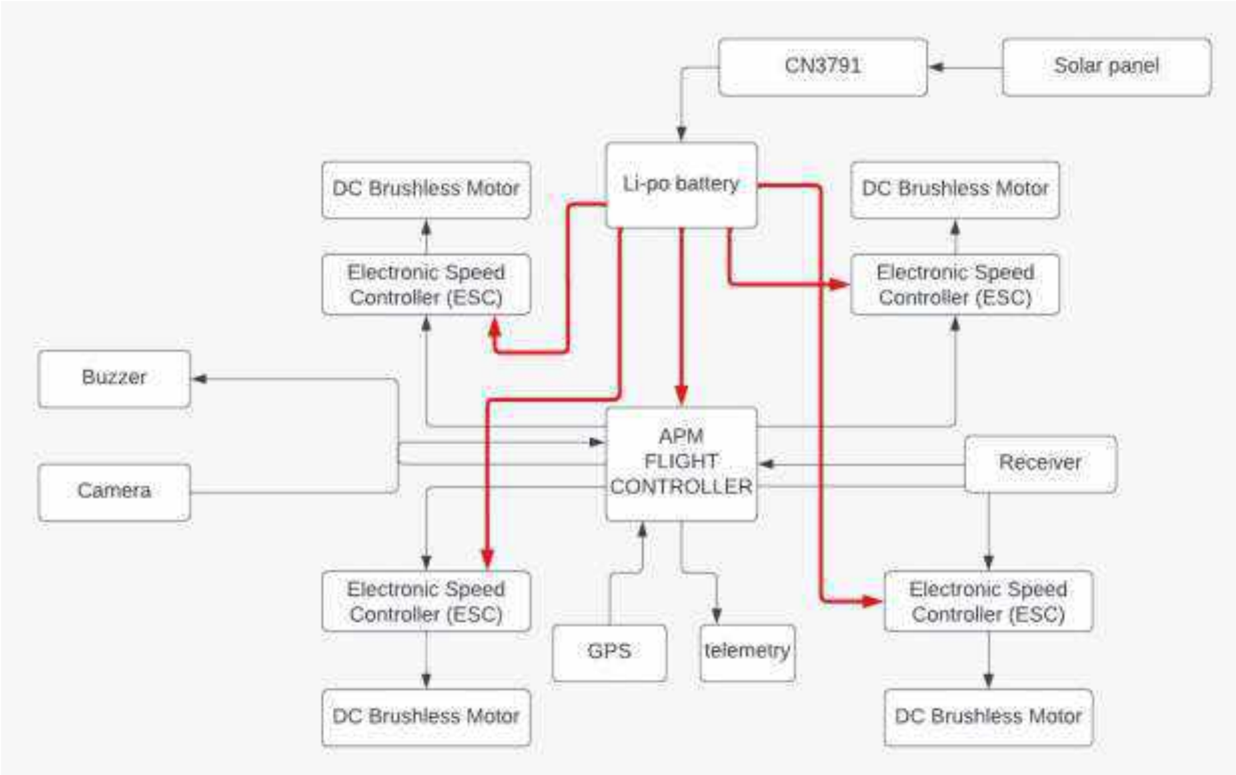


Fig -1: Block diagram

2.2 Proposed Working System

This drone is deployed when there is critical transportation for an ambulance. The motors used are DC Brushless Motor (A2212) of 14000KV and propeller with pair of clock wise (CW) and counter clock wise (CCW) structure. This receiver commands will control the flight through Electronic Speed Controller (ESC) which controls the speed of 4 BLDC motors. The flight controller used in the UAV is APM 2.8 Flight Controller. Telemetry collects the data and transmitted to receiving equipment for monitoring, display and Recording with GPS (NEO M8N) way point navigation. The flights of drones is automated by fixing waypoints in mission planner software so that we can check the status of the drone and can also change the user location between flight of the drone using telemetry communication. The latitude and longitude location is sent to the admin thereby planning mission by fixing the location. The power supply consist of Solar panel which generates the required voltage and it can be stored in the battery and supplied to all the components.

3. EXPERIMENTAL SETUP

The type of drone used here for escorting the ambulance is quadcopter. The main significant thing in the drone is the flight controller which controls the entire flight of the drone. The APM 2.8 Multicopter Flight Controller is a complete autopilot source system for the UAV. Here, the Flight controller receives commands and controls the motors for driving the quadcopter unharmed. For the driving the drone in flight condition Mission planner software were used. Drone telemetry gathers the data from the autopilot flight controller, sensors such as gyroscope, accelerometers and GPS which sends the gathered information to the operator or to Ground Control Station (GSC) for the safety of flight conditions of UAV where the receiver equipment will be displayed, monitored, and recorded. The altitude stabilization of the UAV should be maintained and also Camera is fixed for the surrounding obstacles to avoid the crash avoidance of quadcopter and to land safely without causing any damages for the further use of quadcopter.

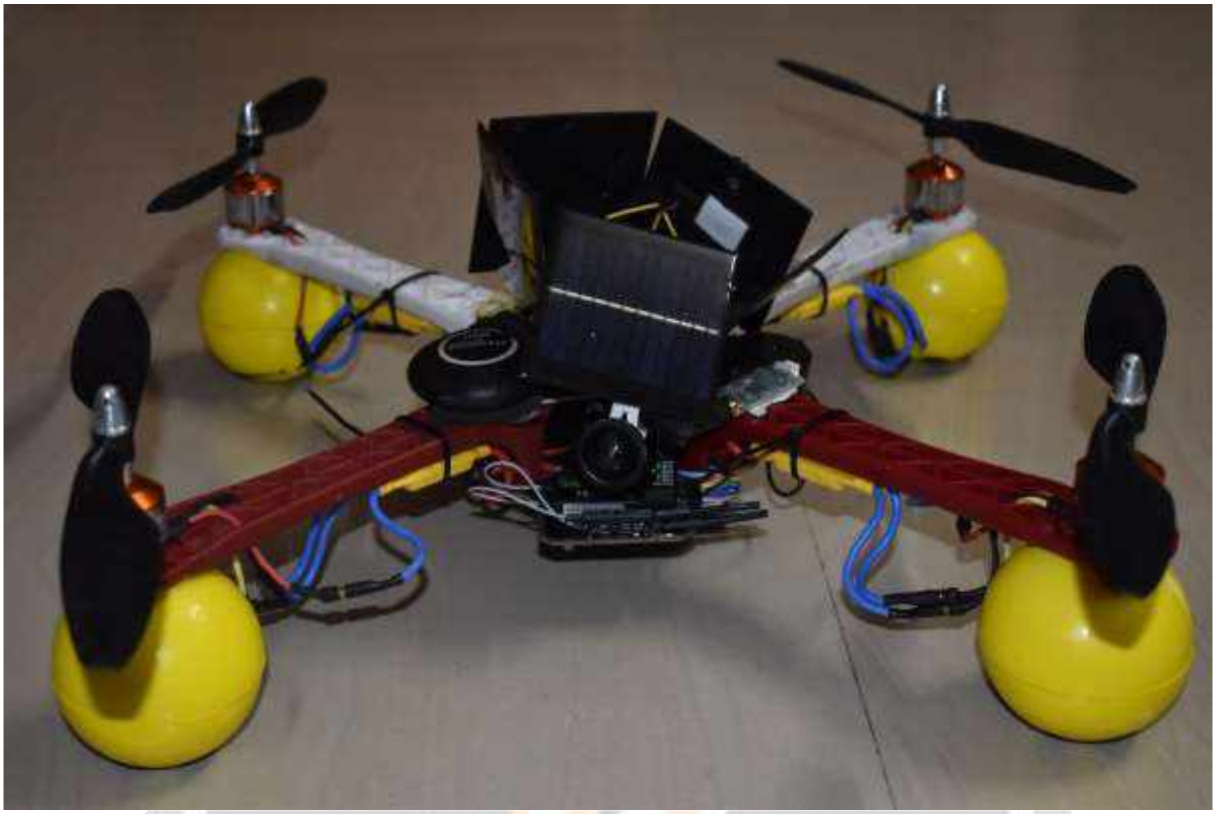


Fig -2: Experimental setup

4. FUTURE SCOPE

Drones can be further easily implemented by using Pixhawk. In future, with further advancement in technology automated drones can be used for collection of blood and tissue samples for virus detection in affected area, dropping off emergency equipment or medication such as Poison antidotes as oxygen masks are just a few of the lifesaving possibilities. Drones can be automated by new emerging technologies like mapping and neural networks and these can be implemented for surveillance of health using the real time data of the patient. During the extreme climatic conditions the drone application in medical field are the best alternative for people's rescue.

5. CONCLUSIONS

In this paper, we devise a new method for escorting the ambulance during critical situations using quadcopter. In this paper, the average rescue during emergency situation can be done using the drone. Drones can be used which is much faster and can be used to clear the traffic and make way for the ambulance. By this method we can avoid the terrific traffic situations by saving the life by serving the humanity and society.

6. REFERENCES

[1]. Anshul singh, P.Kumar, Kaushal Pachuari, K.Singh - Drone Ambulance (2020 2nd ICACCCN)

[2]. Chinnapat Thipyopas, Vis Sripawadkul, Nattapong Warin -Design and development of a small solar-powered UAV for environmental monitoring application (2019 IEEE Eurasia Conference on IOT, Communication and engineering)

[3]. Paul Lucian Nedela, Tudor Ovidiu Popa, Emilian Manolescue, Catalian Bouros, Gabriel Grigorasi, Doru Andritoi, Catalin Pascale, Avramescue Andrei, Diana Carmen Cimpoesu -Telemedicine System Applicability using drones in pandemic emergency medical situations(Article-Multidisciplinary Digital Publishing Institute 2022)

[4]. Hans E. Comtet, Karl-Arne Johanessen-A Socio-Analytical approach to the integration of drones into Healthcare systems (Article-Multidisciplinary Digital Publishing Institute 2022)

[5]. Nayar Ahmed Khan, Mohammed Ahmed, Shabi Alam, Ahmad Masih Uddin Siddique, Danish Ahamad, Mohammed Nadeem Khalid-Development of Medidrone: A Drone based Emergency service System for Saudi Arabian Healthcare (2021 International conference on Computational Intelligence and Knowledge Economy)

[6]. Mithra Sivakumar, Naga Malleshwari TYJ-A Literature Survey of Unmanned aerial vehicle usage for civil Applications (Aerospace technology management 2021)

[7]. Albert Apotele Nyaaba, Mathew Ayamga-Intricacies of medial drones in healthcare delivery: Implications for Africa (Article in Technology in Society June 2021)

[8]. Parvathi sanjana, M.Prathilothamai-Drone design for First Aid kit delivery in emergency situation (2020 6th International Conference on Advanced Computing and Communication Systems)

[9]. Bradley Hiebert, Elysee Nouvet, Vyshnave Jeyabalan, Lorie Donelle-The Application of Drones in Healthcare and Health related services in North America: A scoping review (Drones 2020)

[10]. Reem Osman Elhussien Mohamed, Safaa Mamoun Ahmed Mohamed, Hadiel Abbas Elhag Abashar - Unmanned Aerial Vehicle Intelligent Ambulance based system (2020 International Conference on Computer, Control, Electrical and electronics engineering)

[11]. Hitesh Mohapatra-Offline drone instrumentalized ambulance for emergency situations (2020 International journal of Robotics and Automation, Vol.9, No.4)

[12]. Jonathan Braun, S David Gertz, Ariel furer, Tarif Bader, Hagay Frenkel, Jacob Chen, Elon Glassberg, Dean Nachman-The promising future of drones in prehospital medical care and its applications to battlefield medicine(2019 Wolters kluwer health, j Trauma Acute care surg)

[13]. Anna Konert, Jacek Smereka, Lukasz Szarpak -The use of Drones in Emergency medicine: Practical and legal aspects (Hindawi, Emergency medicine international volume 2019)

[14]. Karanam Ravichandran, Dayananda, Rahul Gomes, Jeremy Straub-An Interconnected Architecture for an Emergency Medical response unmanned aerial system (2017 IEEE)

[15]. A.Josephin Arockia Dhivya, Dr. J Premkumar-Quadcopter based technology for an emergency healthcare (2017 3rd International conference on Bio-signals, images and instrumentation)

LANE DETECTION AND SELF DRIVING APPLICATIONS FOR ADAS

Mrs. Megha L[1], Rohan R[2], P S Vijayarangan[3], Spoorthy K S[4], Monika N[5]

[1] Assistant Professor, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[2] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[3] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[4] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[5] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India.

ABSTRACT

According to the WHO, 1.35 million people die in traffic accidents each year. Technology is improving every year, which has made it possible to integrate artificial intelligence even into cars. Significant development has occurred in recent years in creating lane detection algorithms that can precisely identify and track lane markings in a vast variety of driving situations, including low light and bad weather. The deployment of self-driving vehicles based on ADAStechnology has been carefully examined. Autonomous Vehicles are another name for Self-Driving Cars. This vehicle has the capacity to perceive its surroundings. The various components in the car will operate according to these processed sensed characteristics without the need for a human operator. An autonomous vehicle functions similarly to a regular vehicle but has no human driver. The software section that makes up autonomous vehicles is essential. Between Hardware Components and Applications, the Software Architecture serves as a link. Self-Driving Cars include two vital components. These automatic functions, which operate without human intervention, are Lane Detection and Traffic Signal Detection. In this paper, a machine learning algorithm is proposed. This algorithm is mostly used to create shape algorithms to assist in lane detection and traffic sign detection by detecting shapes and lanes. Both of these applications were developed in Python utilizing the OpenCV2, NumPy libraries, and CNN algorithm for Edge detection. Overall, lane detection is an important technology for the creation of ADAS and self-driving applications. Ongoing research aims to increase the precision and robustness of these systems to guarantee their safety and dependability in actual driving situations.

Keywords: - *Self-Driving, ADAS System, CNN, OpenCV, Lane Detection***.**

1. INTRODUCTION

There is now a way to deal with the problems of traffic congestion, accidents, and the rising demand for mobility thanks to the quick development of autonomous driving technology. Self-driving automobiles have different needs in terms of real-time behaviors and computation speed compared to other robots. They must be effective under a variety of circumstances, from precise path-finding in parking scenarios to accelerated highway driving. To make the best driving decisions, the deployed computer systems must accurately perceive multiple varieties of traffic scenarios. Due to their close proximity to drivers, passengers, pedestrians, and other road users, self-driving cars must make sure to carry out all these jobs while maintaining a very high level of functional safety.

Self-driving cars use a variety of sensors, including cameras, LiDAR, and radar, to detect their surroundings and make decisions based on the information they have gathered. Lane detection has been shown to be difficult because of a variety of environmental conditions, such as poor lane visibility and unstructured roads. However, guaranteeing that autonomous driving technology can function safely and effectively in complex and dynamic contexts is one of the biggest problems facing its development. In this research, we provide a method for detecting the lane for self-driving mode automobiles using real-time camera data.

2. EXISTING SYSTEM

By taking in account of recent years, self-driving cars has gone from “maybe possible” to “definitely possible” condition. The current existing ADAS systems use LIDAR sensors which fails to yield higher accuracy in highly populated areas and are very expensive. The current method consists of three major steps: preprocessing, adaptive ROI setting, and detection and tracking of lane markings (discussed below). The alternatives of LIDAR are RADAR sensors which work well but lack in night conditions and takes more time to lock on a target. Currently available self-driving systems typically use pre-programmed algorithms, mapping data, and GPS to steer the car and sensors like LIDAR and RADAR. These systems struggle to handle challenging circumstances needing human intuition and decision-making, although they can function independently in some environments, such as highways or low-traffic metropolitan areas. The control systems manage the vehicle's actual steering, braking, and other movements. Self-driving systems use advanced control algorithms to steer the car on the road safely and effectively.

In paper [1] Dr. Ramarao Naga Reddy, Vivek B Bhat, Kartik A Kulkarni, Ashley S, Rabin Akbari “Detection of Lanes for Autonomous Vehicles " 2019. This research suggests an image processing-based real-time lane detection system. It introduces an algorithm that recognizes lane markings by combining edge detection and color-based segmentation. In a variety of illumination and road situations, the method achieves great accuracy and resilience. In paper [2]. Lars Sommer, Tobias Schuchert, and Jurgen Beyerer, ¨ “Deep learning-based vehicle recognition in aerial images: a detailed analysis” IEEE Transactions on Circuits and Systems for Video Technology, 2019. An effective lane detecting and tracking system is presented in this paper, which was created for difficult situations like curvy roadways, occlusions, and low-contrast markings. It uses a multi-stage methodology that includes tracking, lane modeling, lane marking extraction, and preprocessing. The algorithm performs better under challenging circumstances, making ADAS applications possible.

According to authors of paper [3]. Q. Tan, J. Ling, J. Hu, X. Qin, and J. Hu, “using deep learning to identify vehicles in high quality satellite remote sensing pictures,” IEEE Access, pp. 153394–153402, 2020, doi: 10.1109/ACCESS.2020.3017894. In particular, convolutional neural networks (CNNs) are examined in this research as a deep learning technique for lane detection.It talks about different network designs and training methods for lane marking extraction from photos. The suggested deep learning-based technique delivers robustness and competitive performance in various contexts. In paper [4]. A. R. Fayjie, S. Hossain, D. Oualid and D. Lee, " Deep reinforcement for autonomous driving in a driverless carUrban Learning Environment," 2019. This study focuses on lane detection and categorization for ADAS applications utilizing deep neural networks. It offers a comprehensive solution that integrates support vector machines (SVM)-based categorization, lane detection, and feature extraction based on CNN. The suggested approach shows precise lane identification and classification results, making it appropriate for ADAS installations in the real world

From this paper [8]. Dong .D, Li. X and Sun. X, " An Approach Based on Vision to Increase the Safety of Self-Driving," 2017 12thInternational Conference on Reliability, Maintainability, and Safety (ICRMS). Through the using of computer vision techniques and different machine learning algorithms, this type work introduces a real-time lane-detecting and lane tracking system. It uses a Kalman filter for reliable lane tracking and a probabilistic voting system for lane detection. The method maintains accuracy and dependability in the lane tracking results while achieving real-time performance.

These studies are a selection of the literature on lane detection using ADAS systems that is currently available. They emphasize diverse methodologies, such as conventional image processing procedures and cutting-edge deep learning strategies, offering insights into the developments and difficulties in the field. The lane-detecting algorithms for ADAS applications can be better understood with further investigation of these works

2.1 Pre-Processing:

Lane and vehicle detection is a significant application of preprocessing since it increases the precision and effectiveness of certain computer vision tasks. Several methods, including picture resizing, color space conversion, thresholding, edge detection, and morphological procedures, are used during preprocessing. I'll go over a few of the standard preprocessing methods for lane and vehicle detection in this response.

Image scaling: The computational cost of the lane and vehicle detection technique is frequently reduced through image scaling. The algorithm may process the image more quickly without compromising accuracy by lowering the size of the image. To prevent image distortion, it's crucial to preserve the image's aspect ratio.

Conversion of color spaces: The color representation of a picture can be changed from one color space to another using color space conversion. This method is frequently used to distinguish the object of interest from the backdrop in lane and vehicle detection. As an illustration, making an RGB image grayscale can help to minimize the image's dimensionality and highlight the margins of the lane and the car.

Thresholding an image: Depending on the pixel intensity, a picture can be divided into various sections using image thresholding. Thresholding is frequently used in lane and vehicle detection to distinguish the lane and vehicle from the backdrop. For instance, a binary threshold could be considered to turn a grayscale image into a black-and-white one, with the background represented by black pixels and the pixels that belong to the lane and the car being represented by white pixels.

Edge recognition: Edge detection is a technique for locating an object's edges in a picture. Edge detection is frequently used in lane and vehicle detection to locate the edge for the lane and vehicle. Common methods for lane and vehicle detection use edge detection are Canny Edge Detection algorithm, Sobel Edge detection, and Laplacian of Gaussian (LoG) edge detection.

2.2 Adaptive ROI Setting:

A method used in lane and vehicle detection systems to increase accuracy and efficiency is adaptive ROI (Region of Interest) configuration. As a way to concentrate on the portions of the captured image that are highly encouraged for detecting lanes and cars, the technique includes dynamically altering the size and placement of the ROI in real-time based on the video feed from the camera. The lower portion of the image, where the lane markings are most likely to be discovered, is often where the ROI is set when performing lane detection. To guarantee that the full lane is caught, the ROI segmentation has to be changed in circumstances where the road curvature is high or the camera is set at a low angle. When detecting automobiles, the ROI is typically set near the image's center, where vehicles are most likely tobe present. However, based on the vehicle's speed and the distance between our car camera, the ROI's size and location could have to be changed. For instance, if a moving vehicle needs to be captured before it exits the frame, the ROI may have to be increased.

The adaptive ROI setting technique employs algorithms to dynamically modify the ROI in real-time based on elements including the camera's position, the vehicle's speed and position, and the road's curvature. This enables the vehicle and lane detection system to concentrate on the areas of the image, improving its accuracy and efficiency.

2.3 Lane Detection and Tracking:

Important tasks in computer vision and autonomous driving include lane and vehicle recognition and tracking. These activities entail locating and monitoring the location and motion of lanes and cars on a highway or road. Lane identification is locating the lanes on a road or highway and figuring out where and how they relate to the moving vehicle. Various methods, which includes Edge Detection, Hough transformations, and picture segmentation, could be utilized for this. Once the lanes have been located, the vehicle can use them to keep itself in its lane and to anticipate twists and turns in the road. In contrast, vehicle detection entails considering whether if any other vehicles on the road and if there are in relation to the detected car. Techniques like object detection, template matching, and machine learning algorithms can be utilized for this.

Using techniques like Kalman filters and particle filters, the positions and motions of the vehicles can be easily tagged if they have been recognized. Because they offer key statistics with respect to the environment and enable the vehicle to make judgements based on that information, lane and vehicle tracking are crucial for autonomous driving. The autonomous car, for instance, can modify its speed and distance to keep a safe following distance if a vehicle is spotted driving ahead of it. The lane Detecting System can provide stats regarding the lane's curvature as the car is nearing a curve in the road, allowing the driver to change the steering angle. In general, lane and vehicle identification and tracking are crucial parts of autonomous driving systems and are essential for guaranteeing the dependability and safety of self-driving cars on the road.

3. PROPOSED SYSTEM

Lane detection and other ADAS functions have sparked significant research conversation in past decade due to their prospective applications in automotive but because of Contextual considerations such as perspective impact, possible low visibility of lanes, and partial blockage, improving the robustness of lane recognition is a difficult challenge.

OpenCV and Convolutional Neural Network (CNN) were our two main tools. In this project, we created a model autonomous vehicle with ADAS features. On a single camera, our model is based. This idea has been put into practices in a variety of road conditions and difficult circumstances. We analyzed the photos and videos to accurately identify the objects with the aid of the OpenCV library. For picture identification, vehicle detection, and traffic sign detection in the OpenCV library, we employed the edge detection technique and CNN. The main objective is to identify the lane marks and vehicles to ensure a safe driving for users. Additionally, it recognizes road curves and adjusts the vehicle's motion accordingly. The device keeps an eye on the travelling lane's left and right-side lane markers to detect lane changes. Emergency breaks are used whenever a car collision is a possibility. to identify vehicles precisely to analyses traffic and to reduce unexpected accidents which can result in improved public security and safety.

4. METHODOLOGY

4.1 OpenCV: An extensive range of image and video processing operations are offered by the well-known open-source computer vision and machine learning software package known as OpenCV. Lane detection and tracking in driverless vehicles is one of OpenCV's most popular uses. In autonomous driving, lane detection is essential because it keeps the car on course and prevents crashes. Typically, lane detection entails spotting the margins of the road and taking the lane lines out of the picture. The Canny edge detector, is an high precision edge detection functions offered by OpenCV, are one of the best ways to locate the edges of a road.

The technique of tracking a vehicle's position in relation to the lane lines over time and making the necessary corrections to keep the vehicle centered in the lane is known as lane tracking. The Kalman filter, one among many lane tracking functions offered by OpenCV, is ideal way to forecast the vehicle's position and update it to the extent of observations from the lane recognition method. The Kalman filter one of the efficient technique for tracking the location of the vehicle and to make precise calculations and prediction even in noisy settings. Overall, OpenCV one among many efficient tool for autonomous vehicle lane recognition and tracking. It is the perfect option for creating cutting-edge autonomous driving systems because of its powerful image and video processing capabilities and sophisticated machine learning algorithms.

4.2 CNN: An essential task in the realm of autonomous driving is lane identification and tracking. It entails locating lane markings on the road and monitoring non stationary vehicles inside those lanes. Due to their capacity to draw out efficient stats from images, convolutional neural networks (CNNs) have demonstrated promising results in lane detection and tracking. An instance of a deep learning algorithm is CNNs, for which they are regularly used image recognition applications. They function with application of number of filters to extract various aspects from an image, such as edges and corners. To represent and create higher-level representations of the inputs that may be applied to classification or regression tasks, these features are then integrated.

CNNs is utilized to gather features from multiple inputs that are pertinent to the task at hand in lane detection and tracking. By searching for patterns of high contrast in the inputs, then network may, for instance, learn to recognize the white and yellow lane lines on the road. After being retrieved, these vital stats could be utilized to forecast where the lanes would appear on the given input. CNN is often developed using a inputs of labelled picture data when used for lane detection and tracking. The network learns to identify these markings by modifying its parameters to minimize the distance between its predictions and the actual facts labels. The dataset comprises of photos of roadways with labelled lane markers. After being taught, the network can identify and follow lanes in real-time video streams. This entails using the network on each frame of the video and directing the vehicle's steering according to the expected lane positions. Overall, the system is designed to improve road safety by preventing accidents caused by driver fatigue, which is a common problem on long drives or during late-night trips. The system can ensure that the vehicle continues to travel safely to stay alert and focused.

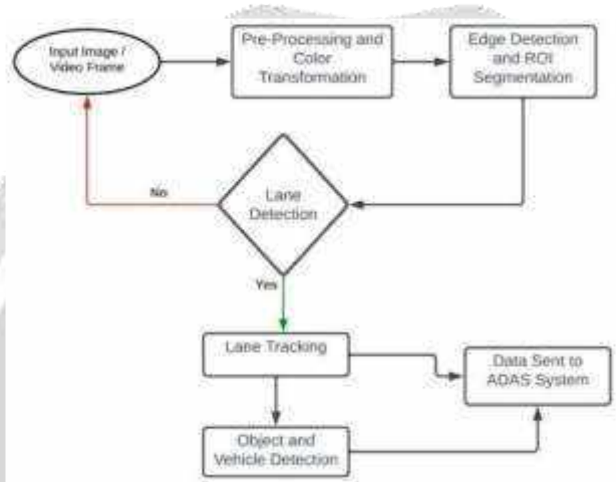


Fig-1: Proposed System Architecture

5. RESULTS

Using the lane detecting algorithm, the project may also result in the creation of self-driving capabilities. This might entail adding more sensors and systems to the car so that it can independently maneuver through traffic and on roadways without the driver's input. The project could lead to improved safety and efficiency on the road by adding lane identification and self-driving capabilities. Driving may become smoother and safer if the car was programmed to make judgements based on current traffic conditions, the weather, and other variables. We may also employ these examples for Commercial Applications and Research and Development. The study might also result in the creation of lane detection and self-driving ADAS commercial applications. This might involve the creation of driverless taxis, delivery trucks, and other commercial vehicles that could function effectively and securely on the road. Lastly, the study may help further ongoing ADAS and autonomous vehicle research and development. This might result in further developments of the technology and its uses, ultimately leading to safer and more efficient transportation for everyone.

Fig-2: Lane detection output

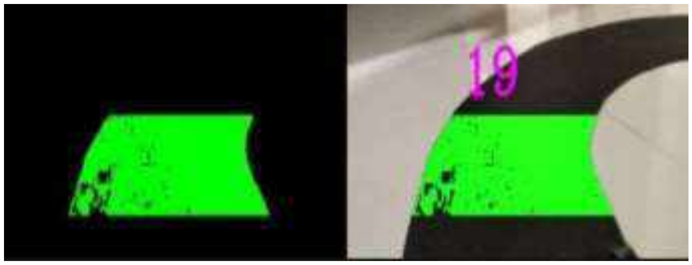


Fig-3: Lane tracking

Fig-4: Another view of lane tracking

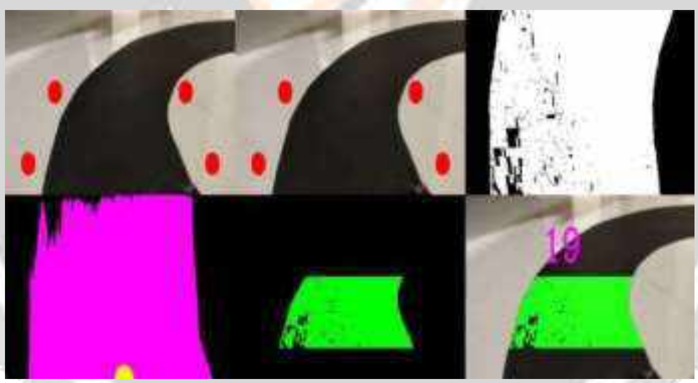


Fig-5: Combined view

6. CONCLUSION

This paper presents and discusses a new software architecture for autonomous driving that is based on the ADAS System. We suggested a potential safe, dependable, and time-capable option. Real-time and usability testing of the architecture for various automated driving situations proved successful. Self-driving and lane recognition devices hold enormous potential for enhancing people and cargo mobility while also enhancing traffic flow and road safety. Although due to inconsistences and various factors there might still be difficulties to be solved, continued research and development activities are anticipated to address these problems and improve the dependability and efficiency of these technologies in the near future.

7. FUTURE WORK

The same task can be expanded in the future with the aid of hardware, but numerous safety concerns and difficulties must also be resolved for autonomous vehicles. such as enhanced decision-making, integration with mapping systems, enhanced lane marking perception, etc.

8. REFERENCES

[1]. Dr Ramarao Narapareddy, Vivek B Bhat, Kartik A Kulkarni, Ashley S, Rabin Akbari Detection of Lanes for Autonomous Vehicles " 2019.

[2]. Lars Sommer, Tobias Schuchert, and Jurgen Beyerer, ¨ “deep learning-based vehicle recognition in aerial images: a detailed analysis” IEEE Transactions on Circuits and Systems for Video Technology, 2019.

[3]. Q. Tan, J. Ling, J. Hu, X. Qin, and J. Hu, “using deep learning to identify vehicles in high quality satellite remote sensing pictures,” IEEE Access, pp. 153394–153402, 2020, doi: 10.1109/ACCESS.2020.3017894.

[4]. A. R. Fayjie, S. Hossain, D. Oualid and D. Lee, " Deep reinforcement for autonomous driving in a driverless car Urban Learning Environment," 2019.

[5]. J. Janai, F. Guney, A. Behl, and A. Geiger, “Computer vision for ¨ autonomous vehicles: Problems, datasets and state-of-the-art,” arXiv preprint arXiv:1704.05519, 2017.

[6]. Hei Law and Jia Deng, “Cornernet: Detecting objects as paired keypoints,” in Proceedings of the European Conference on Computer Vision, 2018, pp. 734–750.

[7]. Z. Quiney, T. Dan and W. Feng Hua, " Fast Exponentially Linear Unit Activation Function-Based Improved Convolutional Neural Network," in IEEE Access.

[8]. Dong .D, Li. X and Sun. X, " An Approach Based on Vision to Increase the Safety of Self-Driving," 2017 12th International Conference on Reliability, Maintainability, and Safety (ICRMS)

[9]. Swaminathan .S, Arora .S, R. Bansala and Rajalakshmi .K, " Convolutional Neural Networks-based Autonomous Driving System with Road Sign Recognition," 2020.

CNN BRAIN TUMOUR SEGMENTATION AND IMAGEPROCESSING

Dr.Kamal Raj T[1], Shireesha Y A[2], Sindhu Shree V[3], Sushmitha M[4], Varshitha H[5]

1Asst Prof,Computer Science Engineering,Rajarajeswari College of Engineering,Karnataka,India
2 Student, Computer Science Engineering, Rajarajeswari College of Engineering, Karnataka, India
3 Student, Computer Science Engineering, Rajarajeswari College of Engineering, Karnataka, India
4 Student, Computer Science Engineering, Rajarajeswari College of Engineering, Karnataka, India
5Student, Computer Science Engineering, Rajarajeswari College of Engineering, Karnataka, India

ABSTRACT

Brain tumor detection is one of the hardest tasks in medical image processing. Because brain tumors can have a wide range of shapes and textures, the images are very diverse, which makes the detection task difficult.

A brain tumor's diverse cell types can reveal information regarding the tumor's nature, severity, and rarity.

Tumors can originate in a variety of locations, and the tumor's location can provide clues about the types of cells that gave rise to it, aiding in further identification. The difficulties that practically all digital photographs have, such as illumination issues, can make the process of detecting brain tumors more difficult. It is possible for tumor and non-tumor pictures to have overlapping image intensities, making it

Keyword: - *Brain Tumor, Deep learning, Convolution Neural Network.*

---

1. Introduction

A brain tumor is a tissue mass where cells proliferate uncontrolled. It develops from several cells, both inside the brain and outside of it. Initial tumors those that emerge from within the brain itself, whereas secondary tumors spread to other areas of the body. Based on the cells or origin derived from various forms of tumors, tumors can have many sources. For instance, grade I or low-grade tumors, such as gangliogliomas, the ones that include neoplastic neurons and are often slow-growing and well-differentiated . Meningioma, which grade I, grade II, or grade III and originates from the meanings (the group of three membranes protecting the spinal cord and brain), is another example.

1.1 Problem Statement

Typically, malignant brain tumors are in the form of blood clots accompanied by fat surrounding it. Detect the location and size of brain cancer required brain tumor pictures. MRI images can help differentiate brain tissue, brain tumors, edema, and spinal fluid-supported differences in color contrast in each tissue. The problem in radiological remains analyzing the results from an MRI brain tumor manually in order that it takes an extended time to seek out the diagnosis from the doctor.

1.2 Existing System

Tumors are the development of unusual cells in our brains. Our skull, which encloses our brain, is very rigid. Any increase inside this type of constrained space can cause issues. According to studies and research, if the tumor is detected in an early stage, the patient can be cured by appropriate treatment. So, it is crucial that you detect and treat the mind tumor in the early stage.

2. System Architecture

The architecture that would be utilized to construct a software product is outlined in the design overview. It provides a comprehensive summary of the system, highlighting the key elements that would be created for the product and its interfaces.

Convolution, Relu, pooling, and fully connected normalized layers are among the many hidden layers that make up a Deep-CNN, a kind of DNN. Weights shared by CNN at the convolution layer help the network function better while using less memory. The 3D volumes of the neurons, local connection, and shared weights are the key characteristics of CNN. A convolution layer produces a feature map using a learnt kernel and multiple input picture subregions. A non-linear activation function is then applied through the ReLu layer to improve the convergence properties when the error is minor. The average or highest-valued pixel found within the region chosen for the pooling layer on the feature map or image is used.

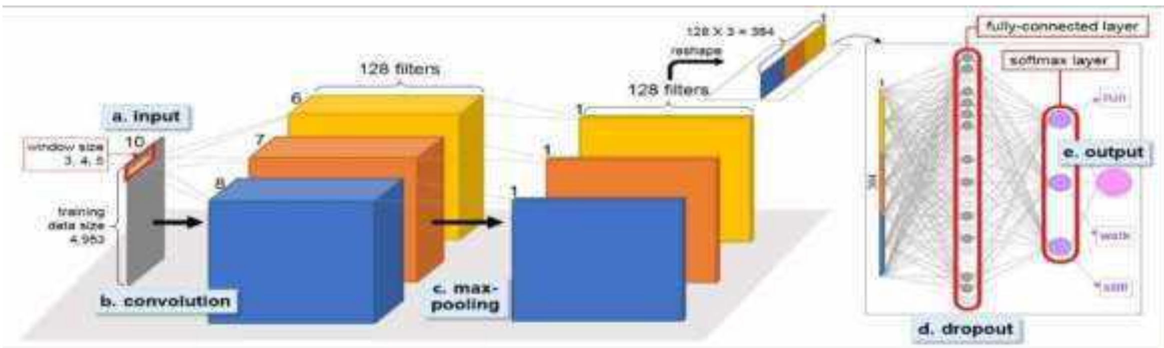


Chart -1: Convolution Neural Network General Architecture

The CNN made up of many layers, including:

A feature map is created by the convolutional layer to forecast each feature's class probabilities by employing g a filter that looks for a tiny piece of the entire image each time.The pooling layer minimises the convolutional layer's information content generates for each attribute while keeping in the most important data by repeatedly alternating the processes of the two layers. By using a completely linked input layer, it flattens the outputs of earlier layers into one vector, which that may be incorporated into the subsequent layer. complete layer connectivity Weights are applied to the source produced thanks to the feature analysis in order to accurately forecast a label.

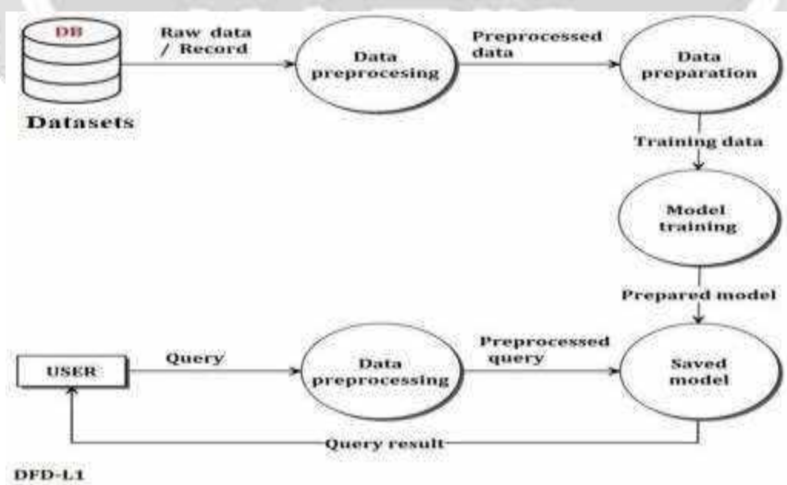


Fig -1: **Data Flow Diagram**

2.1 EVALUATION METRICS

The most common standards for evaluating the effectiveness of medical MR image segmentation include dice coefficient, mean intersection over union (IoU), and pixel accuracy.
The architecture of the suggested method. Training and validation results for the suggested method.

Pixel accuracy does not perform well, though, when there is an imbalance in the classes represented in the photos since the dominant class will ignore the other classes and produce surprising results.
On the other hand, dice and IoU have been shown to be better options overall for semantic segmentation [37], [38]. Equations 5 and 6 use the similarity between the anticipated segmentation B and the ground truth A to assess the IoU and Dice evaluation matrices. DICE is twice as much as IoU. Equations 5 and 6 illustrate how to determine the level of similarity between anticipated segmentation B and ground truth A. With the purpose of analyzing the suggested approach in our study, we also used pixel accuracy (eq. 7), the F1 score (eq. 8), and MCC (Matthews Correlation Coefficient) (eq. 9).

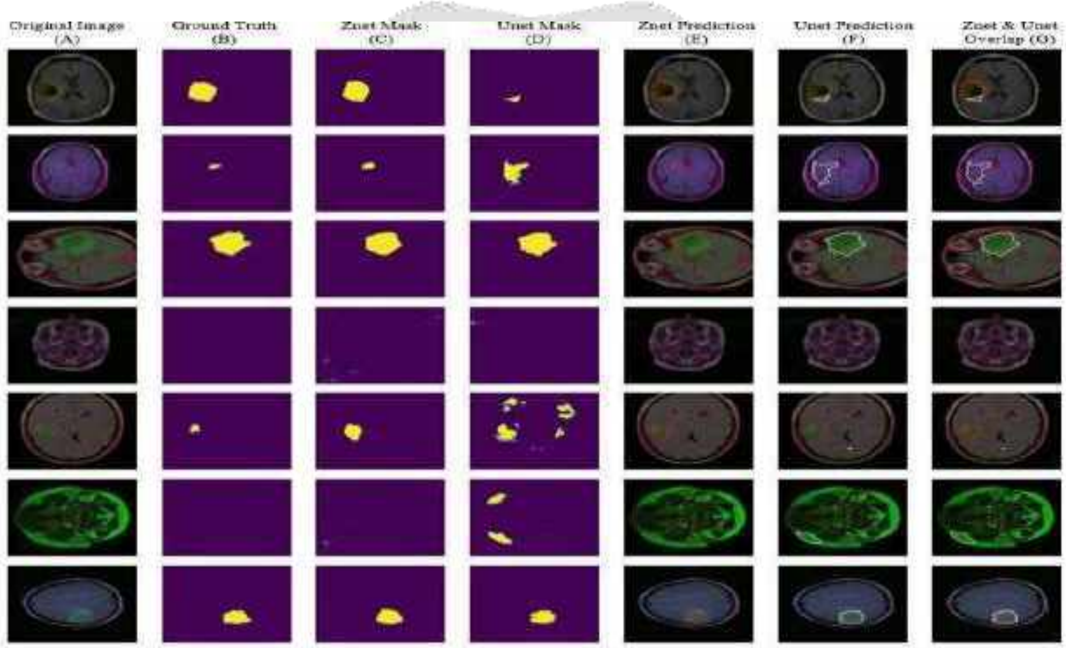


Figure1: MR image tumor segmentation using the suggested model (Znet) and the benchmark model Unet yieldedvisual findings and comparisons.

2.2 Hardware Specification

On a server with the following hardware and software configurations, the suggested framework operated:

- 2x 16-core Intel Xeon processors
- 2x NVidia Titan 12GB GPUs
- 128 GB of RAM
- 6 TB of hard drive space
- Ubuntu 18.04 LTS
- NVidia GPU driver
- v460.91, CUDA 11.2 with CuDNN 8.1, Torch v1.10.0, torch vision v0.11.1,
- Spyder v4.2.5.

3. Implementation

Implementation is the action of converting a new system design into an operational one. That's the key stage in achieving a successful new system. It must therefore be carefully planned and controlled. The implementation of a system is done after the development effort is completed.
Steps for Implementation Front-End Development Using Python Flask: User-friendly computer programmes are

available today. Console-based I/O is not the only form of user interaction. They have faster CPUs and more potent graphics hardware, which contribute to its graphical user interface that is more comfortable (GUI). These programmes allow for input through mouse clicks and let the person to select options with the aid of radio buttons, dropdown menus, and other GUI components. Programming with Flask: Flask is the default Python GUI library. Python and Flask together offer a quick and simple approach to build GUI apps. Toolset for the Tk GUI has a strong object-oriented interface thanks to Flask. Flask has several strengths. It's cross- platform, so the same code works on Windows, macOS, and Linux. Visual elements.

3.1 Module specification

Module Specification is the method to increase the structure design by breaking down the system intomodules and solving it as independent task. By doing so the complexity is reduced and the modules can be tested independently. The number of modules for our model is three, namely preprocessing, identification, feature extraction and detection. So each phase signify the functionalities provided by the proposed system. In the data pre-processing phase median filtering noise reduction is done.

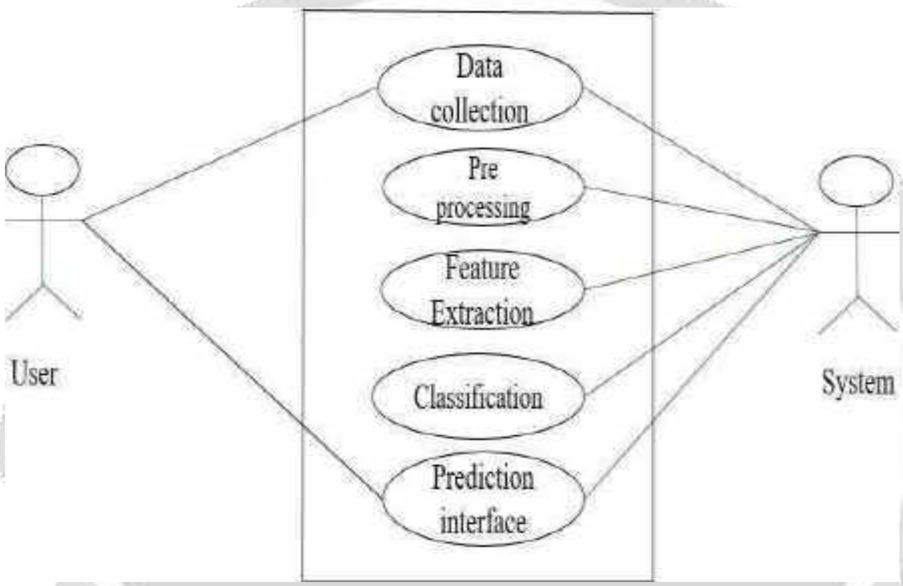


Image Collection The dataset that we have used is in this project available publicly on the internet Image Preprocessing Pre-processing aims to improve image data by reducing undesirable distortions and enhancing some aspects that are crucial for further image processing. There are main components to image pre-processing a) Grayscale conversion b) Noise removal c) Image enhancement a)Grayscale conversion: Only brightness information is contained in a grayscale image. In a grayscale, each pixel value in an image is a certain amount or quantity of light. In a grayscale image, the brightness graduation can be distinguished. Only light intensity is measured by a grayscale image. An 8-bit image will contain brightness variations between 0 and 255, with 0 being black and 255 denoting white. A color image is transformed to grayscale throughout this process.

4. CONCLUSIONS

Prior models fared better than the claimed 97.9% prediction accuracy. In the realm of medical imaging, it is frequently challenging to acquire the enormous number of images that the CNN model needs for training. When used to classify photos that are strikingly similar to the dataset, neural networks with convolutions (CNN) perform very well**.**

5. REFERENCES

[1] S. Bauer, R. Wiest, and L. P. Nolte,"A survey of mri-based medical image analysis for brain tumor studies,"Physics in medicine and biology, vol. 58, no. 13, pp. 97-129, 2013

[2] D. N. Louis, H. Ohgaki, and O. D. Weistler, "The 2007 who classification of tumours of the central nervous system," Acta neuropathologica, vol. 114, no. 2, pp. 97-109, 2007.

[3] G. Tabatabai, R. Stupp, and M. J. Van Den Bent,”Molecular diagnostics of gliomas: the clinical perspective”Acta neuropathologica, vol. 120, no. 5, pp. 585-592, 2010.

[4] B. Menze, A. Jakab, and S. Bauer, ”The multimodal brain tumor imagesegmentation benchmark (brats),” IEEE Transactions on MedicalImaging, vol. 34, no. 10, pp. 1993-2024, 2015.

[5] Seetha, J. & Raja, S.. (2018). Brain Tumor Classification Using Convolutional Neural Networks. Biomedical and Pharmacology Journal. 11. 1457-1461. 10.13005/bpj/1511.

[6] Archa, S., & Kumar, C. (2018). Segmentation of Brain Tumor in MRI Images Using CNN with Edge Detection. 2018 International Conference On Emerging Trends And Innovations In Engineering And Technological Research (ICETIETR). doi: 10.1109/icetietr.2018.8529081

[7] Pathak, K., Pavthawala, M., Patel, N., Malek, D., Shah, V., & Vaidya, B. (2019). Classification of Brain Tumor Using Convolutional Neural Network. 2019 3Rd International Conference On Electronics, CommunicationAndAerospace Technology (ICECA). doi: 10.1109/iceca.2019.8821931.

[8] Janani and P. Meena, “image segmentation for tumor detection using fuzzy inference system”, International Journal of Computer Science and MobileComputing, 2(5): 244 – 248 (2013)

A BLOCKCHAIN-BASED DECENTRALISED FRAME FOR UNBIASED DATA PROCESSING

Manasa G V Kumar[1], Aakashadhithya D K[2], Aditya Kumar[3], Akshay G S[4], Harshitha D[5]

[1] *Assistant Professor, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[2,3,4,5] *Research Scholar, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

A brand-new decentralized computing frame that utilizes blockchain innovations to satisfy various computing requirements. In order to alleviate some of the prevailing issues with centralized data processing, such as data abuse and sequestration violations, and ameliorate data protection and security for individuals. The proposed result adopts decentralized agreement algorithms to ensure transparency and fairness in data processing. In our framework, tasks require different amounts of resources, and workers have different processing capacities. Workers initially obtain task information from the blockchain, do tasks locally and then compete for a scheduler based on instructions that are used for data processing through proof of beneficial work consensus. The scheduler communicates task data into the blockchain network. The fundamental aspect of our decentralised frame is that workers choose their jobs rather than passively obtaining them as in a centralised system.

Keyword: *Blockchain, Decentralised Framework, MF-Q, Fair- CA, POUW*

1. INTRODUCTION

At present, the majority of data computing architectures such as MapReduce, Storm, and Flink use a centralised framework where the master knot centrally controls and monitors a large number of slave nodes. We redesign the transaction recording blockchain architecture to become a data-computing frame with decentralised control for a personal network where enticement mechanisms are not necessary. Our paradigm promotes fair data computing and works on the POUW agreement in our approach. Jobs and workers are heterogeneous. In our approach, task transactions are stored through the POUW consensus.

Workers and schedulers are the two functions that each blockchain block performs. Before performing POUW to strive for a scheduler, workers first receive jobs from the pool accommodating task in accordance with the information related to task on the blockchain. They are then processed locally and returned to the pool. Information about tasks is sent by the scheduler onto the blockchain.

In general, a frame is a creative design that has the implicit ability to revise the way data is reused and managed. By using the power of blockchain technology, the intimidated framework can provide a more safe, clear, and fair medium for data forwarding, which helps address some of the challenges relating to traditional data computing systems.

1.1 EXISTING SYSTEM

The current approach utilizes sole master knot and multitudinous slave knots. Within a centralised data processing structure, the slave nodes are managed and under the sole control of master knot. With respect to the master knots instructions the slave nodes carry out the tasks and procedures. The system includes a numerous benefits alongside the drawbacks.

ISSUES PRESENT IN EXISTING SYSTEM:

[1] Sole knot failure or tailback being in the master knot.
[2] High conservation expenditures for enlarging the scale of the cluster.
[3] Outturn expandability problem when the cluster outruns a certain scale.

1.2 PROPOSED SYSTEM

The proposed system will use a decentralised network of knots, where each knot will posses a duplicate of the blockchain. The knots will be responsible for validating and recovering deals, ensuring the incorruptibility of the data stored. The data stored will be inflexible, meaning it can't be altered once it has been appended to the blockchain network. It sees to that the information is tamper-proof, and any changes made to the data can be easily detected. To ensure fair data processing, the proposed system will apply an agreement medium that will make sure that all knots in the network agree on the validity of deals. This will help any single reality control the data processing system and make sure that all deals are authenticated by the maturity of the knots in the network. This also avoids any vicious actors from tampering with the information stored in the blockchain. The intimidated system will also incorporate insulation- enhancing technologies analogous as zero- knowledge evidence, which will allow stoners to prove the authenticity of their data without revealing any sensitive information. This will cover the insulation of stoners while also icing the integrity of the data. Ultimately, the intimidated system will have a transparent governance model, where all opinions related to the system will be made in a decentralized manner. This will ensure that the system is responsible to its stoners and that all opinions related to the system are made in the swish interests of the stoners.

1.3 OBJECTIVES

- Blockchain's primary motive is to offer a platform for decentralised networks.
- It enables users to secure ledger manipulation without a third party's assistance.
- The primary goal is to transform the transaction-recording blockchain in an original way fordecentralised data processing.
- In order to process data fairly, we use various methods in this project for both the workers and the scheduler.
- These algorithms' primary goal is to properly balance data fairness and collision.

2. LITERATURE SURVEY

[1] The Authors W. Liang, M. Tang explains how prior Industrial Internet of Things blockchain data transfer protocols had inadequate security, high costs for administration, and were very difficult to monitor. To address these **issues, this study presents an industrial IoT data transport solution based on secure fabric blockchain. This method makes use of a dynamic secret sharing system based on blockchain that uses the power blockchain sharing model to produce a reliable trading Centre, power data transfer security matching, and dynamically linked storage.**

[2] The Authors Mohamed El Ghamry, Ayman M. Bahaa Eldin explains
This essay discusses how the main stakeholders in the productization of machine learning models are model builders. They typically try to train their models on a group of data that is sufficient, adequate, usable, and realistic to generate a model with the anticipated level of accuracy. The security and privacy of the dataset, however, is one of their main issues. The motive of the suggested platform is to guarantee data confidentiality and privacy while enabling model builders to submit their models for training and sharing the required data.

[3] The Authors Zhengding Luo, Yinghong Zhang explains
This essay explains how the need for data trading promotes the growth of the data market. In contrast, typical data markets need both buyers and sellers to use a centralised trading platform, which may be dishonest. A dishonest

centralised trading platform may steal data from the data seller and sell it again, or the platform may refuse to transfer data even after being paid by the data buyer. Both parties' interests are hurt, and the fair data transaction suffers. To offer a trustworthy decentralised platform for ethical data trade, we introduce a revolutionary data trading architecture with credible Environment for Execution. Our design suggests using a reliable exchange and a blockchain network to implement payments.

[4] The Authors: SHANGPING WANG1,YINGLONG ZHANG explains
the SHANGPING WANG1,YINGLONG ZHANG [7]Attribute-based encryption discussed. is regarded as a security precaution in traditional cloud storage systems, a key piece of technology for tackling the problems of data privacy and precise access control. However, every ABE scheme's private key generator is capable of decrypting. The cloud server houses all of the data. which could cause serious problems, such as key abuse and privacy data leakage. A sole knot failure might, however, bring the entire system to a standstill because the typical cloud storage model relies on centralised storage. Decentralised storage can be put to use to alleviate the sole knot failure problem in standard cloud storage systems and yields numerous advantages over centralised storage.

2.1 METHODOLOGY

The data file initial is imported into the system, preprocessed to verify that is in a format that the framework can use, and encrypted using the m-FQ encryption technique. The PoUW consensus process is utilized to validate and add the encrypted data partitions to the blockchain after they are distributed to the network of nodes. The nodes mine new blocks and append them to network using either PoUW. The blockchain's smart contracts, which are self- executing algorithms, may assess the data partitions after being appended to the network. The smart contracts carry out their tasks and deliver the user's net results in an encrypted form. The final output of the process then revealed by decrypting the encrypted results using the m-FQ encryption algorithm. This methodology makessure that the foundation for data forwarding is open and equitable overall..

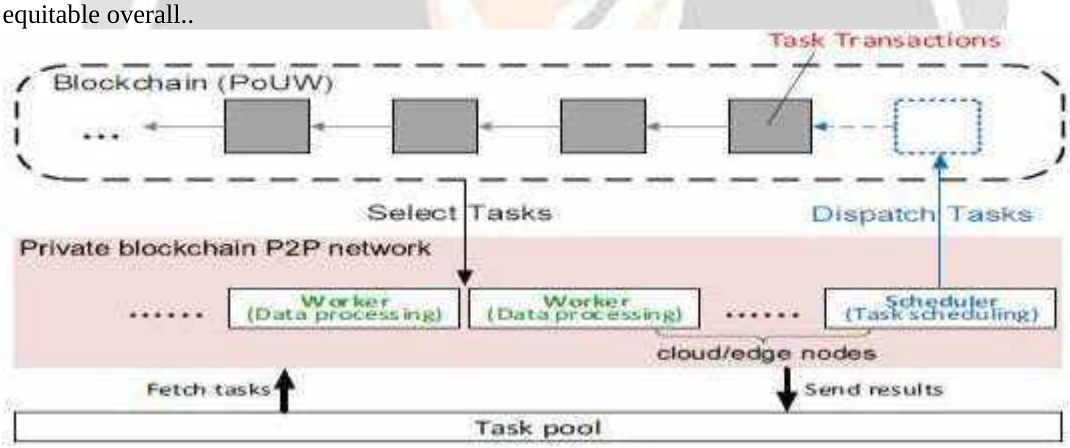


Fig -1 The decentralised frame

2.2 SYSTEM ARCHITECTURE

Building a blockchain based decentralised frame for unbiased data forwarding is a tangled task that comprises of numerous components. Here's a high-level implementation approach:

1. Initialization:

The initialization procedure involves booting up Work Scheduler and Job Scheduler. The Work Scheduler is subjected to Cloud Authority (CA) login, and the Job Scheduler is subjected to Data Owner and Data Receiver (DO and DR) login.

2. Registration as a Data Owner:

The data owner initially registers by providing the necessary details. The data owner then logs in to upload the data that needs to be transmitted.

3. Uploading the data:

The data owner has the feasiblity to upload the file by providing the necessary login credentials. The data uploaded is saved with associated key words. The uploaded data is saved in the cloud.

4. Registration as a Data Receiver:

The Data Receiver registers by providing the necessary particulars. The data receiver logs in by providing login credentials.

5. Putting the consensus into action:

This stands out as key characteristic of our decentralised frame. In accordance to our architecture, the scheduler computes a unbiased index for each recently obtained task using the modified fair queue algorithm. The fair index states that employees use a Fair-CA method to strike a balance between fairness and collision.

6. Requestion of private key:

The Data Receiver after logging in, requests for the private key. The private Key request is sent to the Cloud Authority for verification and authorization.

7. Generation of private and public keys:

The Public key is generated during the registration process of the Data Receiver. The Cloud Authority(CA) logs in to the initiate private key generation. The keys are generated using the Blockchain algorithms.

8. Delivering the encrypted key:

The Cloud Authority signs in to authorize and certify the Data Receiver's request for private keys. The indispensable private key is subsequently emailed by the cloud authority to the data recipient.

9. Acquiring access to the data:

The data receiver can access the encrypted data by entering the proper key phrase, along with the related public key which was developed at the moment of the data recipient's registration and private key which was obtained by means of email from the cloud master.

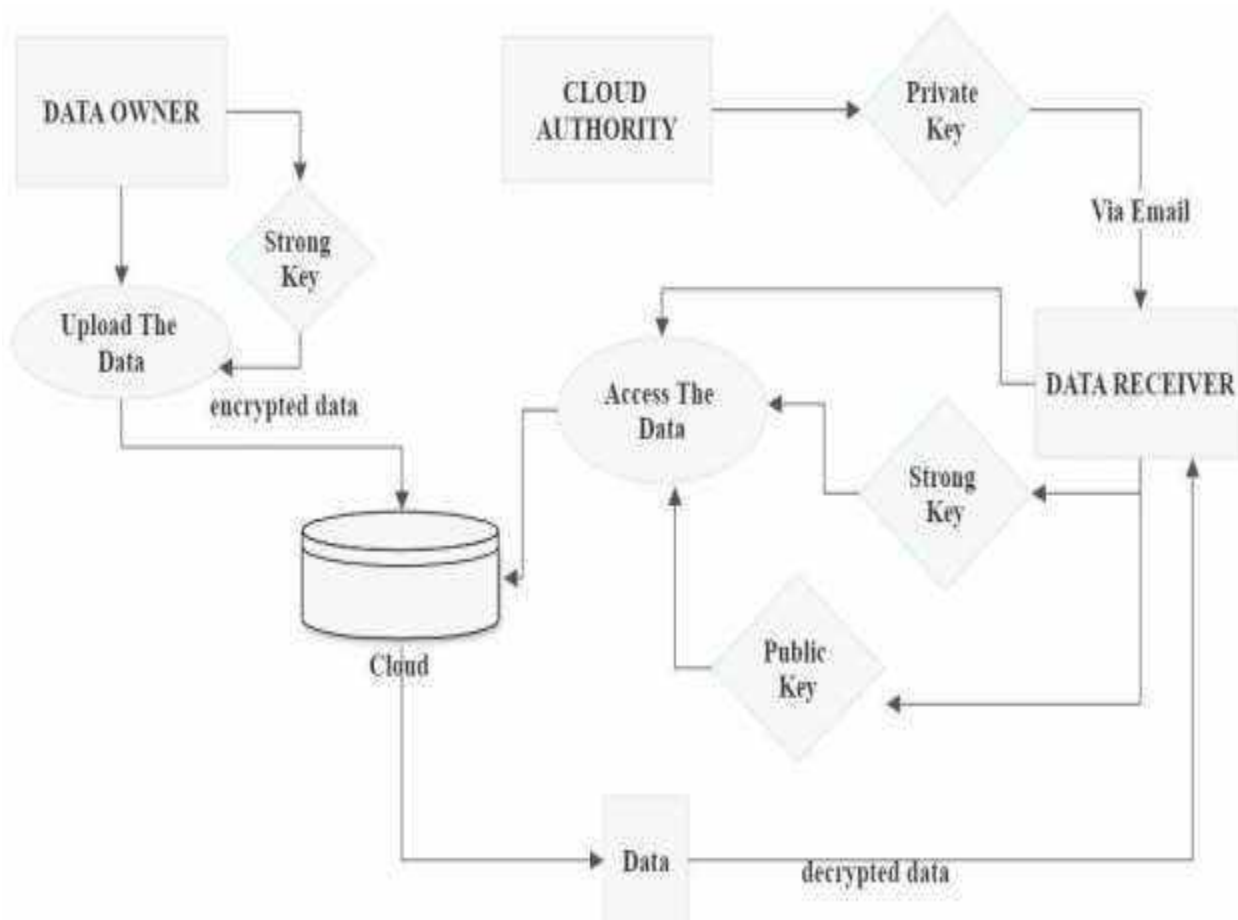


Fig -2 Data flow diagram

3. CONCLUSION

In conclusion a blockchain-based decentralised system can provide a fair and transparent data processing mechanism that is resilient to censorship and manipulation by leveraging the immutable and decentralised nature of blockchain. Such a system can make certain that each and every data transactions are verified and recorded in a tamper-proof manner making it impossible for any party to alter or delete the data without consensus. Moreover a decentralised system can promote a fair distribution of resources incentives and governance among all stakeholders involved in the data processing process this can enable a more equitable and inclusive data economy that benefits everyone involved rather than just a few powerful entities. The presence of three levels of security in our framework namely the public key private key and keyword ensures high level security and prevents unauthorized access to the data-file. However carrying out the blockchain-based decentralised system for fair data processing faces several challenges including scalability, interoperability, security and privacy concerns therefore it requires continuous development and upgrades to address these issues and improve its performance and usability.

Overall a blockchain- based decentralised system has the capability to revolutionise the way we process store and exchange data leading to a more open transparent and democratic digital ecosystem.

4. RESULT

In general, a blockchain-based Decentralised Frame for Fair Data Processing project comprises the proficiency to revolutionise numerous industries by delivering safe, open, and successful remedies that are free from centralised control and manipulation. The campaign may encourage interaction, fairness, and trust, resulting in more unbiased results for all participants.

Fig 1 Registration Page

Fig 2 Uploading of file

Fig 3 Unique keyword page

Fig 4 Sending Request

Fig 5 Approval of Request

Fig 6 Accessing of Data

5. REFERENCES

[1] Implementation of A Secure Fabric Blockchain-based Data Transmission Technique for Industrial Internet-of-Things by W. Liang, M. Tang on 25 March 2019

[2] Implementation A Decentralized Blockchain-based Data Privacy preserving Model Training Platform by Mohamed El Ghamry, Ayman M. Bahaa Eldin on 26-27 May 2021

[3] Implementation of A Blockchain-Based Data Trading Frame with Credible Environment for Execution by Zhengding Luo, Yinghong Zhang on 17-19 December 2020

[4] Implementation of A Blockchain-Based Frame for Data transmission and receival with Fine Grained AccessControl in Decentralized Storage Systems by SHANGPING WANG1,YINGLONG on 29 June 2018

[5] K. Aida, W. Natsume, and Y. Futakata, "Distributed computing with hierarchical master-worker paradigm for parallel branch and bound algorithm," in Cluster Computing and the Grid, 2003. Proceedings.
CCGrid 2003. 3rd IEEE/ACM International Symposium on. IEEE, 2003, pp. 156–163.

[6] C. J. Archer, T. J. Mullins, J. D. Ratterman, A. Sidelnik, and B. E. Smith, "Parallel computing system using coordinator and master nodes for load balancing and distributing work," Jan. 12 2010, uS Patent 7,647,590.

[7] J. Wan, M. Liu, X. Hu, Z. Ren, J. Zhang, W. Shi, and W. Wu, "Dual-jt: Toward the high availability ofjobtracker in hadoop," in Cloud Computing Technology and Science (CloudCom), 2012 IEEE 4th International Conference on. IEEE, 2012, pp. 263–268.

[8] T. A. Genez, L. F. Bittencourt, and E. R. Madeira, "Workflow scheduling for saas/paas cloud providers considering two sla levels," in 2012 IEEE Network Operations and Management Symposium. IEEE, 2012, pp.906–912.

[9] M. Swan, Blockchain: Blueprint for a new economy. " O'Reilly Media, Inc.", 2015.

TRUST BUT VERIFY A FRAMEWORK FOR THE TRUSTWORTHINESS OF DISTRIBUTED SYSYTEM

Dr Kirubha D[1], Neha R Sindhe[2] , Pooja S[3], Manisha K M[4]

[1]*Associate Professor Computer science and engineering, Rajarajeshwari College of engineering*
[2]*Student Computer science and engineering, Rajarajeshwari College of engineering*
[3]*Student Computer Science and engineering , Rajarajeshwari College of engineering*
[4]*Student Computer Science and engineering , Rajarajeshwari College of engineering*

ABSTRACT

Security and privacy concerns in computer systems have grown in importance with the ubiquity of connected devices. Additionally, cloud computing boosts such distress as private data is stored and processed in multitenant infrastructure providers. In recent years, trusted execution environments have caught the attention of scientific and industry communities as they became largely available in distributed systems. Developers have the luxury of creating heterogeneous systems that meet demands specific to the data thanks to the diversity of data management systems.

Keyword: *Trust but verify, Cyber security, Attribute Interceptor Algorithm*

---

1. INTRODUCTION

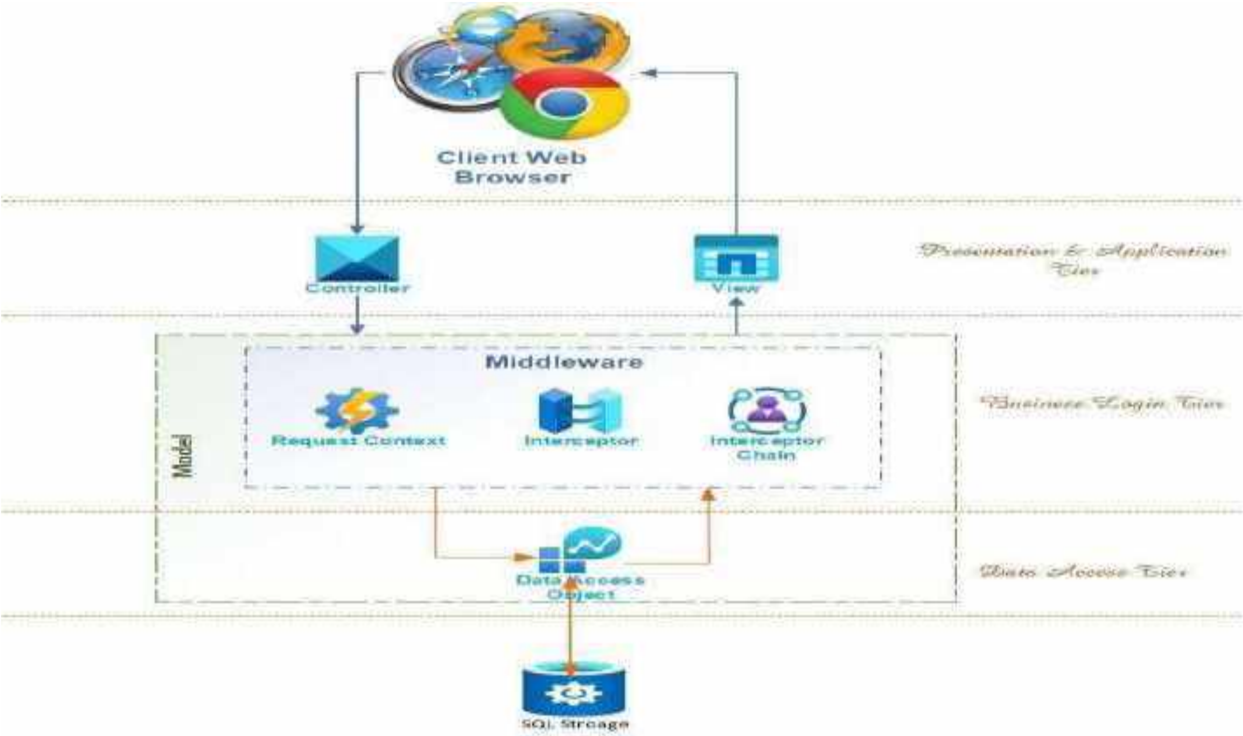
All around us is software. The need to support a growing number of domains has quickly increased the complexity of software systems, making them difficult to maintain and the training process for end users more challenging. As a result, it has become necessary to develop user-friendly application software with straightforward interfaces that make them simple to use, especially for nonprofessional personnel. The economy and society have been significantly impacted by the transformation brought about by digital technology, and they continue to be so. The key to this transition is data, and people are the principal generators of ever-increasing amounts of it.

It is vital to put people (again) at the centre of the process and to address the lack of standards and technical equipment that makes the exercise possible.

2. PROPOSED WORK

This study offers common RESTful interfaces to many data sources. Thus, it lessens the amount of custom code that application developers create specifically for various data sources.The Service Provider may customize the characteristics of a service by modifying the service template. The modification of the service template affects the service which will be instantiated after such modification. The Subscriber may customize the characteristics of a service by modifying the subscriber service profile. The modification of the subscriber service profile affects the service which will be instantiated after the modification. There are two ways to customize the characteristics of a service by the end-user: The first one consists in modifying the end-user service profile which is similar to the subscriber customization. The second one deals with the modification of the customizable data which has data

3. SYSTEM ARCHITECTURE



Nodes: Nodes are the unique components of nodes converse with one another in order to work towards a shared objective. Nodes can be hardware devices, software programmes, or even people.

Blockchain: A distributed ledger called a blockchain is used to securely and openly record transactions. A blockchain is utilised in the trust but verify framework to preserve and verify the history of all interactions between network nodes.

Smart contracts: Smart contracts are self-executing programs that automate the enforcement of rules and regulations in a blockchain network. In the trust but verify framework, The special parts of an uncentralized system called Nodes communicate with one another to work towards a common goal.
Consensus mechanisms: In a blockchain network, To guarantee that all nodes concur on the status that ledger at any one time, consensus techniques are used. The trust but verify framework uses consensus techniques to make certain that each network node agree on the history of interactions captured in the blockchain..

Identity management: Identity management is crucial to the trust but verify structure because it ensures that only approved nodes can interact with the network. To authenticate and authorise network nodes, identity management techniques including public-key cryptography and digital signatures are applied.

Monitoring and auditing: The trust but verify structure relies on identity management to guarantee that only approved users nodes can communicate with the network. Public-key cryptography and digital signatures are used as identity management solutions to authenticate and approve network nodes.

4. MODULE DESCRIPTION

4.1 HTTP Communication

The HTTP/1.1 standard includes a list of all the methods, including Get, Head, Post, and Put options, Delete, Trace, and Connect. the web server, only Post, Put, and Delete are intended to modify a resource. The life cycle of a supply begins with its creation, which frequently entails a Post request. Put requests can then be used to modify the resource once it has been generated. Finally, it can be deleted using a Delete request. A state machine can provide a representation for such a life cycle, with the HTTP methods acting as transitions and the resource having two states—exists and does not exist. Client-server design, stateless communication, layered architecture, and a unified interface with universal resource are only few of the reasonable and tried-and-true architectural limitations that REST offers.

4.2 Pattern coordinates

The term "agent" in relation to coordination systems refers to an entity that synchronises its actions with those of other comparable entities and has the following features: it is active, i.e. It is self-contained, meaning that it only has the bare minimum of resources needed to carry it out, and It can speak with both of its environment and other agents. It encapsulates at least one thread of execution; its behavior is determined both by its own initial program and by its interactions; it may be fixed or mobile (in the latter case, it may migrate from one environment to another one). most of the time, the term "agent" describes a particular support system that specifies the interaction primitives and patterns of the agent.The main common objective is to favor uncoupling between the cooperating entities, which leads to various forms of indirect, asynchronous interaction

4.3 IMPLEMENT MIDDLEWARE INTERCEPTOR

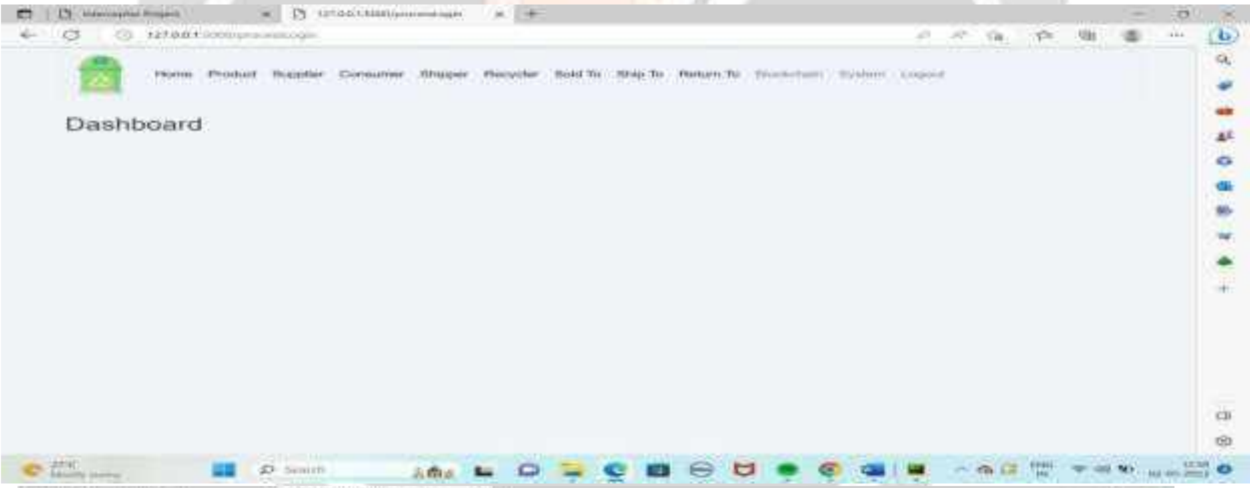
Typically, "agent" refers to a particular support system. that defines the interaction primitives and patterns of the agent: it is active, i.e. It has the very minimal resources required for its execution, is self-contained, and has the ability to communicate with both its environment and other agents. It contains at least one execution thread.; The term agent is primarily used in conjunction with a specific support system, which defines its interaction primitives and patterns; it may be fixed or mobile (in the latter case, it may migrate from one environment to another); behaviour is determined both by its own initial programme and by its interactions.. The main common objective is to favor uncoupling between the cooperating entities, which leads to various forms of indirect, asynchronous interaction

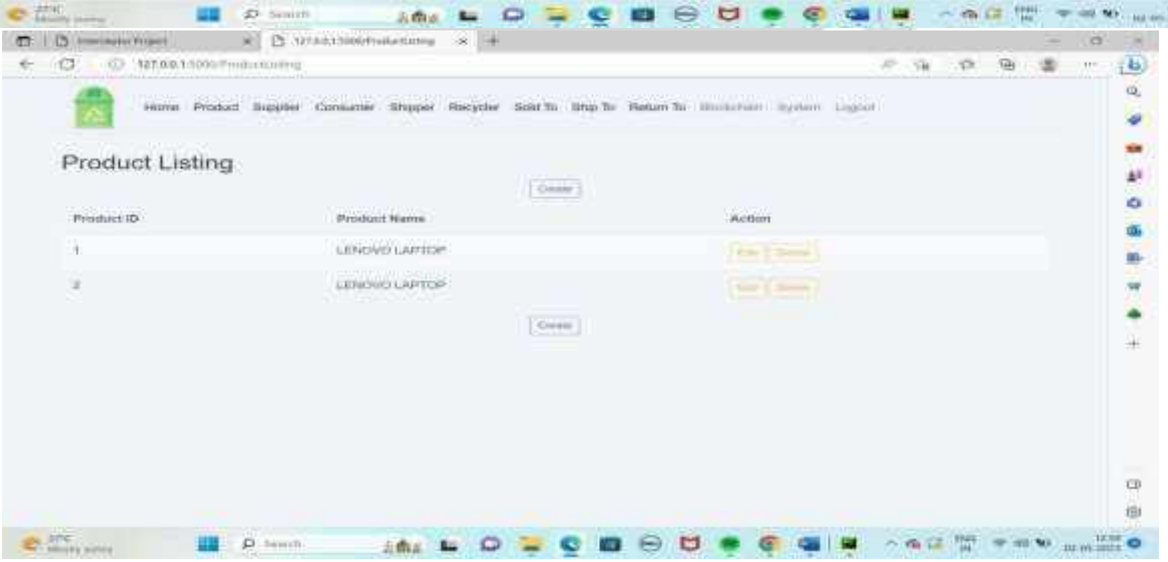
5. System Implementation

Define an API object, such as app = FastAPI()
Define data type, using Pydantic
Map HTTP method and path to the relevant Python function. The different HTTP methods mentioned in the earlier section can be called with @app.get(), @app.post(), @app.put(), etc. respectively, coupled with the path which can be inserted as @app.get("/path")
Start the API application, run uvicorn main:app --reload on the command line, where main refers to the Python filename and app refers to the API object created in Step 1

6. RESULTS


Sign In to Project
Email
Password
Login


Home Product Supplier Consumer Shipper Recycler Sold To Ship To Return To
Dashboard


Home Product Supplier Consumer Shipper Recycler Sold To Ship To Return To
Product Listing
Product ID
Product Name
Action
1
LENOVO LAPTOP
2
LENOVO LAPTOP

7. FUTURE WORK

Future studies will concentrate on more complex policy implementation, adding another technology layer to the suggested strategy, and contrasting it with more advanced techniques like attribute-based encryption (ABE).

8. CONCLUSION

In many previous decentralized trust systems, an implicit always-online requirement is a major hindrance to practical applicability.In this essay, we presented the architecture, founded on a decentralized approach for managing secure communication of data where several entities have the part of providing mutual trust between the parties, i.e. network of trusted services. @@ There are numerous data sources used by different application domains in big data applications. These big data applications frequently become dependent on certain data sources since the interfaces used by data sources vary widely and There is not much to no compatibility between them.@@ The architecture displayed in this work is modular and extendable, enabling developers to create uses for large data not dependent on a single data source. It enables the users to add further features as bundles easily, and also facilitates an easy extension to more data sources, implementing its interfaces.

9. REFERENCES

- R. C. Nickerson, U. Varshney, and J. Muntermann, A method for taxon- omy development and its application in information systems, Eur. J. Inf.
- S. Marti and H. Garcia-Molina, Taxonomy of trust: Categorizing Mar. 2006.
- P. Tasca and C. J. Tessone, Taxonomy of blockchain technologies. Principles of identication and classication, 2018, arXiv:1708.04872.
- D. Carboni, the bitcoin Feedback based reputation on top of org/abs/1502.01504 M. Sharples and J. Domingue, The blockchain and kudos: A distributed system for educational record, reputation and reward, in Adaptive and K. Verbert,
- M. Sharples, and T. Klobuar, Eds. Cham, Switzerland: Springer, 2016.
- J. Zou, B. Ye, L. Qu, Y. Wang, M. A. Orgun, and L. Li, A proof-of- trust consensus protocol for enhancing accountability in crowdsourcing May 2019.
- Z. Yang, K. Yang, L. Lei, K. Zheng, and V. C. M. Leung, Blockchain-based decentralized trust management in vehicular net- Apr. 2019.
- J. Cheng, Slicing concurrent programsA graph-theoretical approach, Int. Workshop Automated Algorithmic Debugging, in Proc. 1st cfm?id=646902.710201
- Z. Movahedi, Z. Hosseini, F. Bayan, and G. Pujolle, Trust-distortion resistant trust management frameworks on mobile ad hoc networks: 2nd Quart., 2016.
- M. J. Fischer, N. A. Lynch, and M. S. Paterson, Impossibility of dis- [10] S. Nakamoto. (2008). Bitcoin: A Peer-toPeer Electronic Cash System.

- M. Vukoli, The quest for scalable blockchain fabric: Proof-of-work vs. BFT replication, in Proc. Int. Workshop Open Problems Netw. Secur.

- M. Zamani, M. Movahedi, and M. Raykova, RapidChain: Scaling blockchain via full sharding, in Proc. ACM SIGSAC Conf. Comput.

- M. Zamani, M. Movahedi, and M. Raykova, RapidChain: Scaling blockchain via full sharding, in Proc. ACM SIGSAC Conf. Comput.

OBJECT DETECTION & SEGREGATION USING R-CNN

Dr. Kirubha D[1], Liyakat Ali[2], MD. Saif, Prem Kumar J[3], Kush Upadhyay[4]

[1] Associate Professor,CSE, *Rajarajeswari College of Engineering, Bengaluru, Karnataka, India*
[2] Student, CSE, *Rajarajeswari College of Engineering, Bengaluru, Karnataka, India*
[3] Student,CSE, *Rajarajeswari College of Engineering, Bengaluru, Karnataka, India*
[4] Student,CSE, *Rajarajeswari College of Engineering, Bengaluru, Karnataka, India*
[5] Student, CSE, *Rajarajeswari College of Engineering, Bengaluru, Karnataka, India*

ABSTRACT

The Computer vision field of computer science recognizes the images and scenes from the images, video or live feed. Computer Vision has a number of solutions which include recognizing objects and images, generating images, resoluting images and more.The computer vision is widely used for recognizing faces, vehicles, human detection, mapping of networks, security of systems, and drivierless vehicle systems, etc. It can also be used for the detection of other sensible objects like different kinds of fruits, buttons, coins, etc. This system uses the correct object recognition algorithms like RCNN, FastRCNN, FasterRCNN, Mobilnet and other fast and correct methods like SSD. By implementing the Machine Learning and Deep Learning frameworks like TensorFlow, OpenCV etc., every single object can be recognized in the image with a highlighted box around it and each recognized object is assigned a label to it.

Keyword : -*Object Detection, Computer Vision, Tensorflow, Opencv, Python, R-CNN*

---

1. INTRODUCTION

Object detection has emerged as a crucial aspect of computer vision, finding applications in various fields such as driverless cars, robotics, surveillance, and pedestrian detection. The process of segmenting images to detect objects plays a pivotal role, requiring models to differentiate objects from backgrounds, body parts, or static elements. Traditionally, object detection relied on mathematical models based on prior knowledge. However, the introduction of Deep Learning has brought a revolution in this field. Deep learning methods for object recognition employs algorithms which can depict objects either in real-time or from images or video feeds. Image classification entails predicting the category of an object within an image, while object detection goes a step further, identifying and enclosing objects with bounding boxes. Object detection techniques are also employed to tasks like hair follicle detection, enabling individual localization of follicles. The process involves constructing object categories for training the system to detect specific objects, and efficiently loading the model for image partitioning and generating records. In our project, we aim to focus on everyday objects encountered in our daily lives, such as fruits, buttons, and coins. For object detection, we will utilize R-CNN, which employs a region proposal generation stage. The selective search algorithm is used to generate sub-segmentations of the image that correspond to different objects based on color and size cues. By leveraging these advanced techniques, our project aims to achieve accurate object detection, enhancing the capabilities of computer vision systems across diverse domains.

2. LITERATURE SURVEY

2.1 Debalina Barik, Manik Mondal ,"Object Identification For Computer Vision using Image Segmentation" : Object detection is the main factor for scene understanding for computer vision. It is a complex task to determine objects from a chaotic background. This solution gives an image segmenting model for recognizing objects from blurry background. First the "feature set" is build from the original object and then the solution is trained using the "feature set" and graph partitioning on the chaotic image. For testing we used the computer manipulated images and real world images. The search objects were identified successfully by the system.

2.2 Cong Tang, Yunsong Feng, Xing Yang, Chao Zheng and Yuanpu Zhou, "The Object Detection Based on Deep Learning" The often happening raining hazards are making human beings to go through many environmental challenges. It affects the country's environment, the community, as well as industries. This paper employs ARIMA and ANN model. For data accumulation, the SVNM is employed. The performance of this method is enhanced and is less prone to errors in MSE. The main disadvantage of employing convolutional techniques leads to lesser accuracy. The method employed in this paper gives a simple method which extracts features from the given dataset and then employs an SVM classifier on the extracted features.

3. EXISTING SYSTEM

The existing systems are not so efficient to detect multipart objects that share similar shapes and colors. The identification of such objects proves challenging, leading to reduced accuracy and increased processing time.
The current solution aims to address these limitations by leveraging neural networks. By incorporating deep learning techniques, the accuracy and efficiency of object identification system is enhanced. Neural networks are very helpful and powerful tools for analyzing image tasks, including object recognition and segmentation. Our system will utilize a convolutional neural network (CNN) architecture, which is greatly used for things employed in computer vision field. By training the CNN on a diverse dataset of multipart objects, we aim to improve its ability to accurately identify and segment complex objects with similar attributes. Additionally, we will explore advanced optimization techniques to improve the speed of our model. By optimizing the neural network architecture and leveraging parallel processing capabilities of modern hardware, we anticipate a significant reduction in the computational time required for object identification. Through our research, we aim to overcome the limitations of the existing graph-based image segmentation approach and provide a more accurate and efficient solution for object identification, even in scenarios involving multipart objects. The usage of neural networks and optimization techniques will advance the computer vision systems, enabling faster and more accurate object recognition in various real-world applications.

4. PROPOSED SYSTEM METHODOLOGY

In the proposed system, we will be basically focusing on the different kind of object that we see in our daily life like various kinds of mobile phones, bottles, humans etc. This system focuses on images having various objects in an image with multiple objects also. First, the image dataset is prepared to classify the different objects and then from the test image the object is searched after partitioning the image using a TensorFlow record generator. The following steps are discussed below.
1. Image Dataset Preparation
2. Creating TensorFlow record
3. Implementation of R-CNN
4. Training
5. Object Identification(Testing)

4.1. Objective of the work
The objective of this work is to detect different objects in the image or video and label a class to them.
4.2. Methodology
In this project, the dataset is collected from different images. After collecting the dataset, we train our machine so that it identifies various types objects from the images or video using neural networks. For testing we will take a image and let it pass through the algorithm and will check for the output. This process is done in few simple steps, which are:
1. Use an open source dataset of images for detecting various type of objects in the image.
2. Train R-CNN to automatically detect objects in images via the dataset we created.
3. Evaluate the results from an educational perspective.

5. SYSTEM DESIGN
The system is designed such that any image can be classified and will help in identifying the object for future reference. The steps or modules involved in the design are:

5.1. Image DataSet Preparation:

For each object class we prepared a collection of characteristics from sample images where the objects are labelled manually. Each entry is recognized by the different value in the dataset. All possible images or a particular image will be classified in one entry so that if the image is taken from some other angle or some other view point even then image can be identified.

5.2. Creating TensorFlow Records:

A unique and simple data format for storing a sequence of binary records. This is done with the help of protocol buffers which isa cross language library for efficient serialisation of structured data. The tf.train.Example represents mapping and is done using TFX and thus records are created with .tfrecord extension.

5.3. Implementing R-CNN:

The region proposals produces a square which is feed into a CNN that produces 4096 dimentational feature vector as output and then CNN acts a feature execrator and the final output layer consist of the various extracted features from the image and is feed into SVM. Thus, we will use R-CNN for training our dataset.

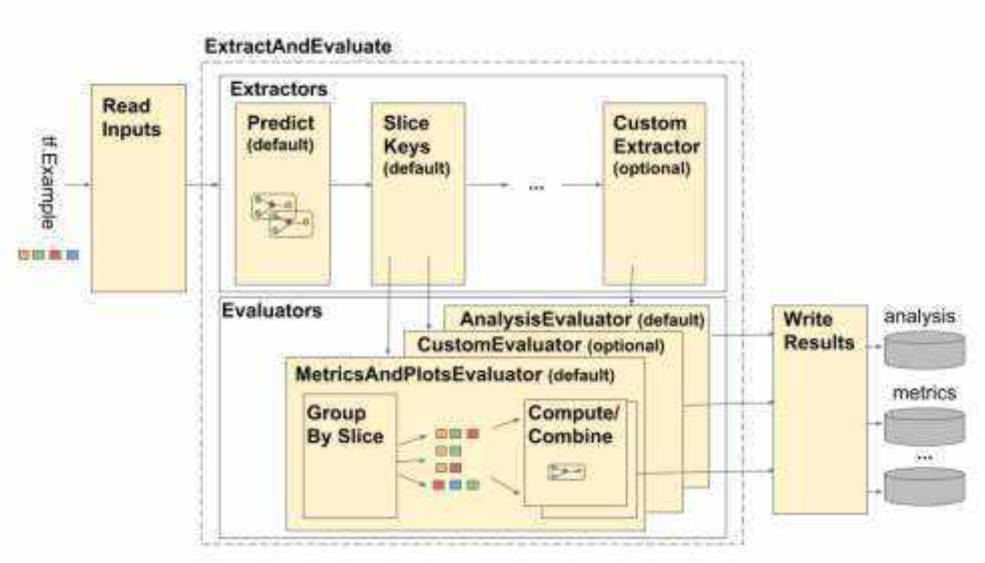


Fig 5.3.1: R-CNN Pipeline

5.4. Testing:

In this phase we will take different types of random images of objects. Images can be combined with different objects or of a single object. We will be taking the images and then tally with the dataset given and will identify what is the object along with it our system will also identify objects using the live feed irrespective of number of objects appearing in from of the camera.

5.5. Object Identification:

After training and testing the system for normal and edge cases our system would be able to identify objects using the image or live feed.

6. SYSTEM IMPLEMENTATION

6.1. Image Collection:

Input to the proposed system is Classification of Scan images of different objects are taken.

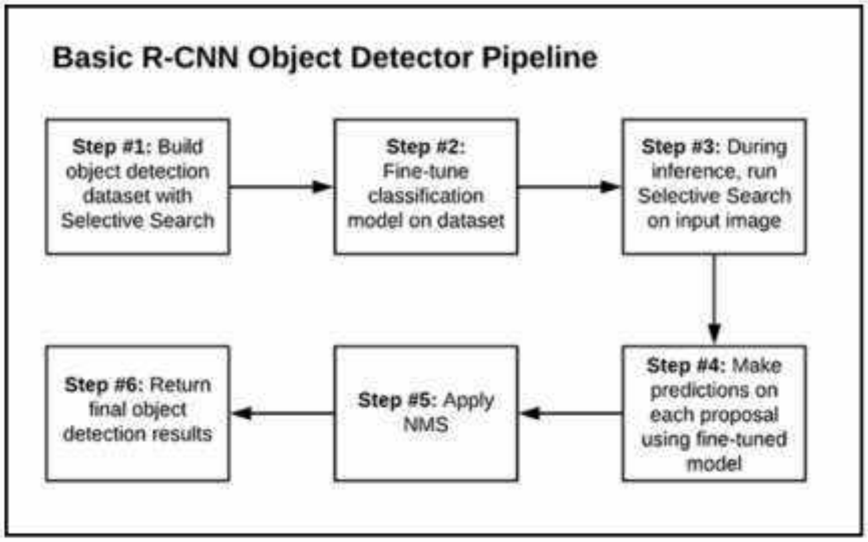


Fig 6.1.1: Basic Pipeline

6.2. TernsorFlow Records:

While working with the large dataset which we would be using in our system TFrecords compresses the dataset into a binary file which can be used during the training of our model. Binary takesup less space on our disk thus, it makes our training much more efficient. It also stores the data in a time series or word encodings this is done with the help of tensorflow comprissing of two components those being:
a)tf.train.Example
b)tf.train.SequenceExample.
These are further used to serialize using TFRecordWriterTo save it in disk. tf.train.Feature wraps a list of data of a specify type so that TensorFlow can understand it. It comprises of stored list which is stored in tf.train.BytesList.

Fig 6.2.1: TensorFlow Record

6.3.Testing:

In the proposed system we employ the R-CNN to differentiate the objects in an image. R-CNN is the convolution neural network which uses the concept of the region proposal made in 2014 by Girshick, who first proposed the concept of a region in 2014. The region segmentation method of selective search is used to extract the region proposals from the image, which include potential object candidates. The model outputs precise object classifications and object bounding boxes to achieve object detection after merging by non-maximal suppression

(NMS). Fast R-CNN exhibits a method that divides the convolution computation between the region proposal of the testing image and the feature layer, greatly reducing the computation.
Further reducing the network calculation, Fast R-CNN uses truncated SVD to enable the replacement of the single fully connected layer corresponding to the weight matrix with two small fully connected layers.
The three modules that make up the suggested R-CNN model are as follows:
Module 1: Region Proposal. Create and extract examples of candidate bounding boxes for category-independent regions.
Module 2: Feature Extractor, Using a deep convolution neural network as an example, extract features from each candidate area.
Module 3: Classifier, Label characteristics as belonging to a known class, for instance, using a linear SVM classifier model.

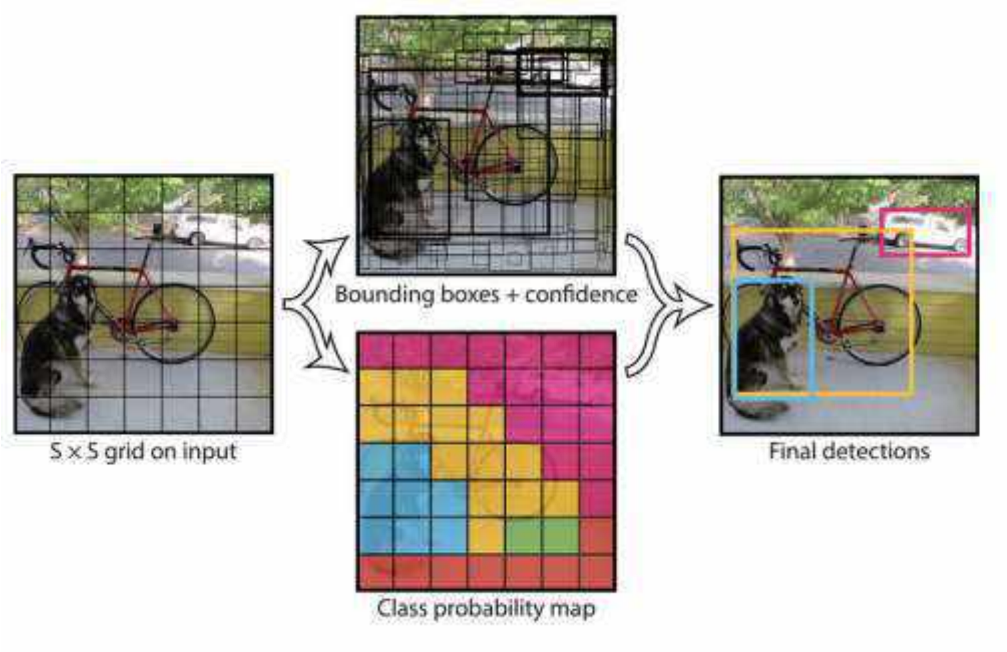


Fig 6.3.1 Generating Bounding Boxes

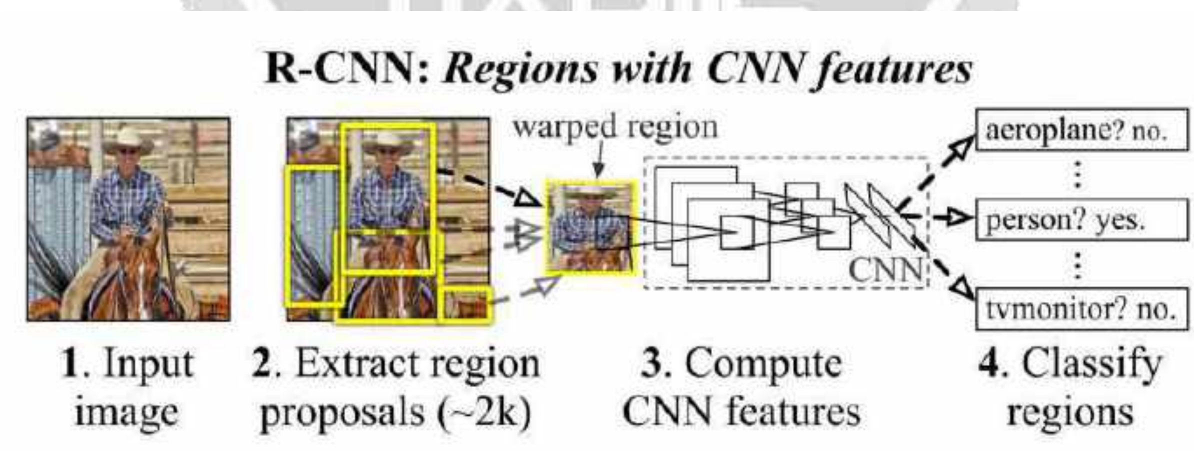


Fig 6.3.2: R-CNN Regions with CNN features

6.4. Object Identification:

After completing all of the aforementioned steps, the image's objects will either be segmented or, if they belong to a different class, will be enclosed in a box with their class name. The time it takes to recognise each object in the image will be reduced because all the objects are easily distinguishable.

7. CONCLUSION

For situations with several comparable items in a non-chaotic backdrop, the investigation of a novel graph-based technique to picture segmentation and object identification has yielded encouraging results. The human body is a complicated multipart object, hence dealing with it presented difficulties. To solve this, an object segregation project was developed, utilizing bounding box regression and the better object identification skills of R-CNN. Visual recognition contests and technology improvements have propelled substantial progress in deep learning-based object recognition. Future studies will concentrate on computational robustness and real-time processing to improve object recognition systems and their applications in various fields.

8. RESULT

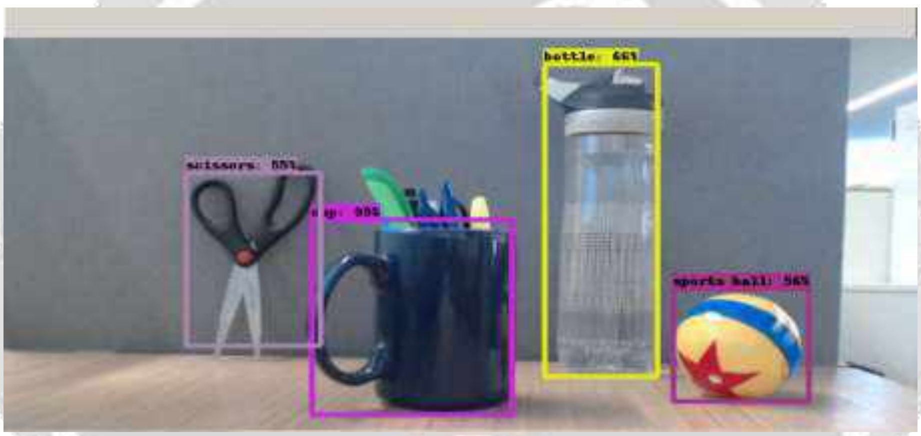


Fig 8.1: Objects identified in an image

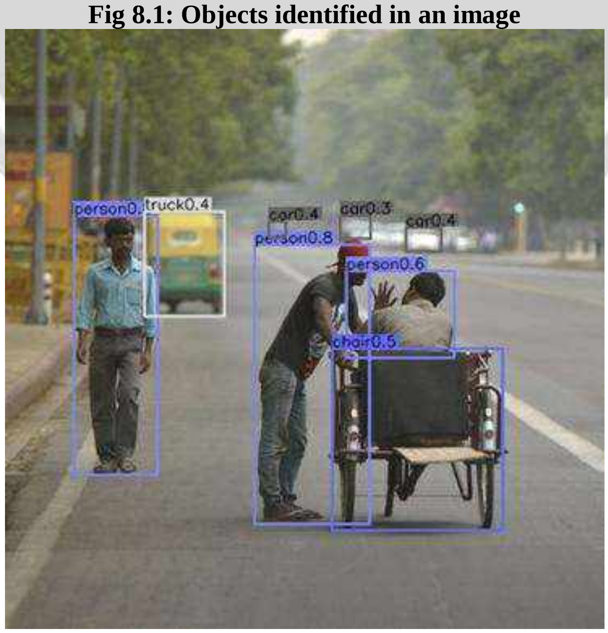


Fig 8.2. Multiple object detection in an image

9. REFERENCES

[1] Jianxin Wu, Gangshan Wu, Xiaohui Xie, et al. Object Segmentation in Images and Videos: A Global Optimization-Based Approach. IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 35, no. 3, pp. 627-641, 2013.
[2] Kaiming He, Georgia Gkioxari, Piotr Dollár, and Ross Girshick. Mask R-CNN. In Proceedings of the IEEE International Conference on Computer Vision (ICCV), 2017.
[3] Liang-Chieh Chen, George Papandreou, Iasonas Kokkinos, et al. DeepLab: Semantic Image Segmentation with Deep Convolutional Nets, Atrous Convolution, and Fully Connected CRFs. IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 40, no. 4, pp. 834-848, 2018.
[4] Jonathan Long, Evan Shelhamer, and Trevor Darrell. Fully Convolutional Networks for Semantic Segmentation. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.
[5] Joseph Redmon, Santosh Divvala, Ross Girshick, and Ali Farhadi. You Only Look Once: Unified, Real-Time Object Detection. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016.
[6] Wei Liu, Dragomir Anguelov, Dumitru Erhan, et al. SSD: Single Shot MultiBox Detector. In Proceedings of the European Conference on Computer Vision (ECCV), 2016.
[7] Abhishek Kar, Shubham Tulsiani, João Carreira, and Jitendra Malik. Category-Specific Object Reconstruction from a Single Image. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.
[8] Olaf Ronneberger, Philipp Fischer, and Thomas Brox. U-Net: Convolutional Networks for Biomedical Image Segmentation. In Proceedings of the International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2015.
[9] Shaoqing Ren, Kaiming He, Ross Girshick, and Jian Sun. Faster R-CNN: Towards Real-Time Object Detection with Region Proposal Networks. In Proceedings of the Neural Information Processing Systems Conference (NIPS), 2015.

DRIVER BEHAVIOR-BASED VEHICLE ACTIVATION SYSTEM WITH DROWSINESS DETECTION

Dr. Selvi M[1], Mohammed Zubair[2], Nagaprasad K R[3], Rahul Rai K J[4], Rakesh P M[5]

[1]Dr. Selvi M, Associate Professor, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[2]Mohammed Zubair, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[3]Nagaprasad K R, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[4]Rahul Rai K J, CSE, RajaRajeswari College of Engineering, Karnataka, India. Rakesh
[5]P M, CSE, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

Our project aims to develop a cutting-edge system that can identify and alert the driver's drowsy or sleepy state while driving. To identify patterns in driver behavior and drowsiness, the suggested method employs computer vision and machine learning algorithms. The framework uses a Raspberry Pi microcontroller unit for equipment execution. The system's three main modules are as follows architecture: data acquisition, recognizing facial landmarks, identifying drowsiness, and activating the vehicle 68 facial landmarks from the driver's face were extracted by the facial landmark detection module using the OpenCV and dlib libraries. The drowsiness detection system makes use of a machine learning algorithm module to classify the driver's state as either active, drowsy, or sleepy based on eye aspect proportion (EAR). The system utilises the Raspberry Pi platform, a camera module, as well as other necessary hardware elements. Modules for obstacle and lane detection, along with facial landmark classification, are comprised of the software implementation. Real-world data was used to evaluate the system's effectiveness, and the results showed that it was able to accurately detect driver drowsiness and prevent accidents. The vehicle's acceleration and braking mechanisms are controlled by the vehicle activation module through H-bridge circuitry. The feasibility analysis of the proposed system suggests that it is a low-cost option that can be easily integrated into automobiles. The framework's practical and non-useful prerequisites have been plainly characterized to guarantee its proficient activity and dependability. To make the system more effective, easier to use, the steps for assembling the hardware and installing the software have been improved. In conclusion, the proposed system offers an effective method for avoiding collisions brought on by impaired driving. The system's ability to accurately detect drowsiness is demonstrated by the project's outcomes. Obstacle detection and lane detection are two potential future additions that could increase driver safety.

Keywords: - *Drowsiness Detection, Driver Behavior, Computer Vision, Machine learning, etc….*

---

1. INTRODUCTION

The "Driver Behavior-Based Vehicle Activation System with Drowsiness Detection" is a sophisticated driver assistance device designed to enhance road safety by detecting the driver's drowsiness and preventing accidents caused by driver fatigue. The system uses facial landmarks drowsiness in the driving, and it can alarm the driver if necessary and activate self-driving if the driver is becomes sleepy. Python, OpenCV, and DLib modules are utilized in the Raspberry Pi implementation of the apparatus. A is a Raspberry Pi low-cost, small, and energy-efficient computer that serves as a flexible platform for software development and hardware interfacing. Popular open-source computer vision libraries for image processing, feature extraction, and machine learning are OpenCV and DLib. The device is designed to run in real-time, using a camera installed in the vehicle to capture images of the driver's face. The facial landmark detection algorithm identifies 68 specific points on the face, such as the eyes, nose, and mouth, and measures their position and orientation. The system then uses these measurements to detect the driver's drowsiness by monitoring their blinking frequency and head position.

2. EXISTING SYSTEM

Existing self-driving systems generally rely on GPS, mapping data, and pre-programmed algorithms to control the vehicle. While These systems can function independently in specific environments, such as highways or low-traffic urban areas, they struggle to handle complex scenarios requiring human intuition and decision-making. Furthermore, there are instances where the driver may wish to take control of the vehicle, such as when they encounter an unexpected obstacle or need to make a quick maneuver.

The following mechanisms/techniques utilised in existing systems to allow a vehicle's self-driving mode:

2.1 Sensor Fusion

Using a number of sensors, including cameras, radar, and lidar, this method creates a thorough picture of the area around the vehicle. Self-driving systems can more precisely detect and react to roadblocks by combining data from various sensors.

2.2 Machine Learning

Artificial intelligence known as machine learning allows self-driving systems to gain knowledge from their past experiences and develop over time. By training on large datasets of real-world driving scenarios, self-driving systems can learn to recognize patterns and make better decisions on the road.

2.3 Mapping and Localization

Self-driving systems also rely on detailed maps and localization techniques to navigate the road. By comparing sensor data to pre-existing maps of the area, self-driving systems can accurately locate themselves on the highway and plan a safe and efficient route.

2.4 Control Systems

The actual steering, braking, and other motions of the automobile are controlled by the control systems. Self-driving systems use sophisticated control algorithms to safely and efficiently maneuver the vehicle on the road.

In paper [1], Drowsiness and driver fatigue have been linked to road traffic incidents throughout the years. A real-timedrowsiness detection and an artificial intelligence system algorithm to identify drivers' fatigue and sleepiness at an early stage are required to minimize road traffic injuries and death instances. For an in-vehicle surveillance and security system, this study suggests an autonomous region-of-interest selection-based layered spatiotemporal convolution-long short-term memory (Conv LSTM) sleepiness detection neural network. In order to choose the region of interest on the human face, Haar Cascade classifiers are utilized. To extract spatiotemporal information from the chosen region of interest and to foretell the driver's level of tiredness, a ConvLSTM model is applied.

In paper [2], P. Nandhini, S. Kuppuswami, S. Malliga, P. Srinath, and P. Veeramanikandan proposed a system, in which Traffic accidents claim the lives of many people. One of the principal contributors to traffic fatalities and accidents is sleepy driving. Major accidents frequently include weariness and little naps while driving as their primary causes. Early signs of sleepiness can be recognized before a harmful situation occurs. The vast majority of traditional methods for identifying drowsiness are grounded in behavioral elements. To be able to determine if drivers are sleepy, a lightweight real-time sleepiness detection a deep learning model technique is deployed. Based on an adaptive threshold method, the system recognizes facial landmarks to check if the driver is tired. This model may be put on a Raspberry Pi to be monitored in real time. The buzzer warning will sound according to the output's threshold value.

According to the paper's authors [3], the vast majority of automobile accidents worldwide are caused by drowsy drivers. Therefore, driver sleepiness detection, which can assist us in reducing numerous road accidents, is the most Crucial preventative measure for these incidents. This article aims to create a Sleepiness Detection System that uses an alarm to notify the driver if the driver's eyes are not open any more than a few seconds. Deep learning it is in this studyto suggest a new frame for classifying the driver's eye as open or closed. At the point when a not entirely set in stone is drowsy, the proposed framework sounds a signal on arriving at a specific immersion point of the tiredness measure.The proposed work is assessed on a huge piece of MRL eye dataset comprising 48000 pictures and it shows a precisionof 86.05% utilizing the CNN model.

In paper [4] the authors discussed that among the most significant contributors to traffic collisions are driver fatigue and drowsiness. Automated driving fatigue detection is an important problem within computer vision because drowsy driving accidents have resulted in the deaths of millions of people over the past few years. A Convolutional Neural Network (CNN) and deep learning-based real-time driver fatigue detection system is implemented to address this issue. In the proposed technique, tiredness recognition is handled as an article discovery and arrangement task. In this strategy, the location and limitation facial of locale is finished utilizing the YOLOv3 ongoing item recognition calculation, while the Commencement v3 pre-prepared brain network is utilized to group the distinguished face as either tired or non-sluggish. The profound learning model was prepared and tried on the standard datasets: a custom database, the National Tsing Hua University's (NTHU) database for driver drowsiness detection, and the Closed Eyes in the Wild (CEW) database. On the three databases, the proposed method achieves an accuracy of 80.32 percent, 79.34 percent, and 89.90 percent, respectively. The proposed framework can handle the info video transfer continuously with no costly equipment like GPUs and subsequently is computationally proficient and financially savvy, since it can deal with an approaching video transfer progressively, on an independent gadget, without the requirement for any costly equipment support. Additionally, face feature extraction, which is a common step in most vision-based drowsiness detection systems, is not used in the adopted method, making the model effective without sacrificing prediction speed or accuracy.

3. PROPOSED SYSTEM

To address the challenges of existing systems, we suggest a system that utilizes real-time camera data to keep an eye on the driver's behavior and activate the self-driving mode when appropriate. The system includes a camera installed on the vehicle's dashboard, which captures images of the face of the driver, and analyzes them using computer vision algorithms The suggested technology seeks to identify tiredness in drivers and activate the self-driving mode of the vehicle in order to prevent accidents caused by driver fatigue. If the system detects that the driver is becoming fatigued, distracted, or disengaged, it will activate the self-driving mode to ensure the safety of the driver and other road users.

Figure-1 illustrates the system architecture of our proposed system. The device uses facial landmarks, which are key points on a person's face, to ascertain whether the motorist is drowsy. Specifically, the system uses 68 facial landmarks to analyze the driver's face and track changes in face-expressions that could signify drowsiness, such as drooping eyelids or a slack jaw. Once the system detects signs of drowsiness, the system will alert the driver of a vehicle by displaying drowsy on the screen. And for the sleepy state, we have 2 modes in order to activate the self-driving of the vehicle and to completely stop the vehicle.

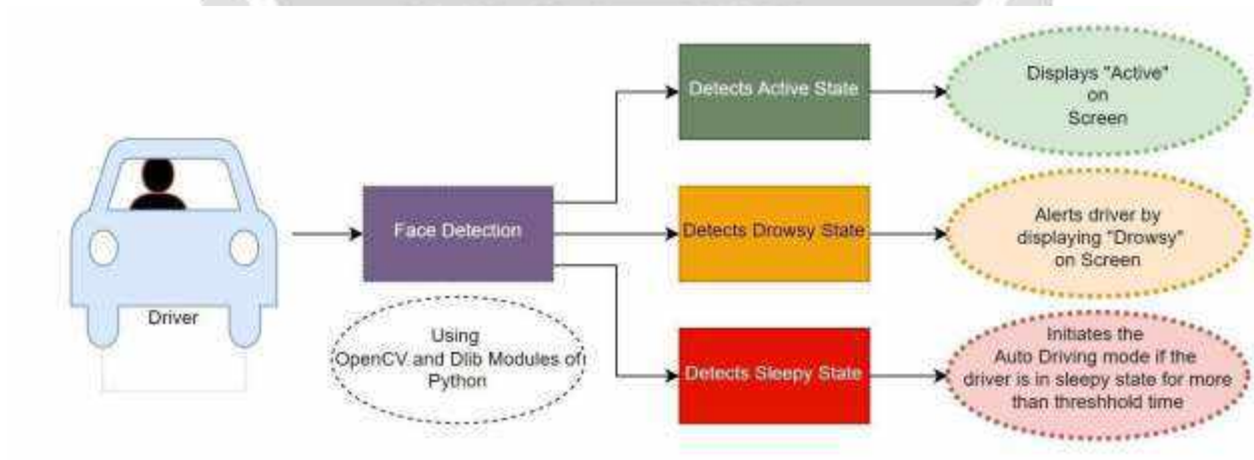


Fig-1: System Architecture

3.1 Data Flow in Proposed System

Figure-2 goes into more detail about the data flow in our suggested system. The data flow diagram is fairly selfexplanatory; the input is taken directly from the camera mounted over the dashboard of the car, and based on the input, a drowsiness detection algorithm is applied over the data frames obtained through a live feed. The output of this algorithm is either an active state or a drowsy state that, if observed for an extended period of time, progresses to a sleepy state. In order to prevent accidents caused by drowsy drivers, our system will either activate the selfdriving mode or stop the car entirely when the sleepy condition arises.

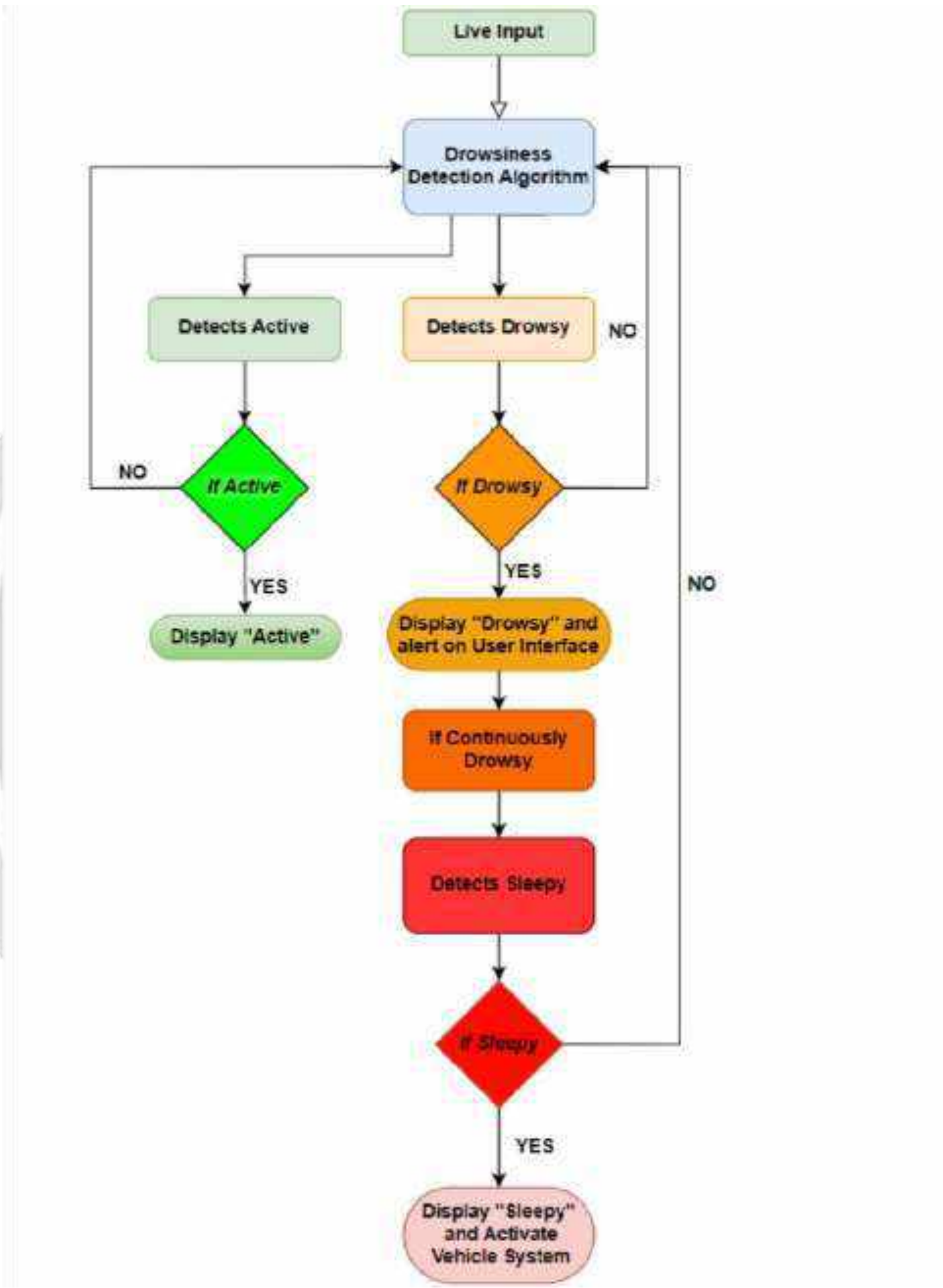


Fig-2: Data Flow Diagram of Proposed System

4. IMPLEMENTATION

4.1 Algorithm:

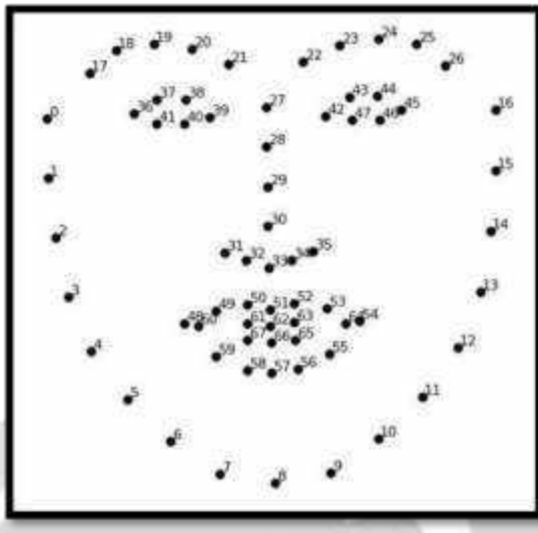


Fig-3: Sample of 68 Facial Landmarks

Figure 3 is a summary of the 68 facial landmarks that are utilised by the algorithm tiredness Detection based on Facial landmarks to analyse the tiredness of drivers using a camera positioned over the vehicle's dashboard.. Overall, the apparatus is designed to improve road safety by preventing incidents brought on by drivers fatigue, which is a typical problem on long drives or during latenight trips. By detecting drowsinessand activating self-driving mode, the system can ensure that the vehicle continues to travel safely despite the driver's inability stay alert and focused.

5. RESULTS

Here are a few of the snapshots of our project. Figure 4 demonstrates the 68 facial landmarks, Figure 5, 6, and 7are the states detected by Facial Detection Algorithm and those are Active, Drowsy and Sleepy state respectively

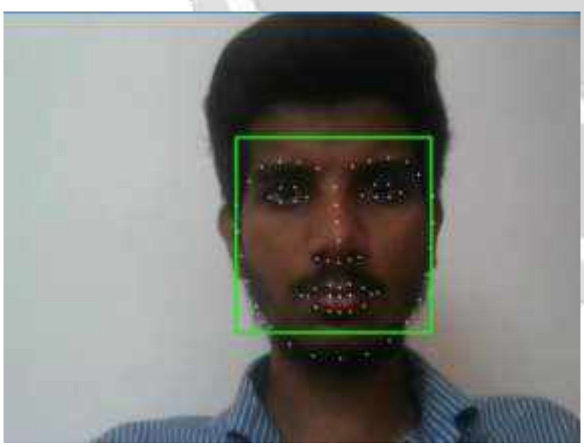


Figure-3: 68 Facial Landmarks

Figure-4: Active State

Figure-5: Drowsy State

Figure-6: Sleepy State

6. CONCLUSIONS

In conclusion, the Driver Behavior-Based Vehicle Activation System utilising Drowsiness Detection was proposed isa successful implementation that makes computer vision usage and machine learning to identify the driver's condition and take appropriate action. 68 facial landmarks are extracted and the driver's Sleepiness is noted by the system, which incorporates the OpenCV and dlib Python libraries. The playsound Python module is the system's method of sound whenever the driver is drowsy. A Raspberry Pi, a camera module, and a motor driver module control the vehicle in the hardware assembly. The Raspberry Pi must be equipped with the necessary Python libraries and modules before the software can be installed.

The outcomes of this project demonstrate promising outcomes and can serve as a foundation for future enhancements, despite the system's existence has limitations and room for improvement. The addition of lane detection and obstacle detection the system might be one way to make it a more complete driver assistance system. Generally speaking, the Driver Conduct-Based Vehicle Actuation Framework with Tiredness Discovery can possibly increment street security and forestall mishaps brought about by driver sleepiness.

7. FUTURE WORK

The driver behavior-based vehicle activation system's overall safety can be enhanced by including lane and obstacle detection. By recognizing obstructions out and about, the framework can caution the driver and even make restorative moves, for example, applying brakes or dialing back the vehicle. Similarly, lane detection can prevent accidents caused by lane drift by ensuring that the vehicle stays in its lane. To add these functionalities, the framework can utilize different sensors like ultrasonic sensors, LiDAR sensors, and cameras. Obstacle detection can be accomplished with ultrasonic sensors, while lane detection can be accomplished with cameras. AI calculations can be prepared on the camera feed to distinguish path markings and caution the motorist in the event that the vehicle floats out of its path. Thesystem can also be integrated with GPS and navigation systems to provide real-time traffic updates and suggest alternate routes to get around roadblocks or congested areas. The system's safety and effectiveness may also be enhanced by this. Overall, these improvements can make the driver behavior-based vehicle activation system safer, more effective, and more reliable, making it a more complete transportation solution.

8. REFERENCES

[1] Muhammad Saif Basit, Usman Ahmad, Jameel Ahmad, Khalid Ijaz, Syed Farooq Ali, " Driver Slumped Driving Detection with Region-of-Interest Selection Based Spatio-Temporal Deep Convolutional-LSTM", international symposium on in 2022 Open Source Systems and Technologies (ICOSST)

[2] P. Nandhini, S. Kuppuswami, S. Malliga, P. Srinath and P. Veeramanikandan, "Driver drowsiness detection using deep learning", 2022 6th international symposium Computing Methodologies and Communication (ICCMC), pp. 1031-1036, 2022.

[3] Y. Suresh, R. Khandelwal, M. Nikitha, M. Fayaz and V. Soudhri, "Driver drowsiness detection using deep learning", 2021 2nd international symposium on Smart Communications and Electronics (ICOSEC), pp. 1526-1531, 2021.

[4] A. Biju and A. Edison, "Drowsy driver detection using two stage convolutional neural networks", 2020 IEEE Modern Developments in Intelligent Computational Systems (RAICS), pp. 7-12, 2020.

[5] S. Ansari, F. Naghdy, H. Du and Y. N. Pahnwar, "Driver mental fatigue monitoring based on the head posture using new modified relu-bilstm deep neural network", IEEE Transactions on Intelligent Transportation Systems, vol. 23, no.8, pp. 10957-10969, 2022.

[6] A. K. Biswal, D. Singh, B. K. Pattanayak, D. Samanta and M.-H. Yang, "Iot-based fatigue detection", Comput., vol. 2021, pp. 6627217:1-6627217:13, 2021.

[7] S. Cheamanunkul and S. Chawla, "Fatigue recognition using eye aspect ratios", 2020 ICSEC, pp. 1-4, 2020.

[8] K. B. R. Teja and T. Kumar, "Real-time Fatigue recognition using dnn", 2021 5th International Conference on Trends in Electronics and Informatics (ICOEI), pp. 1026-1030, 2021.

[9] V. Yarlagadda, S. G. Koolagudi, M. Kumar M V and S. Donepudi, "Driver fatigue recognition using rnns with lstm", 2020 IEEE 17th India Council International Conference (INDICON), pp. 1-7, 2020.

[10] S. Mehta, P. Mishra, A. J. Bhatt and P. Agarwal, "Ad3s: using AI calculations", 2019 ICIIP, pp. 108-113, 2019.

5G ANTENNA DESIGN FOR WLAN APPLICATION

Shashi Ranjan[1], Siddalingappa gouda Biradar[2], Chiranjeevi C M[3], Swetha B V [4]

[1]Department of ECE, Don Bosco Institute of Technology, Bangalore, Karnataka, India Email: drshashiranjan.phd@gmail.com**
*[2]Department ECE, Dayananda Sagar Academy of Technology and Management, Bangalore, Karnataka, India*Email: siddubbiradarr@gmail.com***
*[3]Department of ECE, Don Bosco Institute of Technology, Bangalore, Karnataka, India***Email:chirucm13@gmail.com*
*[4]Department of ECE, Don Bosco Institute of Technology, Bangalore, Karnataka, India**** Email:swethabvgowda@gmail.com*

ABSTRACT

The most popular wireless distribution protocol for local area network communication is WLAN. This article covers a ground plane-equipped, high-gain, single-band microstrip antenna that is printed on FR-4 substrate and measures 29.2 x 29.2 x 1.6mm3. The proposed patch antenna design has a return loss of -39.008dB and covers the 2.4GHz frequency range. The simulation was carried out using ADS 2014. Additionally, the antenna's design is intendedto provide high performance and a fantastic option for WLAN applications.

1. INTRODUCTION

In this letter, a simple microstrip patch antenna is A microstrip patch antenna configuration consists of two sides: one side of dielectric and other side on ground plane. The conductors ofpatch are usually made of copper and sometimes in gold which can be of any shape. However,regular shapes are normally used for simplification of analysis and performance prediction. Onthe dielectric substrate, the radiating elements and the feed lines are photo etched. [1] Square, circular, rectangular elliptical or other irregular shapes are some of the radiating patch. But most commonly used shapes are square, rectangular and circular due to its fabrication and easeof analysis. Microstrip patch antennas have numerous advantages such as

- Low profile, low volume.
- Fabrication cost is low.
- Mass production.

Simple feed can provide easy linear and circular polarization Integration of MIC is easy Patchantennas can be used in variety applications from military to commercial, because of their easeof design and fabrication. Due to the rapid developments in wireless communication, the WLAN plays a vital role for short distance communication and also users can access internet in their portable devices by using 3G/4G through the WLAN. Because it is recognized as a costeffective with high speed data connectivity and communication network in the world. Many types of WLAN standards are available in market.

The 802.11a usually found in business network due to its higher cost. The 802.11 groupannounces the WLAN covered frequencies are 2.4 GHz, 3.6 GHz, 4.9 GHz, 5 GHz, and 5.9 GHz. Due to modern developments in WLAN standard, the application can extended from home networks to large buildings, hotels, food courts and also for portable devices like mobile phones, tablets and others. This paper presents a novel design of a patch antenna for WLAN applications. The proposed design will operate on the frequency of 2.4 GHz range. The proposed patch antenna design is for 802.11b/g/n. The paper is organized as follows: Section II describes the principle of antenna design and its geometry; Section III presents the results ofpatch and its discussion and section IV describes the conclusion of this paper.

2. ANTENNA DESIGN

The final design of the proposed antenna is shown

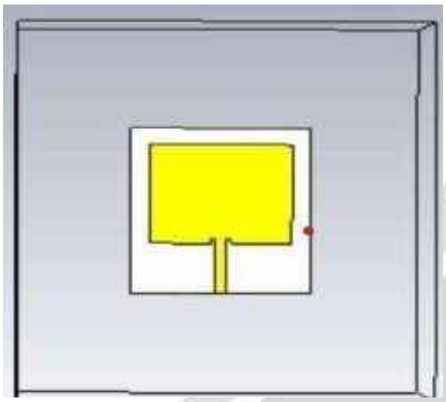


Fig-1 2.4 GHz patch antenna front view

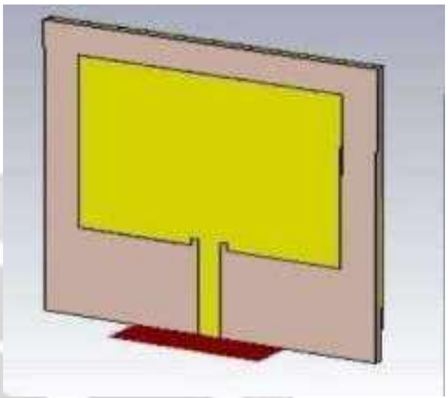


Fig- 2 2.4GHz patch antenna side view

Parametric Table

Name	Expression	Value
antx	3.35	3.35
anty	2	2
wfx	0.77	0.77
wx	6	6
wy	7	7

Table-1 Parametric Table

Using a feed line, one can stimulate radiation by direct or indirect contact. The most common feeding strategies include Inset feed, coaxial probe feed, microstrip line, aperture coupling, andproximity coupling. There are other other feeding methods as well. We constructed an inset feed patch antenna in this research. The patch antenna was previously fed at the very end. Given that this often results in high input impedance, the feed has now been changed as depicted in Fig. 1. If the patch was fed closer to the centre, the input impedance (Z=V/I) would be lower since the current in a half wave patch is low at the ends and grows in amplitude towards the centre. Using an inset feed (a distance R from the centre of the patch was fed closer to the centre, the input impedance (Z=V/I) may be decreased. Utilizing an inset feed (a distance R from the end), as seen in figure, is one way to do this. In this paper, a 2.4GHz microstrip inset feed patch antenna that may be used for both receiving and transmitting is suggested.

Simulation Results OF 2.4GHz Patch Antenna

S11 Parameter

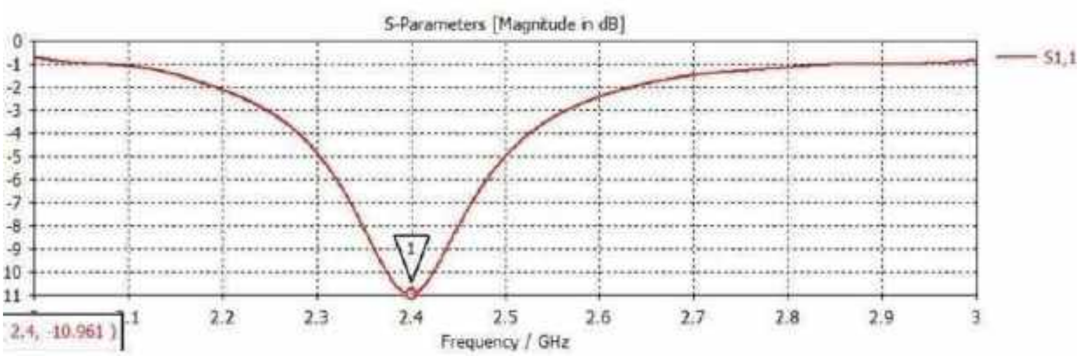


Fig-3 S11 Parameter

VSWR

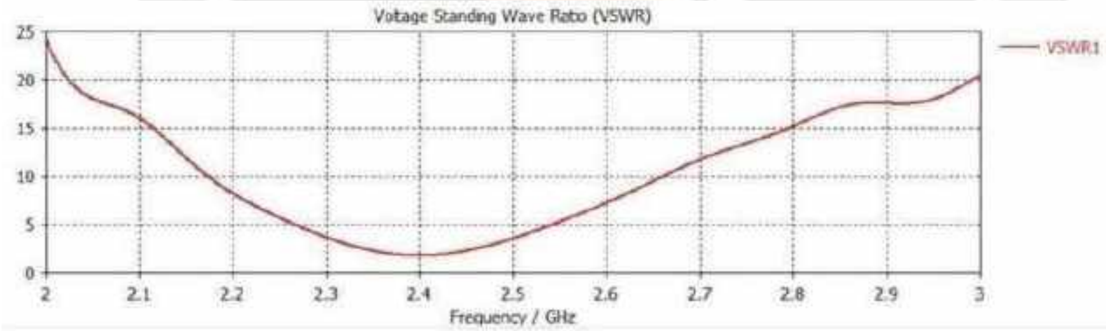


Fig-4 VSWR

The following variables must be taken into consideration when analysing the suggested antenna: Radar pattern and return loss. The ADS programme is used to carry out the antenna design and for the suggested design, momentum microwave optimisation is favoured here. Thesubstrate editor came after the patch design, which was completed in the matching workspace offered by the software. Typically, a microstrip antenna consists of three components: a patch,a substrate, and a ground plane. The patch antenna can be quickly created in the workspace using the coordinate values. The return loss, which is represented by the symbol S11, is a measurement of forward and reflected power.

Far fields 2D Results

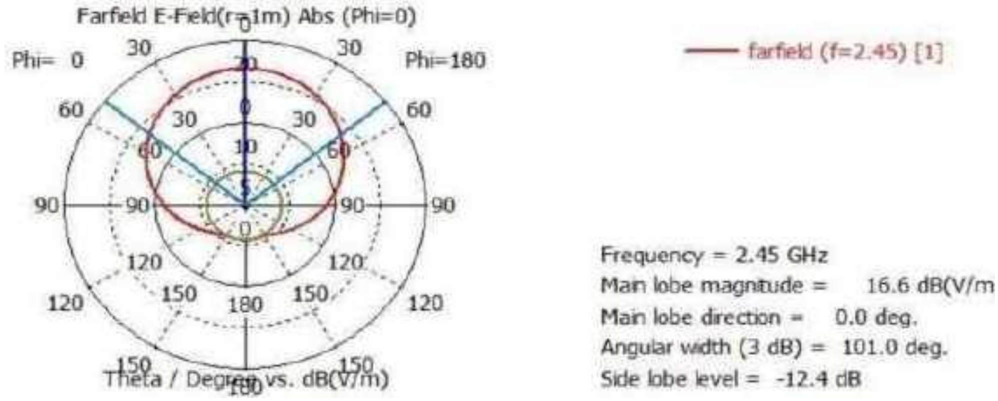


Fig-6 2D Results

3D Results

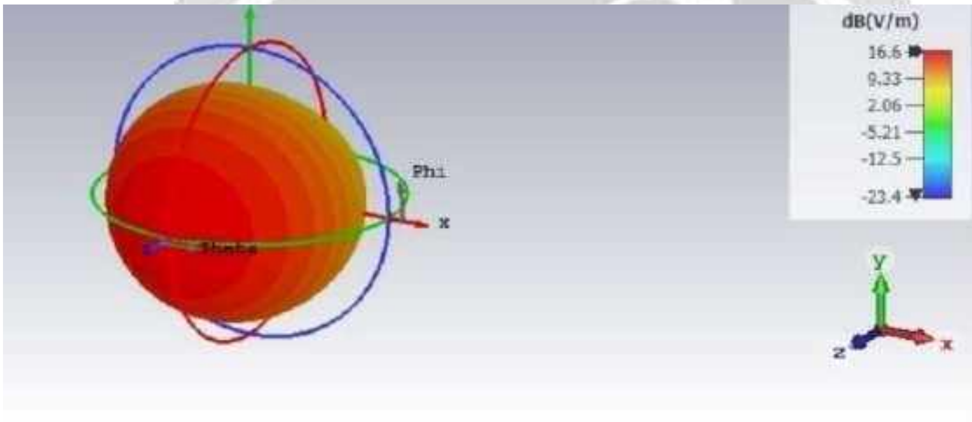


Fig-7 3D Results

The square patch's maximal directivity occurs in the direction perpendicular to the patch whenit is energized in its basic mode. When moving away from the 1198 broadside and towards lower elevations, the directivity decreases. Figures 4 and 5 depict the proposed antenna's polar plot and 3D radiation pattern at 2.4GHz, respectively. According to the simulation results, theproposed patch antenna has a directivity of 6.285 dB and a radiation efficiency of 68.65%, meaning it can radiate nearly 70% of the power.

3.CONCLUSIONS

Agilent's ADS EDA tools are used to develop an inset feed microstrip patch antenna that can broadcast and receive 2.4GHz signals. Through the design of a square patch, we were able to achieve in this article appealing radiation properties and minimal cross polarization radiation. The copper metal is selected, having a thickness of 1.4 mm and a conductivity of 5.8E7s/m. design with the (L, W, and H) dimensions and (l, w) dimensions of the inset feed line are shown in Table 1. The planned antenna has a 4.65dB gain and a 36.57dB return loss. The direction perpendicular to the patch is where the square patch's directivity is greatest when excited in its fundamental mode. From the simulation findings, the proposed patch antenna's directivity.

4. REFERENCES

[1]. Morgado A.H., Kazi Mohammed Saidul, Mumtaz Shahid, Rodriguez Jonathan - A survey of 5G technologies: Regulatory, standardization and industrial perspectives, Digital Communications and Networks (2018) .

[2.] Ali M.M.M., Osama H., Saleh A. - Design of a dual-band printed slot antenna with utilizing a band rejection element for the 5G wireless applications, 2016 IEEE International Symposium on Antennas and Propagation (APSURSI), IEEE (2016) .

[3.] Li J., Luo M.H., Liu H. - Design of a slot antenna for future 5G wireless communication systems, 2017 Progress in Electromagnetics Research Symposium-Spring (PIERS), IEEE (2017).

[4].Hannachi C. and Tatu S.O. - Performance comparison of 60 GHz printed patch antennas with different geometrical shapes using miniature hybrid microwave integrated circuits technology, IET Microwaves, Antennas & Propagation 11 (2017).

[5.] Ali M.M.M., Osama H., Saleh A. - Design of a dual-band printed slot antenna with utilizing a band rejection element for the 5G wireless applications, 2016 IEEE International Symposium on Antennas and Propagation (APSURSI), IEEE (2016).

[6.]D.C. Cox, “Fundamental limitations on increasing data rate in wireless systems,” IEEE Communications Magazine, vol. 46, no. 12, pp. 16-17, Dec. 2008.

[7].Duong Thi Thanh Tu, Nguyen Gia Thang, Nguyen Tuan Ngoc, Nguyen Thi Bich Phuong, Vu Van Yem - 28/38 GHz dual-band MIMO antenna with low mutual coupling using novel round patch EBG cell for 5G applications, 2017 International Conference on Advanced Technologies for Communications (ATC), IEEE (2017).

A WIRELESS ECG MONITORING DEVICE

Basavaraj V[1], Lavanya S[2]

[1] Student, Biomedical Engineering Department, ACSCE, Karnataka, India
[2] Student, Biomedical Engineering Department, ACSCE, Karnataka, India

ABSTRACT

Electrocardiogram (ECG) measure the electrical activity of heart and helps to diagnose various abnormalities governing cardiac activity of the heart. Wireless monitoring of Electrocardiogram (ECG) can help to analyze, classify various cardio vascular diseases and prevent CVDs to great extent. A wearable ECG monitoring device made by using IoT devices can reduce the complexity of device. IoT devices such as micro controller, AD8232 Sensor is used for precise and easy application and Bluetooth devices to send the data wirelessly to other devices. A 6 lead belt system developed by considering the Einthoven triangle is employed to improve the accuracy of signals and to improve the comfort of the patient. In order to eliminate the use of AC power supply which limits the wireless objective of the project, a 3.7v rechargeable DC batteries are used to power the circuit. These batteries can provide a backup of minimum 6 hours depending on the use and can be recharged using USB charging system within 8 hours. The belt developed is made elastic so that it can be used by people with different size and age as well. After receiving the signal, the system uses an adaptive noise filtering algorithm to remove artifacts. The ECG sensors collect the potential from the leads non-gel electrodes which are sent wirelessly using Bluetooth HC-05 module. A software called Real term ECG is employed to filter and store the signals. From this software we can develop the result of 6 lead ECG which can be stored in defined cloud platform or SD card storage. The stored data can be compared with the reference data and check the accuracy of the output in excel sheet itself. This prototype is a small size, wireless, less expensive wearable system to detect and display Electrocardiogram (ECG).

Keyword: - *wearable, wireless, real term, Einthoven triangle etc….*

---

1. INTRODUCTION

Heart is a vital organ for blood pumping and circulation throughout the body. The pumping of blood occurs in 4 chambers i.e., Right auricle, Right ventricle, left auricle and Left ventricle. The pumping action is initialized by rhythm development due to change in electric potential in the Sino-atrial node. The normal heart rate for human being is 72 beats per minute. The whole electrical activity can be understood by measuring and analyzing the electrical signals. Electrocardiograph is the device which can be used to measure electrical activity from the electrical axis vector projection. Holter monitors, Treadmill test, Wearable device are also used to measure ECG.
Wearable devices are the latest form of ECG monitors for easy application and analysis of ECG signals. The person/patient can wear the device in the chest region with the support of shoulder or wrist region and with the help of suitable monitor., they can visualize the signal. Nowadays the wearable systems are made wireless with the help of Bluetooth module as well as suitable micro-controller. In this paper, a wearable and wireless ECG monitoring belt system is developed by using ECG sensor AD8232, Bluetooth module HC-05, ECG leads, Non-gel electrodes, Lithium ion batteries and Real term ECG software to process and store the signals.
The system developed is 6 lead system with belt apparatus and ECG signals from time interval of 10 secs to 3 hours' duration can be produced in single use. People of different age group can wear this device to monitor ECG in their home itself. The lithium ion batteries can be recharged using USB charger.
Overall this is a small, wearable, flexible, inexpensive and wireless device to monitor and store ECG.

2. METHODOLOGY

The developed system works on the following methodology. During the ECG monitoring the person wears the device attached to his chest and belt supported to his shoulders. The ECG leads collect the potential which are placed based on Einthoven triangle vector. The reference signal i.e., the reference potential will be supplied by the software itself.

The ECG sensor AD8232 will accept the potential and convert into suitable electrical signal to the micro controller. The signals will be processed and sent to mobile device i.e., android phone or computer system through Bluetooth connection. The micro controller runs under DC power supply. The ECG data which is sent by Bluetooth device is received and further processing takes place. By using suitable algorithm, the signal is filtered to remove artifacts. The artifacts constitute muscle noise, device noise, body movements, etc. which can be removed by applying suitable high pass and low pass filters. All the filtering takes place in the real term software itself. The clear and processed can either be classified for abnormalities or can be simply displayed in the monitor. The processed signals can be recorded using cloud storage platform or secondary storage devices such as drives, hard disks, SD cards, etc. This is the defined methodology of wireless ECG monitoring system.

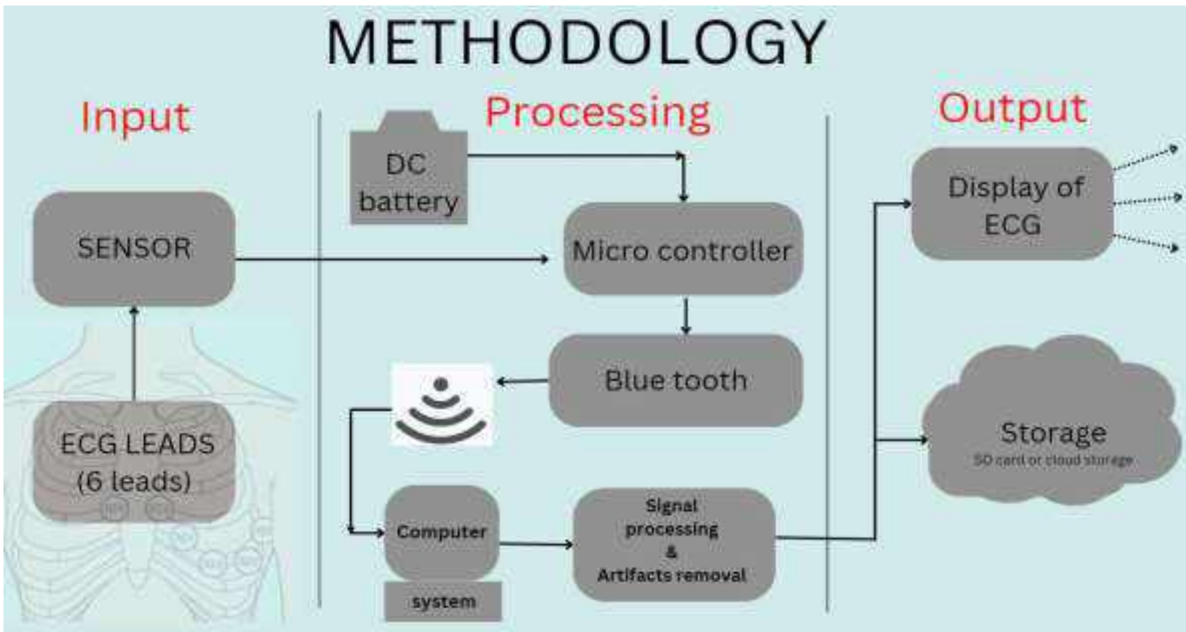


Chart -1: Methodology of the device

Fig -1: Complete Wireless ECG Monitoring apparatus

2.1 Acquisition

The ECG leads are placed in 6 defined chest regions which governs projection of electrical axis vector of the heart. The signals are collected by electrodes and leads are transferred to ECG sensor. The AD8232 ECG sensor is

powered by 3.7v rechargeable lithium ion battery of capacity 2500 mAh. The signal acquisition sensor is connected to Bluetooth module HC-05 module through RX0 and DX0 connections.
The Bluetooth module is also connected to lithium ion battery of capacity 2000 mAh to power the module. This Bluetooth device is set up by linking the device in control panel section of computer. Later the port connection can be checked in device manager.

Table -1: Components specification table

Sl No	Item Name	Power specifications	No. of items
1.	ECG Sensor	3.7v	2
2.	Bluetooth Module HC-05	3.7v	1
3.	Electrodes	-	6
4.	Lead connections	-	6
5.	Lithium ion Batteries	3.7v, 2500 mAh	2
6.	Chest Belt	-	1
7.	Connecting wires	-	few

2.2 Processing

Introduction The Real term ECG software intakes the ECG signals through Bluetooth connection. This is done by opening the required port to which Bluetooth is connected in the port selection of Real term software. Then the software processes the signal by amplifying and converting the data into required digital form.
The path for the storage of data can be specified and the data capture can be initialized. The blinking of light in the software window ensures the device is processing the data successfully. After some duration one can stop capturing the data which will be stored in specified folder and disk. This software helps to process the obtained signals, convert the data into binary, ASCII, hex form of data by suitable file extensions.

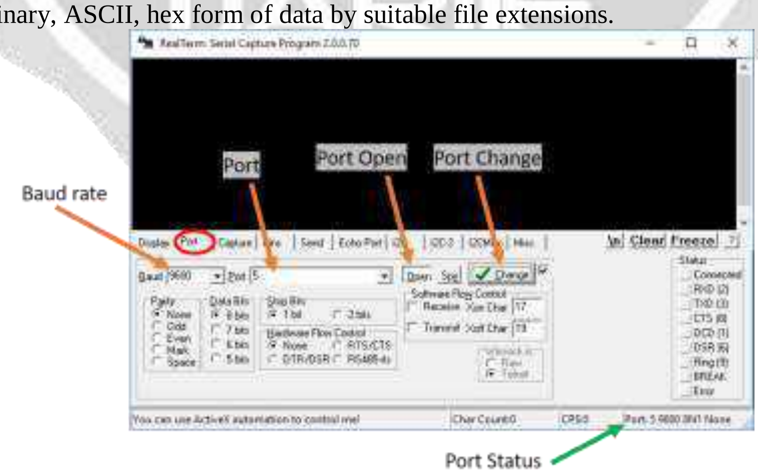


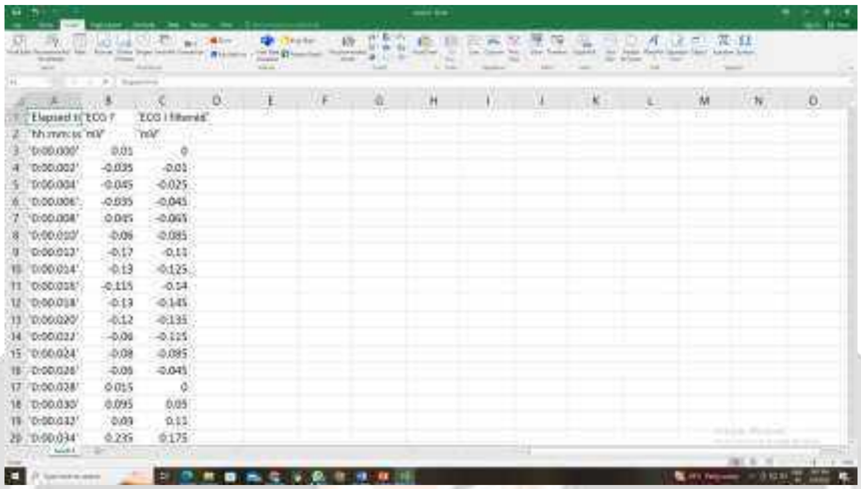
Fig -2: Real term software

2.3 Post processing

After acquisition and processing of data signals will be stored in the specified folder. Usually the data is stored in MS excel sheet for easy visualization by using .csv file extension. The data will be developed for every millisecond for millivolt value.

Some interval of data is selected and plotted into 2-D line chart to see the ECG waveforms. The reference data which can be collected can be from hospitals can be used along with data obtained from the device to check the precision of data and also to compare between two data.

This data can be stored in any cloud platform for accessing and monitoring the data.



	A	B	C
1	'Elapsed ti	'ECG I'	'ECG I filtered'
2	'hh:mm:ss	'mV'	'mV'
3	'0:00.000'	0.01	0
4	'0:00.002'	-0.035	-0.01
5	'0:00.004'	-0.045	-0.025
6	'0:00.006'	-0.035	-0.045
7	'0:00.008'	0.045	-0.065
8	'0:00.010'	-0.06	-0.085
9	'0:00.012'	-0.17	-0.11
10	'0:00.014'	-0.13	-0.125
11	'0:00.016'	-0.115	-0.14
12	'0:00.018'	-0.13	-0.145
13	'0:00.020'	-0.12	-0.135
14	'0:00.022'	-0.08	-0.125
15	'0:00.024'	-0.08	-0.095
16	'0:00.026'	-0.06	-0.045
17	'0:00.028'	0.015	0
18	'0:00.030'	0.095	0.05
19	'0:00.032'	0.03	0.11
20	'0:00.034'	0.235	0.175

Fig -3: Data stored in excel sheet

3. Results and Discussion

The person wears the device properly and connects the leads to the electrodes according to the holes in the belt. The sensor and Bluetooth module is connected to battery to switch on. The blinking of light can be seen by which the whole device in working state can be confirmed. In the desktop system or other display device the Bluetooth device must be linked and Real term software window must be opened. The port access must be established original output waveform can be seen in MS Excel sheet itself by plotting the data of selected intervals into graph chart. The ECG waveforms can be seen with sharp QRS complexes.

Fig -4: Device after wearing

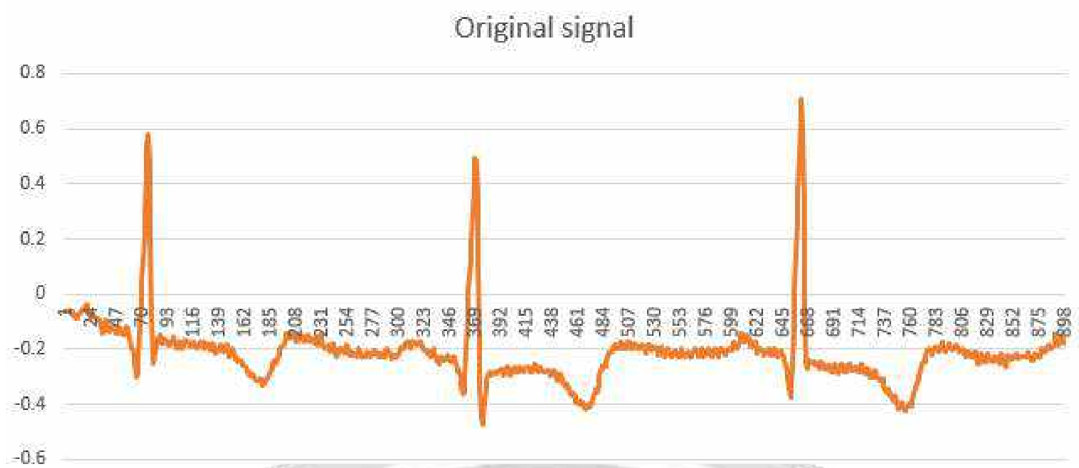


Chart -2: ECG signal from original data

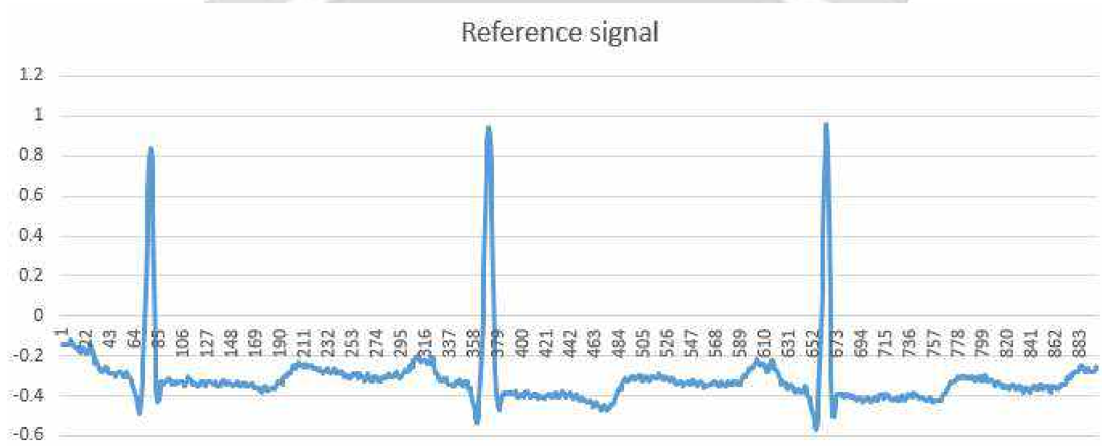


Chart -3: ECG signal from Reference data

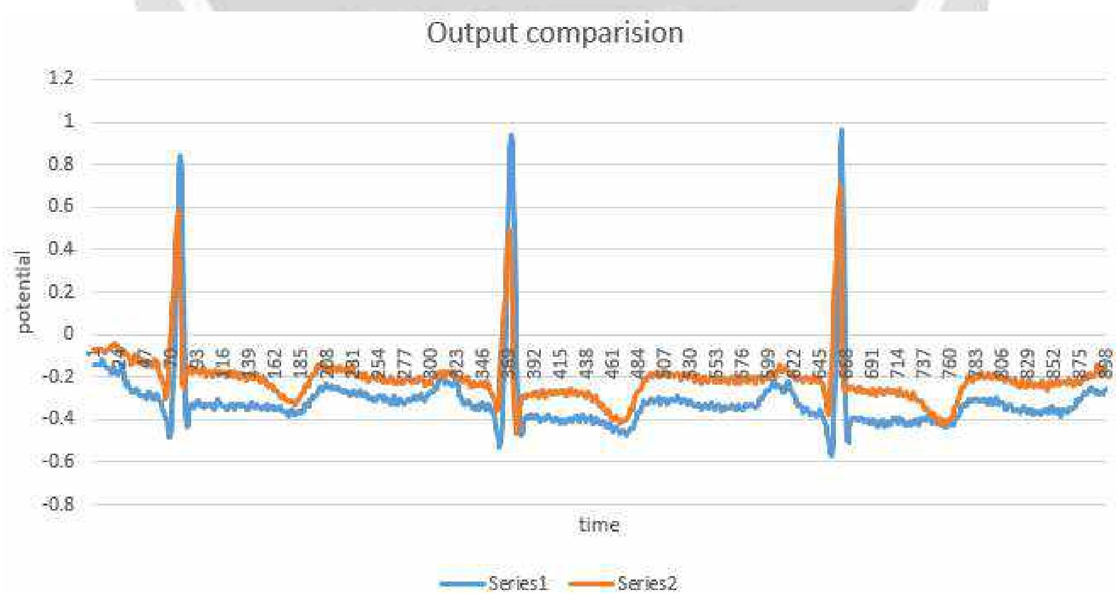


Chart -4: Comparison of both Original and Reference data

4. ADVANTAGES AND DISADVANTAGES

Advantages of the device are that Compact device with wearing made comfortable, 6 lead system which gives high accuracy of ECG output, Rechargeable DC batteries using USB cable for repeated use, Adjustable positions for placement of electrodes, Cloud storage of data and easy display using excel sheet, Affordable cost for household purposes.

Some of the disadvantages include Solid projection of Bluetooth sensor which can create artifacts, 2 step data conversion into waveform, Maintenance of the device and Requirement of reference data to check accuracy.

5. CONCLUSIONS AND FUTURE SCOPE

A wearable ECG monitoring system is designed based on the derived methodology. The processed data can be visible either by plotting graphs from MS excel sheet or by using a separate display application which can display undisturbed data. The person can wear the belt and place the non-gel electrodes and start with acquisition. The data which is processed can also be made to store in a cloud platform or in secondary storage devices such as SD card. Hard disk etc. This prototype is a small size, less expensive wearable system to detect and display Electrocardiogram (ECG).

The belt system can be made much more compact by using a ventilated pouch instead of plastic box to keep sensors. The accuracy can be improved further more by other algorithms. A phone application can be developed for easy visualization of data. Embedding sensors, Wi-Fi module to a single chip to reduce size and provide a single power system. Developing classification platforms for analyzing and classifying the data for coronary abnormalities.

6. REFERENCES

[1]. P. J. Soh, G. A. E. Vandenbosch, M. Mercuri, and D. M. M.-P. Schreurs, ‘‘Wearable wireless health monitoring: Current developments, challenges, and future trends,’’ *IEEE Microw. Mag.*, vol. 16, no. 4, pp. 55–70, May 2019.

[2]. Ahmad M. Rateb, “A Fast Compressed Sensing Decoding Technique for Remote ECG Monitoring Systems” *IEEE Access*, vol. 8, pp. 197124 - 197133, Nov. 2020.

[3]. Elena Politis, Abbes Amira, Faycal Bensaali, “ECG Signal Reconstruction on the IoT-Gateway and Efficacy of Compressive Sensing Under Real-Time Constraints”, *IEEE Access*, vol. 6, pp. 69130 - 69140, Oct. 2018

[4]. Kai Zhang, Wenjie Ling, “Health Monitoring of Human Multiple Physiological Parameters Based on Wireless Remote Medical System” *IEEE Access*, vol. 8, pp. 71146 - 71159, Apr. 2020.

[5]. Ahmed Faeq Hussein, N. Arun Kumar, Marlon Burbano-Fernandez, “An Automated Remote Cloud-Based Heart Rate Variability Monitoring System” *IEEE Access*, Vol. 6, pp. 77055 - 77064, May 2018.

[6]. Dung Nguyen, Belal Mostafa Amin, Timo Kurkela, “Fully Integrated Wireless Elastic Wearable Systems for Health Monitoring Applications”, *IEEE Access*, vol. 11, pp. 1022 - 1027, May 2021.

[7]. Sujie Chen, Fangran Bian, Ming Li, Yisen Pei, “Semi-Disposable Self-Adhesive Sensor System for Wearable Electrocardiogram Detection”, *IEEE Access*, Vol. 9, pp. 1222 - 1226, Sep. 2021.

[8]. Shuenn-Yuh Lee, Yi-Wen Hung, Po-Han Su, “Bio signal Monitoring Clothing System for the Acquisition of ECG and Respiratory Signals”, *IEEE Access*, vol. 10, pp. 66083 - 66097, Jun. 2022.

[9]. Christopher Beach, Sammy Krachunov, James Pope, “An Ultra-Low Power Personalizable Wrist Worn ECG Monitor Integrated With IoT Infrastructure”, *IEEE Access*, vol. 6, pp. 44010 - 44021, Aug. 2018.

[10]. Qi Wang, Yu Wei Mao, Liqun Ren, “Automatic Classification of ECG Data Quality for Each Channel”, *IEEE Access*, vol. 8, pp. 196094 - 196101, Oct. 2020

A NON-INVASIVE NIR BLOOD GLUCOSE SENSOR

Celina Sylvitte[1], Sibyala Kaveri[2], Tejaswini C[3], Yashaswini V[4], Vanishree Prasad S[5]

[1234] Student, Department of Biomedical Engineering, ACS College of Engineering, Karnataka, India
[5]Assistant Professor, Department of Biomedical Engineering, ACS College of Engineering, Karnataka, India

ABSTRACT

Diabetes is one of the notable health concerns around the world. Diabetes need to keep track of their blood glucose level and measure it regularly to evaluate the amount of insulin to be administered to enable the person to live a normal life with a highly stable and healthy relationship with the disorder. The technology at present is definite and effective but in an invasive manner, which limits the scope for real-time measurements which will aid in a positive tight control. This method will bring about a change which will overcome the difficulties induced by the current invasive technology. This rugged, pain-staking and low cost device built upon near infrared light irradiation based optical technique, will support continuous glucose sensing and improve quality of life. The results obtained through the proposed prototype will help lead to a conclusion for further research on this simple, pain-free technology and also for implementation on a larger scale in the medical field.

Keywords: *Glucose, Glucometers, NIR, BGM, Beer Lambert's law.*

---

1. INTRODUCTION

Glucose is a simple sugar molecule. The sugar molecule is chemically symbolized as C6H12O6. This means that glucose molecule contains 6 Carbon (C) atoms, 12 Hydrogen (H) atoms, and 6 Oxygen (O) atoms. In human's blood, glucose molecule circulates as blood sugar. Normally after eating food or drinking, our body breaks down sugars from food and uses them for energy in our cells. To perform this, our pancreas produces a hormone called insulin. Insulin pulls sugar from the blood and puts it in the cells for use. If anyone has diabetes, our pancreas can't produce sufficient insulin. For this, the blood glucose level increases. As a result, our cells fall into much-needed energy shortage. This can lead one to many potential complications including blindness, kidney disease, nerve damage, amputation, stroke, heart attack, and damage to blood vessels etc. Diabetes cannot be cured but it is possible to prevent or control it by keeping glucose level at normal range. Considering this, it is important to regularly check blood glucose level by glucometer.

There are different types of glucometers available in the market. But these are invasive. These invasive glucometers need a small amount of blood by puncturing a finger using a needle and put on a test strip which shows the glucose level. Sometimes this method discourages patients because finger puncturing is painful, infectious when the same needle is used for multiple patients, and has a higher cost. Due to this, it is necessary to develop a non-invasive method which does not need finger puncturing and cost effective for diabetic patients.

Fig-1: Conventional invasive blood glucose test

According to NICE guidelines, the following are ranges of blood glucose which are observed in normal individuals, diabetics, and pre diabetics. Home diabetes tests allow individuals to determine which category they fall into to determine whether or not they are required to take a shot of insulin. When blood sugar content is too high, an insulin injection is administered in order to help efficiently use the body's blood glucose in order to bring it down to normal range.

Plasma glucose test	Normal	Prediabetes	Diabetes
Random	Below 11.1 mmol/l Below 200 mg/dl	N/A	11.1 mmol/l or more 200 mg/dl or more
Fasting	Below 5.5 mmol/l Below 100 mg/dl	5.5 to 6.9 mmol/l 100 to 125 mg/dl	7.0 mmol/l or more 126 mg/dl or more
2 hour post-prandial	Below 7.8 mmol/l Below 140 mg/dl	7.8 to 11.0 mmol/l 140 to 199 mg/dl	11.1 mmol/l or more 200 mg/dl or more

Table-1: Glucose Measurement Test Standards as per NICE Guidelines

1.1 Exordium

Near-infrared spectroscopy consists of wavelengths in the range of 780nm to 2500nm. We encounter near-infrared radiation in our day to day life. For example, when there is a fire and we place our hands near, it is IR radiation, while the vast majority of it is NIR. The water molecule absorbs this radiation and causes a rise in temperature of the skin's water content.

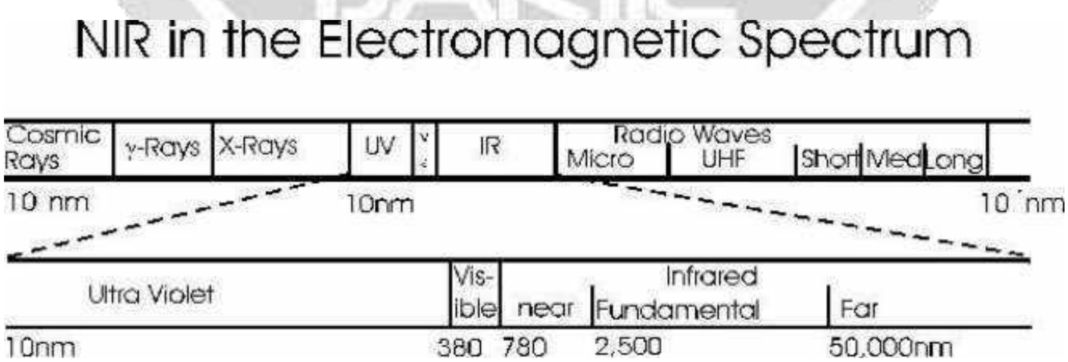


Fig-2: Near-Infrared Spectroscopy Range

Beer Lambert's Law

Based on Beer Lambert's Law, when a light source passes through a medium, it is absorbed or transmitted through, causing the intensity to decrease.

$$A(\lambda) = Log10\ (Ii\ /It)$$

Ii = Incident light's intensity

It = Attenuated light's intensity

When an NIR source is passed through the blood containing of glucose molecules, the glucose molecules tend to absorb them and therefore transfer less to the phototransistor. As the concentration of glucose increases, the rate of absorption increases simultaneously due to the nature of glucose molecules. Therefore, the quantity of blood sugar is directly proportional to the absorbance. Instead of invasively measuring the amount of blood acquired through routine checks, NIR can be used to measure the amount of glucose present within the blood's components.

1.2 Literature Survey

Schichiri et al (1985) were the first to introduce the minimally invasive technique by the development of subcutaneously implantable needle-type electrodes. The used of subcutaneous implantation technique able to avoid infection problems such as septicaemia, fouling with blood clots, and embolism. They have designed a glucose sensor with a fine needle, or flexible wire and the active sensing element is implemented on the tip of it and implanted in the subcutaneous tissue. Nowadays, there are various types of continuous glucose monitoring systems which has been commercialized. Example of such systems may be using electrochemical detection or and optical detection of glucose oxidase to measure glucose in blood.

Bushra Alsunaidi et al (2021) provides an updated review of some of the pioneering non-invasive optical techniques for monitoring blood glucose levels that have been proposed in the last six years, including a summary of state of the art error analysis and validation techniques. As no cure has been found for diabetes yet, regular monitoring and control of glucose concentration in the blood is the only solution to optimize the lifestyle of diabetics and prevent them from experiencing severe complications. Various glucose monitoring techniques have been developed recently. These technologies are classified based on their mechanism as invasive (IN), minimally invasive (MI), and non-invasive (NI).

2. METHODOLOGY

Near-Infrared spectroscopy is an optical method in which scattered, transmitted, or reflected light from the illuminated surface is studied. It has been investigated for glucose estimation for the last few decades. NIR waves have deeper penetration, so they can easily reach the dermis layer of skin and interact with blood components. Thus, NIR spectrometry is used to estimate glucose levels in the blood. This technology is low-cost and simple.

The NIR waves are partially scattered or absorbed as they penetrate through skin tissue. The scattering and absorption are related to the molecular vibrations of chemical bonds of molecules present in the medium. This phenomenon can be utilized in measuring the concentration of biological functional groups such as C–H, N–H, C–O, and O–H present in the blood. Glucose molecules contain C–H and C–O bonds, so the absorption and reflectance of NIR waves passing through the skin can be developed to detect the concentration of glucose in the blood. The NIR absorption for isomers of glucose, such as fructose, lactose, and galactose, has absorption peaks at different wavelengths, ranging in first overtones and combinational bands of NIR spectra. These wavelengths do not coincide with the wavelength at which glucose absorption is being detected. Hence, detection of glucose is not much affected by the presence of these isomers.

Here, the blood glucose meter that can provide glucose measurements painlessly, without a blood sample or finger pricks, within a few seconds. The device checks the heartbeat and it is displayed on LCD.

When a light ray passes through biological tissues, it is both absorbed and scattered by the tissues. Light scattering occurs in biological tissues due to the mismatch between the refraction index of extracellular fluid and the membranes of the cells. Variation in glucose level in blood affects the intensity of light scattered from the tissue. Beer- Lambert Law plays a major role in absorbance measurement which states that absorbance of light through any solution is in proportion with the concentration of the solution and the length path travelled by the light ray. Light transport theory describes light attenuation as

$$I=I_{oe}\ \text{-}\mu_{eff}\ L\text{---------}\ (1)$$

where, I is the reflected light intensity, I0 is the incident light intensity and L is the optical path length inside the tissue. Attenuation of light inside the tissue depends on the coefficient known as effective attenuation coefficient (μ_{eff}), which is given by

$$\mu_{eff} = [3\mu s\ (\mu s + \mu s\ ')]^{\frac{1}{2}}\ \text{---------}\ (2)$$

The absorption coefficient (μ_a) is defined as the probability of absorption of photons inside the tissue per unit path length, which is given by

$$\mu_a = 2.303\in C\text{---------}\ (3)$$

$\in$ is the molar extinction coefficient, C is the tissue chromophore concentration and the reduced scattering coefficient (μ_s') is given by equation 4.

$$\mu_s\ ' = \mu_s\ (1\text{-}g)\ \text{--------}\ (4)$$

where g is anisotropy and μs is scattering coefficient. Hence from the equations (1) to(4) it can be concluded that μ_a depends on the glucose concentration in blood. Thus, with the increase in blood glucose concentration, the scattering property of blood decreases.

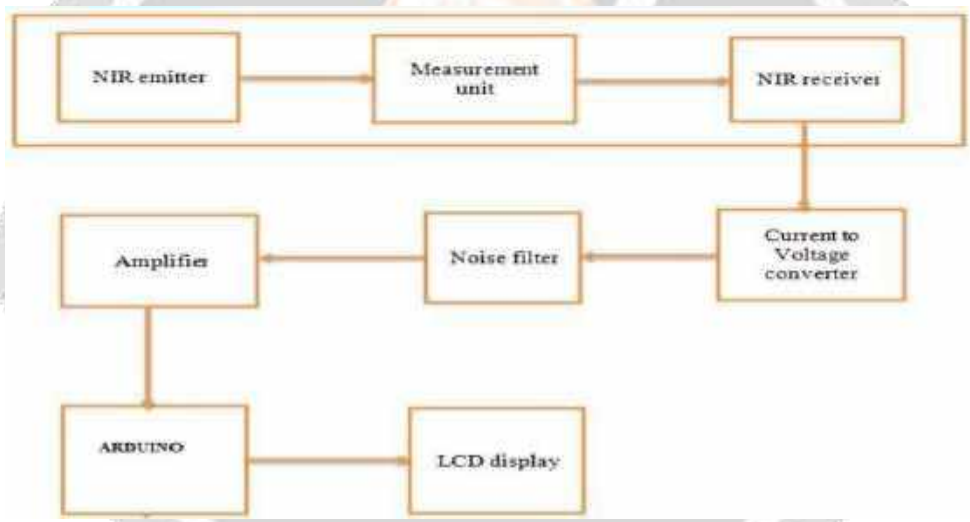


Fig-3: Detailed Block Diagram

2.1 Hardware Implementation

Compact hardware is designed and fabricated for the proposed for non-invasive technique. The photo-sensor has wavelength sensitivity of 600 nm to 800 nm and detects the laser light passed through glucose sample to convert the optical energy into electrical energy. The output voltage detected by the photo-sensor depends on the intensity of the received laser light.

Other elements of the red laser blood glucose monitoring are Arduino-UNO microcontroller, connected with PC to display the output voltage. The suitable wavelength for BGM is determined experimentally by measuring the transmittance and absorbance of different wavelengths of light ranging from 500 nm to 1200 nm. The light is passed through the human finger. The highest absorbance is of NIR of wavelengths from 700 nm to 1000 nm making it the least suitable for BGM applications. Red laser light of 650 nm has the capability of penetrating into the water and the human finger as it has the highest % transmittance as compared to other wavelengths.

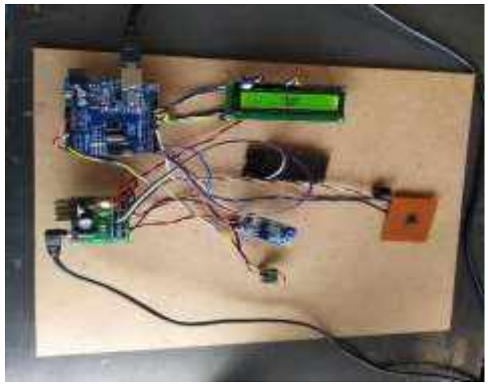


Fig-4: Prototype of the proposed method

3. RESULT

Testing of the model is done by measuring the subject's blood sugar levels first with an invasive tool as the standard. After that, the subjects measured their blood sugar levels with the designed prototype and compared the results. AccuCheck Instant was chosen as the golden standard, which still need a specific strip to measure blood glucose levels. The glucose concentration for different patients are measured. It was developed by the laser light of wavelength 650nm and photo transistor. The Arduino microcontroller is used to control the operation. Hence the glucose level is tested and the value (mg/dL) is displayed.

4. CONCLUSIONS

In this paper, a non-invasive blood glucose sensor based on near infrared spectroscopy has been discussed. The result shown in this paper indicates that this method is feasible to measure blood glucose level non-invasively, though it is still need an improvement to achieve better results.

5. REFERENCES

[1]. Md. Rezwanul Haque, S. M. Taslim Uddin Raju , Md. Asaf-Uddowla Golap, And M. M. A. Hashem "A Novel Technique for Non-Invasive Measurement of Human Blood Component Levels From Fingertip Video Using DNN Based Models".

[2]. D. Li, X. Huang, H. Yu, Z. Zhang, F. Huang, K. Xu, and X. Hu, "A Novel Minimally Invasive Method to Detect Glucose Concentration without Blood Extraction, in the IEEE International Conference.

[3]. Prof. A. Shinde, Dr. R. K. Prasad: "Non Invasive Blood Glucose Measurement using NIR technique based on occlusion spectroscopy", International Journal of Engineering Science and Technology (IJEST), Vol. 3, December 2011.

[4]. Hashem : A Novel Technique for Non-Invasive Measurement of Human Blood Component Levels From Fingertip Video Using DNN Based Models(2021).

[5]. Sithara Surendran K T, T Sasikala: "Sensor system based Non-Invasive System to Measure Glucose Level in Human Body" (2019).

FORECASTING OF SEISMIC TREMORS USING MACHINE LEARNING TECHNIQUES

T Auntin Jose[1], Tejas V[2], Varsha P[3], Vasantha D V[4], Vijeth S Gowda[5]

[1]Professor, Computer Science, Rajarajeswari college of engineering, Karnataka, India
[2,3,4,5]Student, Computer Science, Rajarajeswari college of engineering, Karnataka, India

ABSTRACT

An earthquake is a type of natural disaster that is well-known for the devastation it causes to both naturally existing and artificial structures, including buildings, and residential areas, to name a few. Seismometers, which pick up vibrations caused by seismic waves moving through the earth's crust, are used to measure earthquakes. The damage caused by an earthquake is categorized in this work into damage ratings, which have values ranging from one to five. The damage grade of a certain structure, which is also known as Unique Identification String, is predicted using a previously gathered data set and a number of criteria. An analysis of current machine learning classifier techniques is being used to make the forecast of earthquake. In order to predict earthquakes, machine learning methods like KNN, Random Forest Classifier, and Logistic Regression are used. The best algorithm will be taken into consideration after reviewing all of the aforementioned previously employed algorithms. The approach employed to anticipate the property will be examined, and data analysis will disclose information that could help to mitigate the effects of future earthquakes.

Keyword :- *Earthquake Magnitude Prediction, Location Prediction , Deep Learning*

1.INTRODUCTION

A few years ago, the majority of each company's programmers were primarily focused on developing the user interface when developing software and hardware image processing systems. Since the introduction of the Windows operating system, when the majority of developers shifted their focus to addressing the issues with image processing itself, the situation has significantly changed. In solving common problems like identifying faces, car numbers, road signs, analysing remote and medical photos, etc., this hasn't yet produced the fundamental advancement. Through trial and error, various teams of engineers and scientists work to find solutions to each of these "eternal" problems. The task of automating the construction of software tools for tackling intellectual difficulties is formulated and vigorously tackled abroad because modern technological remedies are proving to be excessively expensive. The required toolset for image processing should make it easier to analyse and recognise photos with new material and guarantee effective application development by normal programmers. Similarly to how the Windows toolkit facilitates the development of interfaces for addressing many practical issues.

1.1 Existing problem

One of the methods recently used is seismogram. The scientist in order to measure how large the earthquake was use seismogram recording that are made on seismographs on the surface of earth. The size of earthquake is known as the magnitude which will be used a lot throughout this report. Here is a figure that shows some wiggly lines. These lines define if the earthquake occurred was large or small. If the line is short, it means that it is small earthquake and if it is long means it is of high magnitude. There is other method used to predict earthquake which is called triangulation method. In this method it takes three seismographs to find an earthquake.

1.2 Proposed System

The proposed system of this project is to predict the magnitude of earthquake for a region given by the user with the help historical data. As we know that the destruction caused by earthquakes is massive and causes loss of lives every year. There is several ways Geologist use to predict earthquakes. The results so far have been successful in telling where an earthquake has more probability to occur but when it will happen is still under research. This application will ask the user to enter the range of latitude and longitude for the region where they want to know if earthquake can occur. Based on these co-ordinates it will use the data set and apply Regression algorithms to make the prediction. The mean square error is also calculated so we can find which algorithm gives accurate results.

1.3 Objectives of the project

To Design a System to predict the Earthquake .To apply various Algorithms and build our ML model. To determine the performance of our model using parameters like accuracy etc. To develop a User Interface for our model.

2.RELATED WORK

Seismometers, which pick up vibrations caused by seismic waves moving through the earth's crust, are used to measure earthquakes. The damage caused by an earthquake was categorised in this work into damage grades, which have numbers that vary from one to five. The damage grade of a certain structure, which is linked to a Unique Identification String, was predicted using a previously gathered data set and a set of factors. An analysis of current machine learning classifier techniques was used to make the forecast. In this study, the machine learning techniques employed were K-Nearest Neighbours, Random Forest Classifier, and Logistic Regression. The best algorithm was taken into accounts after a review of a number of attributes. The method used to predict the property underwent a thorough investigation, and the data analysis that followed revealed information that could help future earthquakes' effects be lessened. It is safe to conclude that concrete with reinforcement is a substance that can be utilised in the construction of a building's foundation, rooftop, and ground floor based on the findings from the examination of the aforementioned displayed bar graphs. Due to its capacity to endure high tensile stress, particularly when reinforced with steel, reinforced concrete is a well-known material in the building construction industry. Steel and a few other polymers are only a handful of the materials that can be used to strengthen it.

3.METHODOLOGY

Based on a variety of data and characteristics, machine learning is used to forecast earthquakes. Here, the user enters geographical information like latitude, longitude, and numerous other forms of general data. Smaller sets of the datasets in Fig. 1 below are then classified using classification techniques. We will be able to compare and estimate the size of the user through comparison and prediction. All of the aforementioned user inputs are used to process the detected data using machine learning techniques before it is given to an earthquake prediction model. The algorithm then uses the user-entered data to combine and compare the entire processed data in its prediction model to identify the earthquake. An architecture diagram is a visual representation of a number of concepts, including the principles, elements, and components, that make up an architecture.

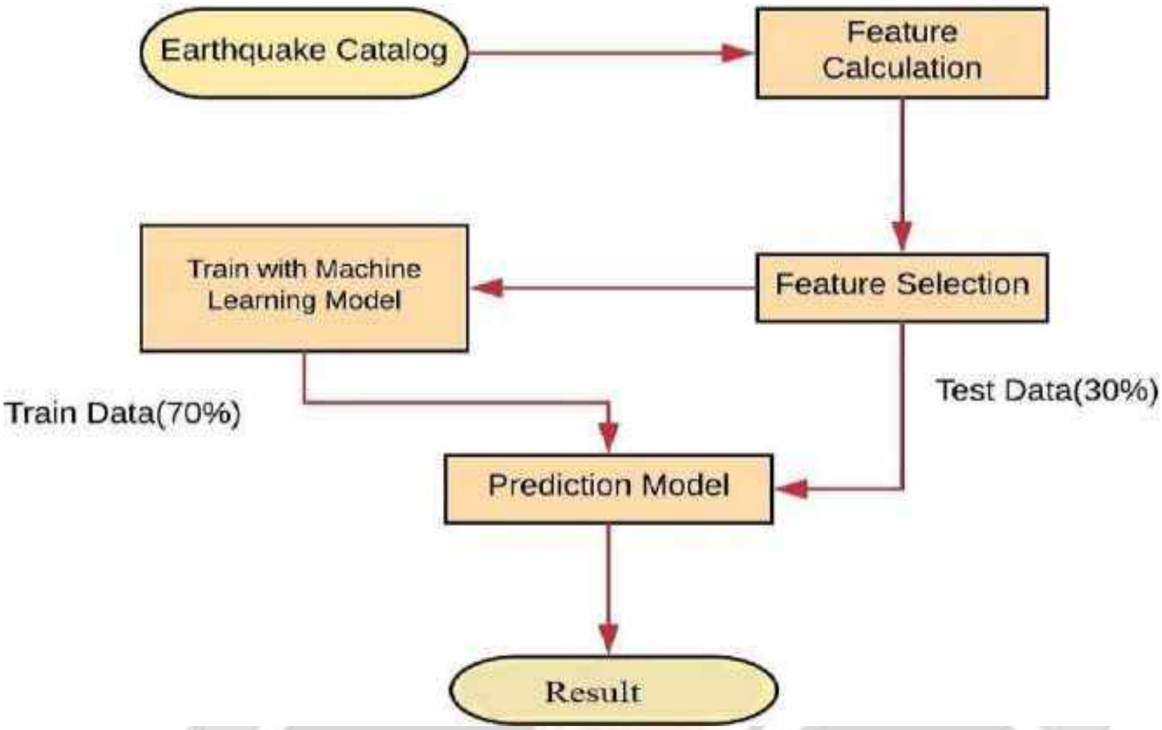


Fig 1: Proposed Block Diagram

4.Unit State Diagram

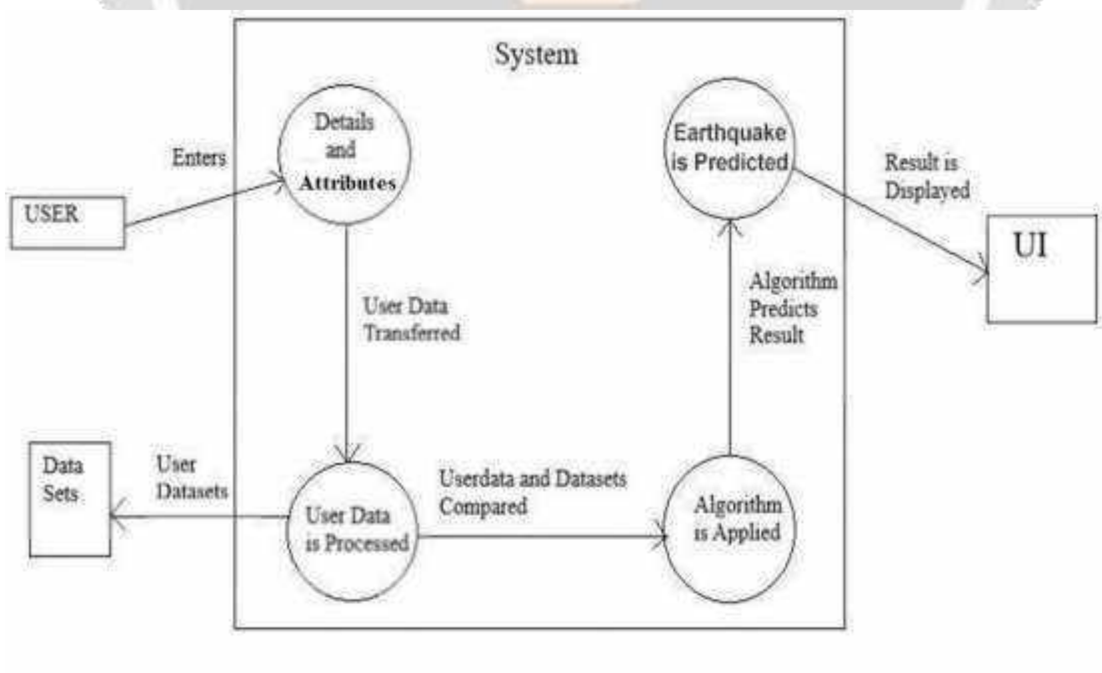


Fig 2: *Unit State Diagram*

The unit design of predicting earthquakes with machine learning consists of all the various aspects that are required. This unit design fig.2 shows from starting the model flows from one step to another, like enter into the system then it enters all the information's and all other general information along with the attributes that goes into the system, compares with the prediction model and if it states true then it predicts the appropriate results otherwise it shows the details where the user had gone wrong while entering the information

5.RESULT

THE ACCURACY OF TECHNIQUES FOR MACHINE LEARNING

In this phase, we structure six distinct kinds of classification models. We could use numerous other models to resolve classification problems; however, these are the most popular models in use. Using the algorithms, all these models can be built workably provided by the sci-kit-learn package. The results of applied ML algorithms are presented.

Sr No	Algorithm Name	Accuracy Score (%)
1.	Decision tree algorithm	99.93
2.	KNN algorithm	99.95
3.	Logistic regression algorithm	99.91
4.	SVM Algorithms	99.93
5.	Random forest tree algorithm	99.92

Fig 3: *The accuracy of machine learning algorithms*

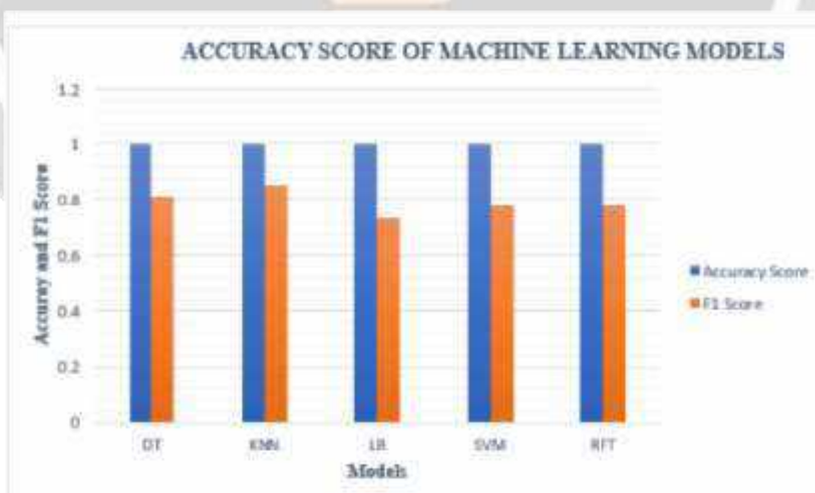


Fig 3: *Comparative analysis*

6.CONCLUSIONS

For both monitoring and control purposes, this work has presented a novel automatic earthquake detection system in real- time. This work will indeed help in improving the security, law and order situation for the betterment and safety of humanity, especially for the countries who had suffered a lot with these kind of natural calamities. This will bring a positive impact on the economy by attracting investors and tourists, as security and safety are their primary needs. So we can infer that combining seismic activity with Machine Learning technology produces significant and efficient results that may be used to anticipate earthquakes in a wide range of situations, provided that the prior history of the event is sufficiently maintained. The two can work together even more closely to better protect against earthquakes. Large datasets have shown to be extremely useful. The same methodology can also be applied to the prediction of numerous other natural calamities.

7.REFERENCES OR BIBLIOGRAPHY

I. *C.P Shabariram and K.E Kannammal "Earthquake prediction using map reduce framework" 2017 International Conference on Computer Communication and Informatics (ICCCI), pp. 1–6, 2017.*

II. *Purdue University, Department of Physics and Astronomy: This stemmed from the DOE Council workshop "Information is in the Noise: Signatures of Evolving Fracture and Fracture Networks" held March 2018 that was organized by Prof. Laura J. Pyrak-Nolte*

STOCK PRICE PREDICTION USING STATE-OF-THE-ART MACHINE LEARNING ALGORITHMS

Sunil A[1], Yashwanth M[2], Karthik T[3], Karthik E[4], Jahnavi H P[5].

[1] *Asst Professor, Department of CSE, Rajarajeswari College of Engineering, Karnataka, India.*
[2] *Department of CSE, Rajarajeswari College of Engineering, Karnataka, India.*
[3] *Department of CSE, Rajarajeswari College of Engineering, Karnataka, India*
[4] *Department of CSE, Rajarajeswari College of Engineering, Karnataka, India.*
[5] *Department of CSE, Rajarajeswari College of Engineering, Karnataka, India.*

ABSTRACT

Stock market forecasting and machine learning are two strategies that have recently gained popularity. The goal of this research is to forecast stock prices and market movements using machine learning algorithms. To forecast futuremarket values, this model takes into account a variety of factors such as financial statistics, historical trends, market mood, and news. To provide information on patterns and trends, the system will employ data visualization techniques. By precisely anticipating stock values, the software will also assist traders and investors in making educated judgements. The proposed approach will produce strong results for analyzing product prices and models, making it an excellent tool for investors and traders looking to make informed investment decisions.

Keywords: - *stock market, machine learning, deep learning, historical data, information visualization*.

1. INTRODUCTION

The stock market is predicted to expand in popularity in recent years, as it assists investors in making stock market judgements. Stock price forecasting is tough and requires complex models and algorithms. It is affected by a variety of factors, including firm performance, market trends, global events, and investor behavior. This issue can be resolved by examining stock prices, AR, ARIMA, SARIMA, Bayesian Auto ARIMAX, and so on. Many guessing algorithms have been proposed to solve it. These algorithms look for patterns, trends, and anomalies in historical data. that might be utilized to forecast future market values. To be specific, it comprises a wide range of elements such as company trends, market conditions, and external factors. The algorithm is built on a massive database of historical assets, allowing us to spot patterns and trends that human analysts might overlook. Using a variety of statistical techniques, this model is then assessed for correctness and reliability.

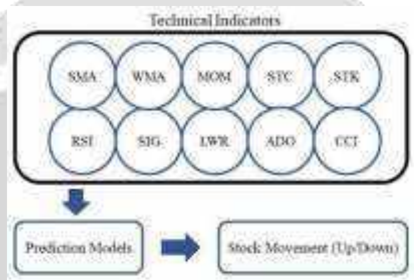
The use of machine learning and artificial intelligence in product forecasting has altered how organizations make decisions. With the use of this technology, traders may produce predictions in real time. Machine learning models' capacity to recognize patterns and patterns that human analysts find difficult to detect has given market research a competitive advantage. Furthermore, this tool allows more people to forecast the business and encourages more people to invest in it and benefit from its growth.

In summary, the potential of machine learning and artificial intelligence to change business decisions. Accurate forecasts can be made in real-time with this technology, highlighting patterns and trends that human analysts may overlook, indicating business prospects to investors. A great tool for individuals interested in investing in equities.

2. EXISTING SYSTEM

Forecasting stock prices is a crucial task for both investors and analysts. With the abundance of data and technological advancements in the modern era, the application of AI/ML techniques has become a popular choice for this purpose. Utilizing neural networks, which can learn from input data, is one popular strategy and output predictions to generate accurate forecasts. Researchers have created a variety of neural network types, including neural networks with feed-forward and recurrent loops (RNNs), and convolutional neural networks (CNNs), for predicting stock prices.

Apart from neural networks, there are other machine learning methods used in business forecasting, such as support vector machines (SVM), decision trees, random forests, and Bayesian algorithms. These algorithms can handle nonlinear relationships between inputs and outputs, which makes them suitable for analyzing business model data. Additionally, these methods can handle the ambiguity and incompleteness that are frequently present in financial data.



bro

Figure-1 Estimation of stock movements with continuous data.

The study also focused on selecting different options for accurate stock price forecasting. Accurate selection involves identifying the most essential features that have the greatest impact on predicting a company's value. Key point analysis, trend analysis, and data integration were some of the feature selection techniques used by researchers to determine the most crucial elements for market forecasting.

Overall, corporate forecasting has benefited greatly from the incorporation of machine learning and artificial intelligence. However, the accuracy of the model is heavily reliant on the quality and quantity of data used. Researchers are constantly exploring innovative data processing methods to improve forecast accuracy, model architecture, and selection.

3. LITERATURE SURVEY

Author [1] conducted a study with the goal of predicting stock prices in the future. The proposed algorithm utilized the relationship between public sentiment and its impact on stock prices. The model proven to be most useful for analyzing historical values is the LSTM, however, the incorporation of a memory gate to discard outdated values could further enhance its accuracy. The potential applications for this project are vast, with the first option being the analysis of public sentiment on different social media networks, including Twitter. Additionally, the study only considered spoken English, but including all languages spoken by the community could improve the accuracy of LSTM in predicting stock prices.

Author [2] conducted a study using a hybrid technique combining genetic algorithms and machine learning (GA)-based vector machine. The system developed in the study incorporated multiple measurements and evaluated product prices based on the prices charged by various businesses. In terms of forecasting future values, including technical indicators and stock projections, the results showed that the GA-SVM hybrid system outperformed the pure SVM system. The SVM system performed better when genetic algorithms were added to machine learning algorithms, potentially improving the likelihood of accurate predictions. The study highlights the usefulness of hybrid approaches for increasing the precision of algorithms for machine learning.

Author [3] implies that there are no set criteria for predicting market values and that the stock market is a tool for projecting future trends. The author also discusses Anomaly Radio Networks (ANN) and their usefulness in detecting hidden patterns in data for market forecasting. The author proposes two models for cost estimates that use a back-propagation technique to learn a multi-layer feed-forward network model. Furthermore, the author suggests using backward and multi-layer feedforward algorithms to estimate market prices.

Author [4] investigated the utilization of artificial intelligence (AI) models to predict stock prices, utilizing financial indicators such as power indicators, cash flow indicators, and exponential moving average correlation**.** The study found that the proposed model has a higher prediction accuracy and LS-SVM optimization ability than the PSO method.

Author [5] proposed a novel forecasting method for predicting the next day's stock pattern using SVM (support vector machine). The algorithm being discussed considers various factors such as time correlation between global market and various financial forecasts. The model can also be utilized with some conversion algorithms to analyze the real market. The study utilizes ML algorithms to forecast stock trends by analyzing data from various global financial markets. To evaluate the prediction algorithm's accuracy, a basic working model was employed. Additionally, the study identified short selling instruments and indicated that the market can still generate profits even during a downtrend.

Author [6] To forecast movements in the stock market, researchers used artificial neural networks (ANN) as a forecasting tool by analyzing specific financial time series with various architectures. The study focused on predicting upward or downward trends and employed methods such as multi-layer perceptron (MLP), convolutional-neural-network (CNN), and short-term memory (LSTM) recurrent neural network. The study's findings revealed that the implementation of ANN showed promising results in predicting stock market movements and was capable of accurately predicting the behavior of financial periods, even with time-lapse data.

Author [7] says Researchers employed techniques from the field of AIML to analyze financial news articles using different text representations. A dataset of 9,211 financial news articles and 10,259,042 stocks from the S&P 500 index over a five-week period was analyzed. The proposed model considered the article's position and the stock price at the time of publication was recorded along with the corresponding data, achieving the best performance in predicting future stock prices. The accuracy rate in predicting the direction of the stock price movement was 57.1%, and it generated a profit of 2.06% in simulated trading using a three-dimensional representation of the article's words and stock prices. The study also highlighted the importance of proper nouns in achieving the model's success by avoiding the limitations imposed by common nouns and entity names.

4. METHODOLOGY

Stock market forecasting typically involves multiple steps, starting from the process of collecting historical financial data and relevant news and announcements. The gathered data is then processed and cleaned to remove inconsistencies, fill in missing values, and prepare it for analysis. The next step involves feature engineering, where significant variables that impact stock prices are identified and selected as essential features. These chosen features are then utilized to train models, such as ARIMA, SARIMAX, or LSTM, which are commonly used in market forecasting to detect trends and connections between variables in data and follow historical trends. Once trained, the algorithm can be evaluated and validated using performance measures such as mean absolute error (MAE) and root mean squared error (RMSE) to ensure its accuracy and reliability. Finally, the model can be used to predict future trends and stock prices, which can be visualized through graphs and charts to aid in decision-making.

5. PRICE PREDICTION

To predict future market prices, it is necessary to conduct a thorough investigation and interpretation of historical data. This involves identifying patterns and trends and using ML algorithms such as time series analysis, regression, and neural networks to analyze the data. These algorithms examine historical data and identify relationships between variables such as economic indicators, business trends, and company performance. By taking into consideration the current market conditions and other relevant factors, these algorithms can forecast future stock prices. The reliability of these forecasts relies on the quality and sophistication of the methodologies employed and the precision of the utilized data.

The potential for high returns on investment has enabled ML algorithms to become an increasingly cost-effective solution for analyzing and forecasting market prices. As a result, there are many machine learning models that have been developed for stock price forecasting. However, despite the numerous benefits, the unpredictable characteristic of the stock market and its vulnerability to external factors make it challenging to define the true benefits of these models. Therefore, further market research is needed to develop more accurate and reliable ways to address the complexities and unpredictability of the stock market.

5.1 TIME-SERIES-ANALYSIS (TSA)

Time-series-analysis is a commonly used system to forecast market trends, utilizing various models such as AR (Autoregressive), ARIMA (Autoregressive Integrated Moving Average), and SARIMAX (Seasonal-Autoregressive-Integrated-Moving-Average). The models are designed to predict future trends and assist in investment decision-making by analyzing historical data. An AR model will focus on the connection between past and present data points, while an ARIMA model has been used to model non-stationary data.

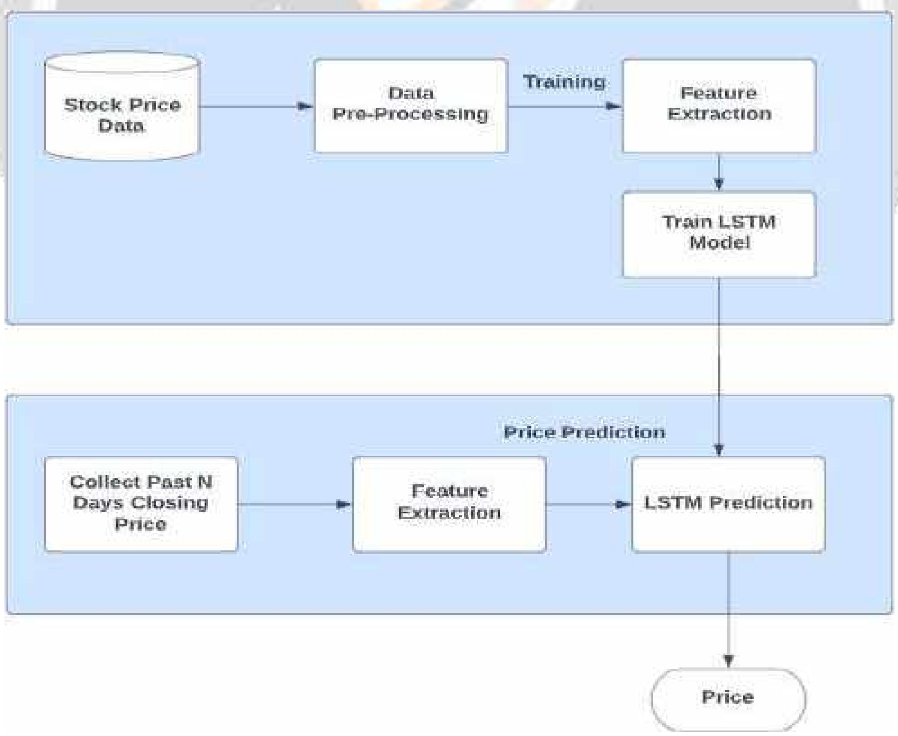


Fig -2 Time series Process

The stock-market has evolved into a complex and ever-changing industry due to advancements in technology. Predicting stock prices has and will always be a daunting task as a result of the impact of various factors on the market. However, ML algorithms have emerged as effective tools for stock price forecasting. Supervised learning algorithms like ARIMA and SARIMAX have been widely used to predict stock prices, enabling investors to make more informed decisions and achieve higher ROI. As the need for business intelligence continues to increase in corporate development, the use of ML algorithms to forecast activities is projected to become even more significant.

Time series analysis is a statistical approach that involves examining data patterns over time to identify trends, seasonality, and other factors that can help predict future outcomes. This approach is used across many fields, including finance, economics, engineering, and climate science. In financial forecasting, time series analysis will be an invaluable tool for analysts seeking to make informed decisions based on asset behavior over time. Owing to the complexity of production data, TSA has become increasingly popular in business forecasting.

6. RESULTS

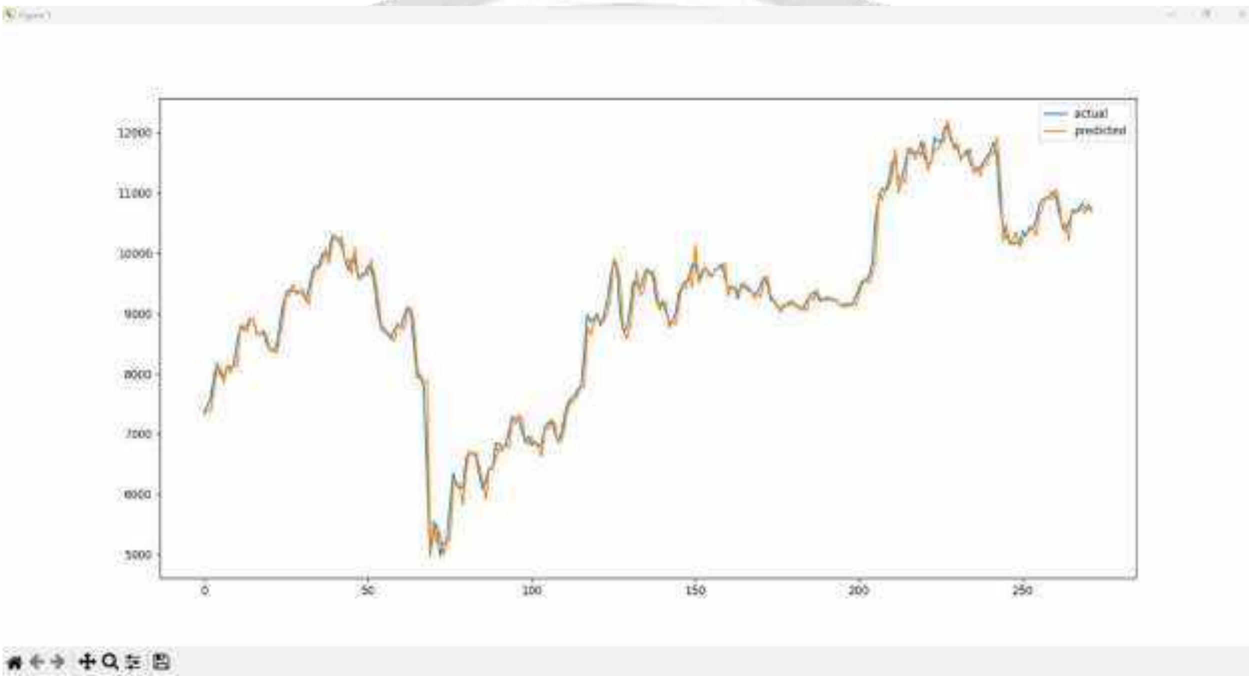


Fig-3 Predicted by BAYSEN

Fig-4 Predicted by SARIMAX

7. CONCLUSION

Accurate stock market prediction requires the utilization of advanced machine learning techniques. Time series models like as ARIMA and SARIMA have proven to be effective in accurately forecasting stock prices. However, there is still a need for further research in the field, particularly in the areas of model data processing and feature selection. Accurate market projections can provide investors with valuable insights, enabling them to make informed decisions and pursue new investment strategies.

8. REFERENCES

[1] "Apache Spark - Lightning-Fast Unified Analytics Engine," 2020. Available: https://spark.apache.org/

[2] V. Atanasov, C. Pirinsky, and Q. Wang, "The efficient market hypothesis and investor behavior," 2018.

[3] S. Agrawal, D. Thakkar, D. Soni, K. Bhimani, and C. Patel, "Stock market prediction usingmachine learning techniques," International Journal of Scientific Research in Computer Science, Engineering and Information Technology, 2019.

[4] M. Afeef, A. Ihsan, and H. Zada, "Forecasting stock prices through univariate arima modeling," 2018.

[5] P.-F. Pai and C.-S. Lin, "A hybrid arima and support vector machines model instock price forecasting," Omega, vol. 33, no. 6, pp. 497–505, 2018.

[6] D. Karmiani, R. Kazi, A. Nambisan, A. Shah, and V. Kamble, "Comparison of predictive algorithms: Backpropagation, svm and lstm for stock market," in 2019 Amity International Conference on Artificial Intelligence (AICAI). IEEE,2019, pp. 228–234.

[7] E. Ahmadi, M. Jasemi, L. Monplaisir, M. A. Nabavi, A. Mahmoodi, and P. A. Jam, "New efficient hybrid candlestick technical analysis model for stockmarket timing on the basis of the support vector machine and heuristic algorithms of imperialist competition and genetic,"Expert Systems with Applications, vol. 94, pp. 21–31, 2018.

[8] S. Sharma and B. Kaushik, "Quantitative analysis of stock market prediction for accurate investment decisions in future," Journal of Artificial Intelligence, vol. 11, pp. 48–54, 2018.

[9] https://zerodha.com/varsity/

[10] https://towardsdatascience.com/illustrated-guide-to-lstms-and-gru-s-a-step-by- step-explanation-44e9eb85bf21

ARTIFICIAL / SYNTHETIC HUMAN FACE GENERATOR USING GENERATIVE ADVERSARIAL NETWORK (GAN)

Abhishek Pandey[1], Gaurav Kumar Bhatt[2], Mohammad Saqib Shah[3], M Jeniga Gemsy Thepora[4]

[1] Student, CSE, RRCE, Karnataka, India
[2] Student, CSE, RRCE, Karnataka, India
[3] Student, CSE, RRCE, Karnataka, India
[4] Assistant Professor, CSE, RRCE, Karnataka, India

ABSTRACT

Noise, Structure, and Elements to produce high-quality pictures, vector transport must be properly represented in graphics algorithms. Although currently available algorithms are extremely effective at this, creating and formatting virtual environments is expensive and time-consuming. As a result, there is an opportunity to automate this tedious procedure by using recent improvements in computer vision. Recent advances in complex generative models, notably GANs, have inspired a significant deal of interest in the field of computer vision for creating realistic images. Backpropagation is coupled with the assistance of an adversarial method that consists of two networks, The generating system allowed G, while the discriminator allowed D, with G creating erroneous images and D categorizing them into genuine or phony image categories. Backpropagation is combined with an adversarial approach that makes use of two networks, Generator G and the discriminator D, where Generator G generates fictitious pictures and Discriminator D assesses whether they are real or false. As the training goes on, G develops the capacity to create images that are plausible to deceive D. [1]. In this study, a model capable of producing high-quality photographs of human faces at scale was trained using the Deep Convolutional Generative Adversarial Networks (DCGAN), a kind of convolutional architecture based on GAN. The DCGAN model was trained using the Celebrity Faces Attributes Dataset. The Architectural analogies Index (SSIM), which analyses both structural and spatial coherence between two pictures, was used to objectively evaluate the trained DCGAN model. According to the data acquired, the image quality is equivalent to the top-tier photographs in the Celeb dataset.

Keyword: - *Artificial/Synthetic face generation, Generative Adversarial Network, Structural Similarity Index, Convolutional Neural Network (CNN), Artificial Intelligence(AI), Deep learning Computer Vision(CV).*

1. INTRODUCTION

Every learning strategy—supervised and unsupervised—tends to be undermined by the generative adversarial network (GAN), also known as a GAN. Due to the natural modelling of multidimensional data patterns, this is possible. The GAN hypothesis was first created in 2014 and was conceptualized as a contest between two neural networks to see which one might perform better. Think of one network as an unauthorized intellectual owner and the other as a reliable resource for visual data analysis. In order to produce authentic images, a copycat, also known as a generative structure and denoted in literary works as variable G, creates duplicates. The discriminating D gathers both real and fake samples in an effort to ascertain if samples are valid (as shown in Figure 1). The Generator Network lacks access to actual images. The discriminator is trained using both samples obtained from the real world dataset and fake images. The discriminator's fault is determined using the base fact picture dataset, which comprises both false and genuine photos. As the produced oversight gets transmitted across the network, each epoch leads to higher-quality photos. When seen as an operative mappings from an apparently arbitrary, high-dimensional environment known as the "latent space" to the space of real image data, the basic framework of a generator system is mathematically characterized as G: G (z).

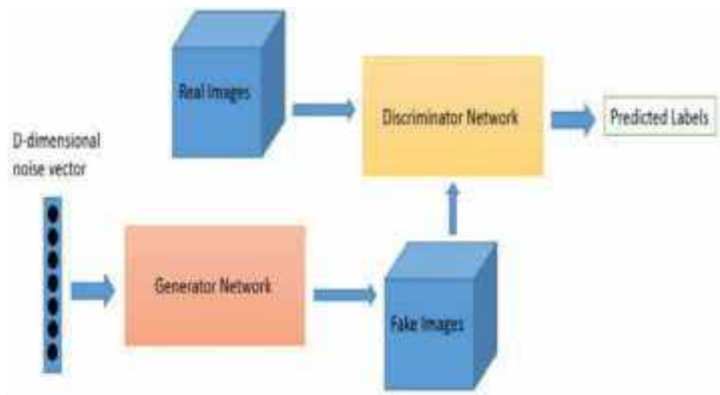


Fig- 1: General Architecture of Generative Adversarial Networks [10]

Figure 1 illustrates a simple GAN's discriminative system, D, as a function that converts matrix values to a probability that indicates the likelihood that the image is being analyzed originated from a real-life image rather than a generator. D: D(x) (0, 1). The discriminator, indicated as D, can be trained for a certain generator in order to classify pictures into either category. The discriminator will be fixed once it reaches perfection, at which point the generator may continue relying on it for precision. The discriminator is tricked into calculating 0.5 for all inputs if the generator's probability closely resembles the statistical pattern of the real data. In addition to the exciting academic issues connected with their construction and training, GANs may one day be used for a variety of applications. These are a few potential uses for this technology: The expense of a studio, travel, and a limited number of human volunteers might be utilized in conjunction with GANs to create images of fictional fashion models. They may be employed to produce fashion ad campaigns including a sizable number of models that might encourages customers to buy more goods. After a decent amount of training, GANs create images with higher quality than original pictures while maintaining all other image aspects like colors, backgrounds, foregrounds, and so on [18].

2. LITERATURE SURVEY

GANs have become quite popular in artificial intelligence research in the recent years. GANs offer a unique opportunity to pursue both research and business applications by bringing novel concepts into a wide variety of industries. Generative adversarial networks are the "coolest idea in computational intelligence within the past two decade," according to Yann LeeCunn. GAN researchers are now directing their efforts towards computer vision and image processing. GAN technology, which was recently created, enables the development of realistic, high-quality images of humans, animals, and other things, as well as neural patterns that transfer visions from other domains. [4]. Furthermore, GANs have been used to investigate various machine learning areas of expertise including recognizing spam, speech and natural language processing (NLP), and so on [9]. Concurrently training two distinct artificially intelligent neural networks is required: a generating system G for distribution of data and a discriminative network D for assessing the probability obtaining a sample from a real-world dataset used for training. This cutting-edge technique was developed in 2014 by the researcher Goodfellow et al. [1]. G's training aim is to maximize D's mistake potential. At NIPS 2016, Ian Goodfellow presented an overview [2] on generative adversarial networks, where he addressed: (1) the significance of generative models in artificial intelligence, and (2) the architecture of GANs and its juxtaposition with other cutting-edge algorithms within the literature; (3) internal details about how GANs work; (4) the long-term potential of GANs-related technologies; and (5) the most advanced computational image processing prototypes that use GANs and other algorithms. Following the initial development of the GAN-related theory, numerous research works were published to further develop the concept. Zhang et al.'s [3] Self-Attention Generative Adversarial Network (SAGAN) offers long-range and attention-driven modelling in image generation tasks for a number of applications. Gregor et al. [6] were the first to introduce Deep Recurrent Attentive Writer (DRAW), a type of neural network that generates realistic visuals. DRAW networks combine a sequential variation auto-encoding architecture with a special spatial attention mechanism that mimics the development and function of the human eye to enable iteratively better picture output. A novel technique for producing high-quality photographs using conditional adversarial generating networks (conditional GANs) was put out by Wang et al. [7].

3. DESIGN AND IMPLEMENTATION

Convolutional neural nets perform discrete convolution operation using its convolutional layer. The discrete convolution operation is a linear transformation. It is sparse as only a small number of input units gets utilized to produce a single output unit. It reuses parameters of convolutional layer, indicating that the same set of weights are utilized to produce output at more than a single location.

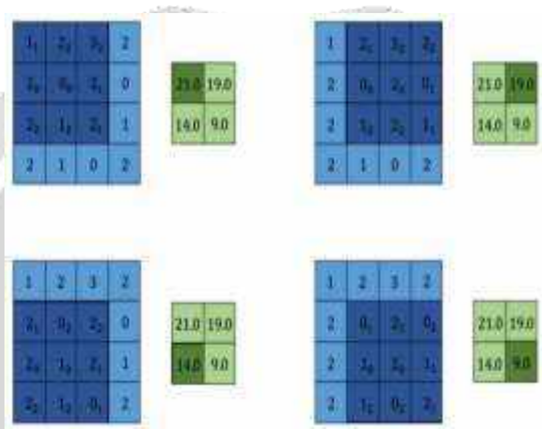


Fig- 2: Matrix Representation

Convolutional neural nets perform discrete convolution operation using its convolutional layer. The discrete convolution operation is a linear transformation. It is sparse as only a small number of input units gets utilized to produce a single output unit. It reuses parameters of convolutional layer, indicating that the same set of weights are utilized to produce output at more than a single location. A discrete convolution process on matrices is shown in Figure 2. A matrix that contains the values of each pixel in each picture may be used to represent any image. Figure 2 displays the input image as a 4 × 4 light blue matrix. A collection of dark blue matrices is used to represent the the kernel itself or feature map [13]. The input matrix is explored repeatedly using kernels. It integrates the kernel components by the relevant input matrix elements in each configuration. The total is then reported as the outcome for the present location when the results are added together. The green matrix shows the characteristics of the feature mappings or the final convolution result.

3.1 Pooling Layers

A group of methods known as "pooling layers" are employed to make feature maps less dimensional. Typical pooling scenario is shown in Figure 3.

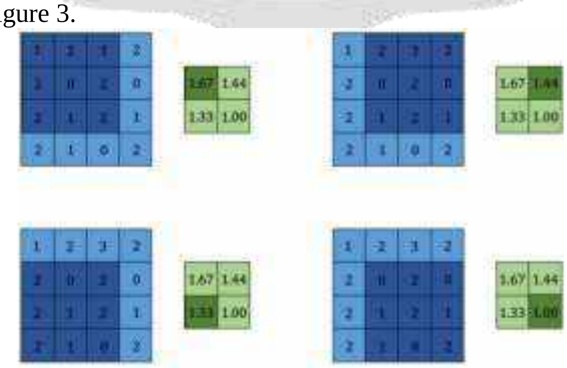


Fig- 3: **4x4 input using 3x3 Average Pooling Scenario**

3.2 Deep Convolutional Generative Adversarial Networks (DCGAN)

Convolutional networks are utilized to construct the generator model of the DCGAN, while inverted convolutional neural networks are employed to construct the discriminator model. The discrimination algorithm has been tuned to increase the likelihood of correctly detecting whether or not an input sample is from the dataset used for training. Both the discriminator and generator systems play a couple-player min max game employing the following optimization equation.

$$\text{Minimum Maximum } x\sim pdata(x)[logD(x)] + Ez\sim pz(z)\ [\log(1 - D(G(z))$$

Fig- 4: Optimization Equation

Fig- 5: Image samples from CelebA dataset

Figure 5 illustrates a selection of photographs from the CelebA dataset. The information given is pre-processed before being entered into the model to ensure its suitability. Figure 6 depicts how the images in this study's dataset were centered and transformed to a dimension of 64x64. For appropriate training and evaluating methods, these 3x64x64 images are transformed into tensors of exactly the same size. For taking the advantage of cutting-edge optimization methods that require data in microscopic groupings of dimensions ranging from 4, 8, 16, and 32, the dataset was divided into micro pieces of size 8.

Fig- 6: 32x32 single batch of training image

3.3 Network Architecture

The DCGAN probably consists of two major components which ids Generator let G and Discriminator let D. Finding a function that converts the latent area of gradients into matrices, or 3-by-64-pixel pictures, is the goal of the generator network. This is performed by connecting 2-dimensional convolutional transpose layers, as depicted in Fig- 7. Each layer is completed using a ReLU activation and a 2D batches norms layer. The D discriminator network's job is to determine how likely it is that an input picture is real. D uses a sigmoid activation function and a

3x64x64 input picture to transmit the probability through a series of convolutional layers, successively normalizing data layers, and ReLU activation functions. Fig. 8 shows this. The network's parameters are randomly selected in order to break up symmetry, which leads to less-than-ideal outcomes.

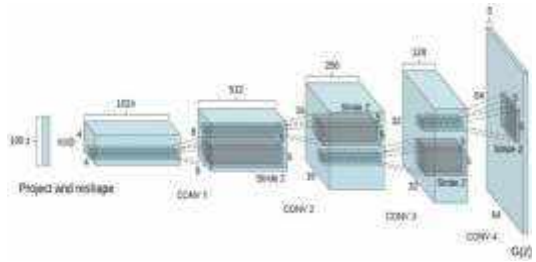


Fig- 7: Generator Network Architecture [5]

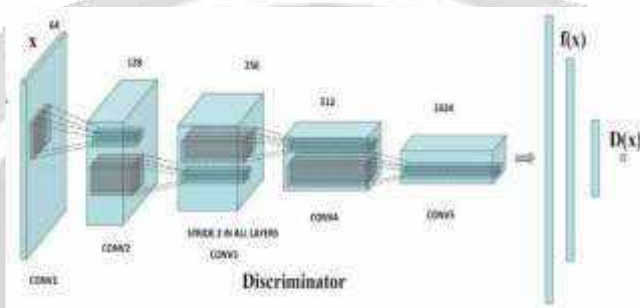


Fig- 8: Discriminator Architecture [5]

3.3 Hyperparameters

In the realm of machine learning, a parameter is a hyperparameter that is established prior the training cycle begins. These customizable parameters have a direct influence on how well a model train operates. Model hyperparameters, which affect the results of picking a model and can't be anticipated by fitting the model to training data, and algorithm hyperparameters, which typically have no impact on model efficacy but instead affect the rate and uniformity of the optimization process, are divided into two categories. The hyperparameters' specifications and values are displayed in Table I.

Table- 1: List of Hyperparameters Values

Hyperparameters	Values
Learning rate	0.0002
Number of epochs	50
Number of GPUs used for training	1
Batch size	8
beta1 (Adam Optimizer's parameter)	0.5
Regularization Parameter	0.003
Gradient Accumulation step	1

3.4 Training Process

The DCGAN model's overall produced loss function. The Adam optimizer method is employed to optimize the non-convex cost function. This approach makes use of the appropriate cost function's primary degree derivative to optimize stochastic objective operations. The technique is very simple to implement in any programming language, computationally quick, memory-light, and robust to diagonally gradient rescaling, and suitable for large training datasets. The approach also produces sparse gradients throughout optimization and works well with noisy and non-stationary training data. The hyper-parameters are simple and almost ever need to be adjusted. The following equations regulate the optimization steps of the Adam optimizer:

$$va_t = \beta\mathrm{eta}_1 * va_{t-1} - (1 - \beta\mathrm{eta}_1) * gn_t$$

$$si_t = \beta\mathrm{eta}_2 * si_{t-1} - (1 - \beta\mathrm{eta}_2) * gn^2$$

$$\Delta w_t = -\eta \frac{va_t}{\sqrt{si_t + \epsilon}} * g_t$$

$$w_{t+1} = w_t + \Delta w_t$$

Fig- 9: Optimization Steps of Adam Optimizer

η: Primary rate of Learning
gt: $Gradient\ at$ a particular $time$ instance $t\ along\ w$j
$v$at: $Expoenent\ Average\ of\ gradients\ along\ w$j
$s$it: $Expoenent\ Average\ of\ squares\ of\ gradients\ along\ w$j
βeta1, βeta2: $Hyperparameters$

3.5 Evaluation parameter

In the proposed study, the Structural Likelihood Index (SSIM), a metric of image quality, is employed to impartially assess the GAN model's performance. The Morphological Resemblance Index (SSIM), a method for evaluating image processing, evaluates how similar images and videos are from multiple sources, which includes digital TVs, movie stills, and other digital images, appear to be. The University of Texas at the Austin's Centre for Image and Video Engineering (LIVE) started the work that Columbia University's Computing Visual Laboratory (LCV) at the New York City continues. By using a variety of attributes extracted from the photos and transformed into multiple spaces, SSIM compares two images. SSIM addresses the shortcomings of several common metrics, such as MSE and PSNR. The SSIM index is computed using several image windows. Two windows of size NxN, both x and y, with the metric:

$$SSIM(x,y) = \frac{(2\sigma_x\sigma_y + k_1)(2\boldsymbol{\mu}_{xy} + k_2)}{(\sigma_x^2 + \sigma_y^2 + k_1)(\boldsymbol{\mu}_x^2 + \boldsymbol{\mu}_y^2 + k_2)}$$

Fig- 10: Equation for SSIM Index

σx: $Avearge$ value $of\ x$
σy: $Avearge$ value $of\ y$
μ2: $Variance\ of\ x$
μ2: $Variance\ of\ y$

4. SIMULATION RESULTS AND ANALSIS

4.1 Generator and Discriminator Training Loss

Figure 11 depicts the training loss for the Generator (G) and Discriminator (D). The graph unmistakably demonstrates that the output photo quality increases with each training iteration as the associated loss lowers and approaches 1.0. Figure 12 does not explicitly illustrate it, but it is feasible to see that the Discriminator Network loss is approaching the ideal equilibrium value of 0.5.

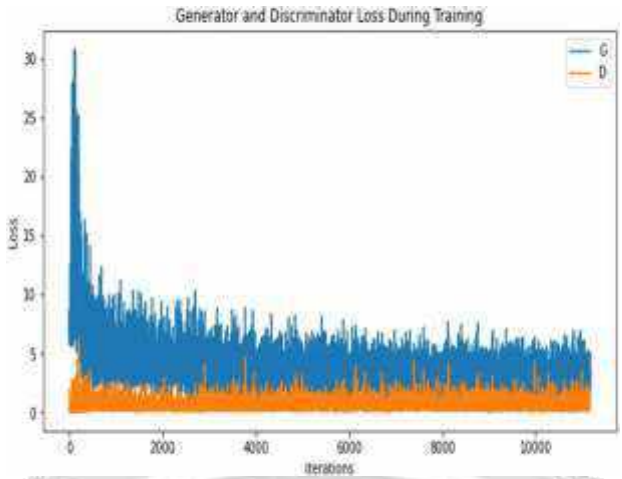


Fig- 11: Iterations with respect to training loss

4.2 Artificial Face Images

The simulated facial images generated by the trained DCGAN model are shown in Figure 12. These 64x64 images have a poor resolution. Figure 9 indicates unequivocally that this model is capable of producing pictures that closely resemble faces, despite the imperfection of the facial characteristics.

Fig- 12: Artificial or Synthetic face image generated using DCGAN model

4.3 Evaluation

The Structural Similarity Index (SSIM) is used to compare genuine and generated facial photos from CelebA dataset. Table 2 displays the result of the SSIM scores for the images chosen at random. According to the SSIM findings, a rising proportion of artificially created facial photographs resemble the genuine images taken from the CelebA collection. The comparatively low values are owing to the limited reliability of the produced photographs, but they might readily be boosted with some extra training time, resulting in higher-quality face shots.

Table- 2: SSIM Scores Of Some Random Images.

	Structural Similarity Index
20 random images	0.13
100 random images	0.26
200 random images	0.29
500 random images	0.35

4. CONCLUSIONS

GANs are an intriguing concept, which have applications in medicine, computer gaming, and animation. The Deep Convolutional Generative Adversarial Network (DCGAN) was trained to produce phony faces resembling celebrities to demonstrate how effective it is at producing realistic photos. The DCGAN model was trained and tested using the CelebA dataset. The effectiveness of the produced pictures was evaluated in this work using the Structural Similarity Index (SSIM). The core CelebA dataset's fake face photos included in the model showed the highest structural similarity, 0.34. These synthetic face pictures might be utilized to train additional models for a variety of supervised or labelled learning applications. The use of GANs to create high-quality photos might be added to the current work. Future studies should focus on improving architecture that can produce high-quality synthetic pictures in constrained settings, for example those with constrained computer resources and training time. Additionally, it can be used with FPGA, DSP, Geforce Jetson, and Edge hardware boards. [11] [12] [14] [15] [16] [17].

5. REFERENCES

[1].Ian. J. Goodfellow et al.,"Generative Adversarial. Networks", In Proceedings of the Neural Information.Processing Systems, pp. 248- 260, 2014.
[2].Ian.Goodfellow, "NIPS Tutorial: Generative Adversarial Networks", arXiv:1701.00160, 2017.
[3].Han.Zhang et all., "Self-Attention Generative Adversarial Networks", CVPR, arXiv:1805.08318v2, 2018.
[4].Alexey.Kurakin et all, "Adversarial examples in the physical.world", CVPR, arXiv:1607.02533v4, 2017.
[5]. Radford Alec, et all., "Unsupervised Representation Learning with Deep Convolutional. Generative Adversarial Networks", CVPR, arXiv preprint arXiv:1511.06434, 2016.
[6].Alec Radford et all., "Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks", CVPR, arXiv:1511.06434v2 2016. [7] Karol Gregor et all., "Draw: A recurrent neural network for image generation", CVPR, arXiv:1502.04623v2, 2015.
[8].Ting-Chun Wang et all., "High-Resolution Image Synthesis and Semantic Manipulation with Conditional GANs", CVPR, arXiv:1711.11585v2, 2017.
[9].Yongyi Lu et all., "Attribute-Guided Face. Generation Using Conditional CycleGAN", CVPR, arXiv:1705.09966v2, 2018.
[10].Dominic Monn et all., "Deep convolutional generative adversarial networks with. TensorFlow", OREILLY, 2017.
[11].Biswas A., Jain A., Mohana "Survey on Edge Computing–Key Technology in Retail Industry,"Lecture Notes on Data Engineering and Communications Technologies, vol 58. Springer, Singapore.
[12].Mohana et al.,"Object Detection and Tracking using Deep Learning and Artificial Intelligence for Video Surveillance Applications" International Journal of Advanced Computer Science and Applications(IJACSA), 10(12), 2019.
[13].M. R. Nehashree et al.,"Simulation and Performance Analysis of Feature Extraction and Matching Algorithms for Image Processing Applications," International Conference on Intelligent Sustainable Systems (ICISS), 2019.
[14].D. Akash, et al.,"Interfacing of flash memory and DDR3 RAM memory with Kintex 7 FPGA board," 2017 2nd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2017.

[15].V. P. Korakoppa et al.,"An area efficient FPGA implementation of moving object detection and face detection using adaptive threshold method," International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2017.
[16].V. P. Korakoppa et al.,"Implementation of highly efficient sorting algorithm for median filtering using FPGA Spartan 6," 2017 International Conference on Innovative Mechanisms for Industry Applications (ICIMIA), 2017.
[17].S. K. Mankani et al.,"Real-time implementation of object detection and tracking on DSP for video surveillance applications,"International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2016.
[18].Pradhyumna P et al.,"Graph Neural Network (GNN) in Image and Video Understanding Using Deep Learning for Computer Vision Applications," 2nd International Conference on Electronics and Sustainable Communication Systems(ICESC),2021.

AN EFFICIENT PROGRAMME FOR A STUDENT ATTENDANCE TRACKING SYSTEM WITH A GEOGRAPHIC FOCUS

Ms.Manasa G V Kumar[1], Srivalli N[2], Simple K S[3], Yashvanth P S[4], Uday[5]

[1] *Assistant Professor, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[2] *Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[3] *Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[4] *Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[5] *Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

A software solution created to make tracking student attendance easier is called An efficient programme for a student attendance tracking system with a geographic focus. The tool tracks students' locations in real-time using Face Detection Based technology, doing away with the necessity for manual attendance taking. Students can quickly check-in to their classes using this software on their mobile devices, which have GPS capabilities. Their presence is automatically tracked by the programme, which also sends the information to a central database that teachers and administrators may see immediately. Overall, the Face Detection Based Student Attendance System Mobile Application is a dependable and effective method for taking attendance that streamlines the procedure and saves time and money for schools. This application is a must-have for any school wanting to update their attendance tracking system due to its user-friendly interface and robust capabilities.

Keyword :- *Real-time, Check-in, Automated, Alerts, Notifications, Analytics, Reports etc..*

1. INTRODUCTION

The traditional paper-based attendance system has been widely used by educational institutions for decades. However, it can be prone to errors, time-consuming, and often difficult to manage, especially for larger institutions. With advancements in technology, a more efficient and accurate way of tracking student attendance has emerged - the Face Detection Based Student Attendance System Mobile Application.

This application leverages the power of Face Detection Based technology to track the real-time location of students and automatically record their attendance when they arrive at school. By using the GPS capabilities of mobile devices, students can easily check-in to their classes, and the application will automatically send the attendance data to a centralized database. This enables teachers and administrators to monitor attendance in real-time and take appropriate actions to improve student attendance.

The Face Detection Based Student Attendance System Mobile Application offers several features that make it an essential tool for any educational institution. These include automated alerts for parents, real-time notifications for absent students, and the ability to generate reports and analytics on attendance data. By providing this information, the application helps teachers and administrators identify patterns and trends and take proactive measures to improve attendance.

1.1 Existing Problem

One of the main problems with the traditional paper-based attendance system is the lack of accuracy and reliability. The manual process of taking attendance can be prone to errors, such as misspelled names, incorrect recording of attendance, and misplaced attendance sheets. This can lead to confusion and inaccurate reporting, affecting the overall effectiveness of the attendance tracking system.

Another problem is that the traditional attendance system can be time-consuming, especially for larger institutions with hundreds or thousands of students. This can lead to delays in taking attendance, which can impact the start of classes and cause disruptions in the learning process.

Finally, the traditional attendance system does not provide analytics or reports on attendance data, making it difficult for teachers and administrators to identify patterns and trends and take proactive measures to improve student attendance.

These problems can be overcome by implementing the Face Detection Based Student Attendance System Mobile Application, which offers a more efficient, accurate, and reliable way of tracking student attendance.

2. LITERATURE SURVEY

Many research studies have been conducted on the use of Face Detection Based Student Attendance System Mobile Applications in educational institutions. A study conducted by Chinnery and Kuhne (2018) found that the application of such an application resulted in a significant increase in attendance rates among students. The study also found that the application helped teachers and administrators identify patterns and trends in attendance data and take proactive measures to improve student attendance.

Another study conducted by Gouda et al. (2019) found that the implementation of a Face Detection Based Student Attendance System Mobile Application reduced the time and resources required to manage the attendance system in educational institutions. The study also found that the application improved the accuracy and reliability of attendance data and provided real-time notifications for absent students.

Furthermore, a study conducted by Amasha and Bajaj (2020) found that the implementation of a Face Detection Based Student Attendance System Mobile Application improved the communication between teachers, students, and parents. The study found that the application provided automated alerts for parents, real-time notifications for absent students, and generated reports and analytics on attendance data.The study also identified concerns around privacy and data security.

2.1 OBJECTIVES

The main objectives of implementing a Face Detection Based Student Attendance System Mobile Application in educational institutions are:
Improve accuracy and reliability: The application should provide a more accurate and reliable way of tracking student attendance, eliminating errors and reducing the risk of inaccurate reporting.
Real-time tracking and notifications: The application should enable real-time tracking of student attendance and provide notifications for absent students, allowing teachers and administrators to take timely action to improve attendance.
Streamline the attendance system: The application should streamline the attendance tracking system, reducing the time and resources required to manage attendance data.
Generate reports and analytics: The application should provide reports and analytics on attendance data, enabling teachers and administrators to identify patterns and trends and take proactive measures to improve student attendance.
User-friendly and modern: The application should be user-friendly and modern, providing an intuitive interface that is easy for teachers, students, and parents to use.
Ensure data privacy and security: The application should ensure the privacy and security of attendance data, protecting student information from unauthorized access or disclosure.
Cost-effective: The application should be cost-effective, providing a solution that is affordable and sustainable for educational institutions of all sizes.

3. DESIGNS AND IMPLEMENTATION

The creation and application of a Face Detection Based Student Attendance System Mobile Application involves several steps, including:

1. Requirement gathering: Identify the requirements of the application, including the features, functionalities, and user interface design.
2. Technology selection: Select the appropriate technology stack for the application, considering factors such as scalability, security, and compatibility.
3. System architecture: Develop the system architecture for the application, including the database design, application servers, and APIs.
4. User interface design: Design the user interface for the application, ensuring that it is intuitive and easy to use for teachers, students, and parents.
5. Application development: Develop the application using the selected technology stack and system architecture, ensuring that it meets the identified requirements.
6. Testing and quality assurance: Conduct comprehensive testing and quality assurance to ensure that the application is stable, reliable, and free from errors.
7. Deployment and integration: Deploy the application on the appropriate servers and integrate it with other systems, such as student information systems and learning management systems.
8. Maintenance and support: Provide ongoing maintenance and support for the application, ensuring that it remains up-to-date and functional.

In terms of the specific features and functionalities of the Face Detection Based Student Attendance System Mobile Application, it should include:

1. Face Detection: The application should track the Facial expressions and other characteristics registered in the database.
2. Real-time notifications: The application should send real-time notifications to teacher and parent when a student is absent from class.
3. Analytics and reporting: The application should provide analytics and reporting on attendance data, allowing teachers and administrators to identify patterns and trends.
4. User roles: The application should have different user roles, including teachers, students, and parent, each with their possess set of permissions and access levels.
5. Security and privacy: The application should ensure the security and privacy of attendance data, protecting student information from unauthorized access or disclosure.
6. User interface: The application should have a modern and intuitive user interface, making it easy for teachers, students, and parents to use.

4. TESTING & RESULTS

Testing and Results for a Face Detection Based Student Attendance System Mobile Application would involve several steps, including:

- Functional testing: This would involve testing the application's core functionalities, such as location tracking, real-time notifications, user roles, and reporting.
- Usability testing: This would involve testing the application's user interface and user experience to make sure that it is intuitive and easy to use.
- Performance testing: This would involve testing the application's performance under different loads and conditions to make sure that it is stable and reliable.
- Security testing: This would involve testing the application's security features, such as data encryption, authentication, and authorization, to make sure that it is secure and protected from unauthorized access.

The results of testing would be analyzed to identify any issues or bugs in the application, and these would be addressed through further development and testing. Once the application has been thoroughly tested and verified, it can be deployed to the educational institution for use by teachers, students, and parents.

The effectiveness of the Face Detection Based Student Attendance System Mobile Application can be evaluated based on several metrics, including:

- Accuracy and reliability of attendance data: The application should provide accurate and reliable attendance data, reducing errors and improving reporting.
- Improved attendance rates: The application should help to improve student attendance rates by providing timely notifications and enabling proactive measures to be taken to address attendance issues.
- Time and cost savings: The application should streamline the attendance tracking process, reducing the time and resources required to manage attendance data.
- User satisfaction: The application should be user-friendly and modern, providing an intuitive interface that is easy for teachers, students, and parents to use.
- Data security and privacy: The application should ensure the privacy and security of attendance data, protecting student information from unauthorized access or disclosure.

5. CONCLUSION

To sum up, a mobile application for a Face Detection Based student attendance system allows educational institutions to monitor student attendance in real time using GPS technology. The software could increase attendance rates while lowering mistakes and the time-consuming administrative duties involved in manual attendance tracking.

The development and implementation of such an application require careful consideration of user requirements, appropriate technology selection, and a robust system architecture. Testing and evaluation of the application are essential to ensure that it meets the identified requirements and is stable, reliable, and free from errors.

The application should also provide a modern and intuitive user interface, offer different user roles, ensure the privacy and security of attendance data, and integrate with other systems to avoid duplication of effort and ensure seamless data flow.

Overall, a Face Detection Based Student Attendance System Mobile Application can benefit educational institutions and their stakeholders by providing a streamlined and efficient way of tracking attendance, allowing for proactive measures to be taken to address attendance issues, and improving the overall educational experience for students.

6. REFERENCES

[1] Aggarwal, A., & Sahni, A. (2015). Smart attendance system using facial recognition. 2015 IEEE International Advance Computing Conference (IACC).

[2] Deepa, M. N., & Narayanan, N. K. (2017). RFID based automated student attendance system. 2017 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS).

[3] Kaur, M., & Goyal, R. (2017). Face recognition-based student attendance system using IoT. 2017 2nd International Conference on Telecommunication and Networks (TEL-NET).

[4] Odhikari, M. R., Roy, P. K., & Ray, P. P. (2017). An IoT-based solution for automated attendance management system using Bluetooth low energy beacon. 2017 2nd International Conference on Communication Systems, Computing and IT Applications (CSCITA).

[5] Bhatt, R. K., Joshi, A., & Haldankar, A. (2018). Smart attendance system using IoT and machine learning. 2018 4th International Conference on Internet of Things: Smart Innovation and Usages (IoT-SIU).

MALWARE DETECTION AND PROVIDE REMEDIES USING COUNTERMEASURE SELECTION

Dr. Selvi M[1], Keerthana R[2], Madhushalini M[3]

[1] *Associate Professor, Computer Science and Engineering, Rajarajeswari college of engineering, Karnataka, India*
[2] *Student, Computer Science and Engineering, Rajarajeswari college of engineering, Karnataka, India*
[3] *Student, Computer Science and Engineering, Rajarajeswari college of engineering, Karnataka, India*

ABSTRACT

These days, cloud computing is used by both suppliers and users in the majority of businesses, including the public sector. Cloud computing has, however, become a target for hackers and criminals who want to take advantage of its weaknesses as a result of its increasing popularity. The Distributed Denial-of-Service (DDoS) assault is one such attack that can be carried out by compromising virtual computers within the cloud system. This comprises a number of procedures, including vulnerability scanning and compromising weak virtual computers to produce zombies that are subsequently utilized to launch DDoS attacks. It might be difficult to identify these attacks within the cloud system, especially in Infrastructure-as-a-Service (IaaS) clouds. We offer NICE, a multi-phase distributed mechanism that uses analytical models and customizable virtual network-based countermeasures to identify vulnerabilities, assess threats, and choose the best countermeasures, to address this problem. Through system and safety evaluations, our suggested solution has proven to be effective and efficient in preventing the cloud's vulnerable machine virtualization from being compromised.

Keyword: - *Intrusion Detection, Network Security, Counter-Measure Selection*

---

1. INTRODUCTION

Security is the top concern for users moving to cloud computing, according to recent research. According to a recent survey by the Cloud Security Alliance, which was (CSA), the misuse and malicious usage of cloud computing pose the biggest security risk. Attackers can use cloud resources to launch assaults by taking advantage of weaknesses in cloud systems. The host machines have centralized identifying vulnerabilities and patching capabilities. Patching known security flaws may not be as efficient as well may even be in violation of the Service Level Agreement (SLA) in cloud data centers where cloud users have the ability to control software on their managed virtual machines (VMs).

Furthermore, cloud users installing vulnerable software on their virtual machines (VMs) can create security holes in the cloud. The main difficulty is to create a system that is efficient at identifying vulnerabilities and assaults, reacting to them, and minimizing the effects of security breaches on cloud users. Protecting "business continuity and service availability" from service disruptions is one of the top challenges in cloud computing systems, M. Armbruster et al. emphasized in a prior study. Attackers can more effectively leverage shared resources in a cloud system, whose infrastructure is shared by potentially millions of users, by abusing them and using them maliciously. This allows them to take advantage of cloud vulnerabilities. Due to the common practice of cloud users sharing computing resources, cloud-based settings are particularly susceptible to such assaults.

They frequently connect via the same switching and share file and data storage, which leaves them open to potential attackers. It is also tempting for attackers to compromise many VMs due to the similarities of VM installations in the cloud, including virtualized methods, VM operating systems, installed sensitive applications, networking, and other elements.

2. SYSTEM ANALYSIS

The identification and mitigation of possible risks to the technological ecosystem of an organization depend heavily on cyberthreat assessments. It entails investigating each potential vector, whether it arises from non-human or human sources, that could represent a threat to an apparatus or asset.
Cyberthreat analysis is often an organized, repeatable process that enables businesses to reliably recognize and address possible risks. To assist organizations in creating a successful threat remediation plan, it entails obtaining data, analyzing data, and external counsel and recommendations.
Overall, any complete cybersecurity strategy must include a study of cyberthreats. Organizations can lessen their risk of cyberattacks by proactively identifying and fixing potential vulnerabilities.

2.1 Existing System

Currently, attackers are able to launch massive Distributed Denial-of-Service (DDoS) incidents by taking advantage of flaws in cloud systems and compromising virtual machines. A DDoS attack often comprises a number of processes, including multi-step profiteering, lower-frequency vulnerability scanning, and the compromise of susceptible virtual machines to create zombies, which are then used to launch the DDoS attack. It is quite difficult to detect zombie exploration assaults in the cloud system, especially in Infrastructure-as-a-Service (IaaS) clouds.

2.2 Proposed System

In the second stage, NICE-B analyses the cloud traffic behaviorally and employs machine learning methods to identify zombie virtual machines. The framework trains a model based on machine learning to distinguish between regular and zombie VMs using a set of attributes that capture various aspects of cloud traffic. When a zombie virtual machine is found, NICE-C is activated to isolate the infected machine from the network's resources and launch a fresh, unharmed machine in its place. By using this method, zombie VMs are swiftly discovered and eliminated, ensuring that they can't be exploited in cyberattacks. Overall, NICE offers a thorough defense-in-depth strategy for protecting cloud systems from zombie VMs.
The NICE-A agent uses mirroring technology to capture a copy of the network traffic flowing through the server. This copy is then analyzed by the agent using various intrusion detection techniques, such as signature-based detection, anomaly detection, and behavior-based detection. By deploying NICE-A on each cloud server, the framework can detect and respond to potential security threats in real-time, regardless of the location or origin of the attack. This helps to improve the overall security posture of the cloud environment and mitigate the risk of data breaches and other cyber-attacks. Then, within a cloud server to establish Scenario Attack Graphs (SAGs).

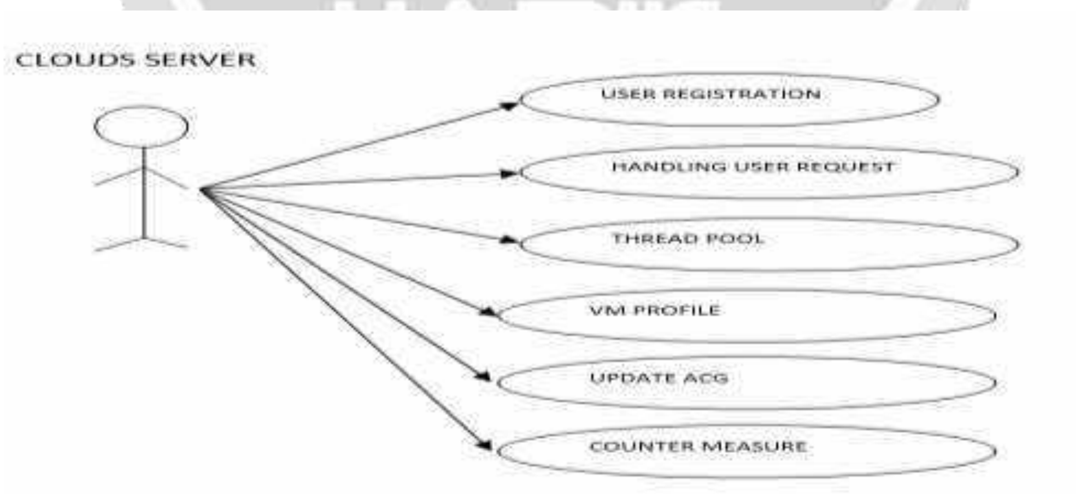


Fig 1: Cloud Server

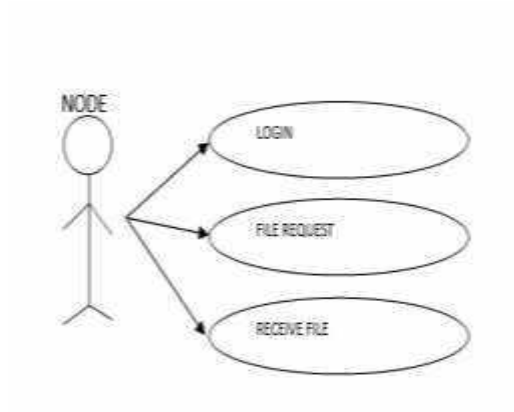


Fig 2: Node

3. FUNCTIONAL REQUIREMENTS

- Server use should be frequently examined by NICE-A.
- NICE-A should verify the client's IP address if the quantity of packets delivered from the client's computer to the VM surpasses the threshold.
- The NICE-A software must prevent packets from the attacker.

3.1 Cloud Computing

A methodology for delivering computing resources over the internet that gives customers access to services on demand is called cloud computing. This eliminates the need for businesses to purchase and maintain their own infrastructure by enabling rapid and easy access to computing resources.
The capacity of cloud computing to reduce administrative and service requirements is another significant aspect. The management and administration of the core infrastructure, including duties like security, upkeep, and upgrades, is often handled by cloud providers. The idea of cloud computing satisfies the ongoing demands of IT.
In that end users can use computing resources without being aware of the underlying infrastructure necessary to offer those resources, cloud computing can be contrasted to the energy grid. A novel approach to providing IT services based on internet standards called "cloud computing" enables the dynamic delivery of scalable, frequently virtualized resources. Users no longer need to spend money on and operate their own infrastructure in order to scale up or down the amount of computing power as needed.

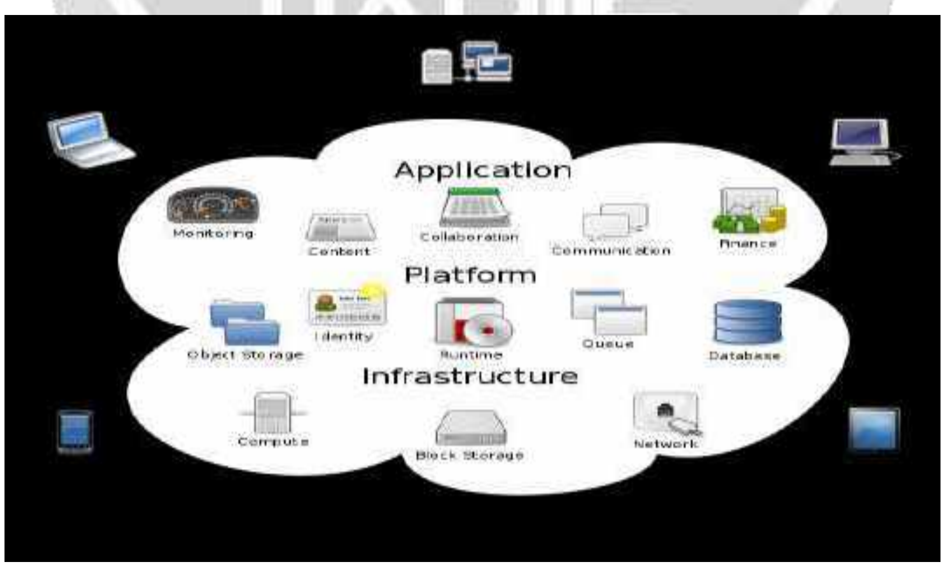


Fig 3: Cloud Computing

3.2 Intrusion detection system

An organization's safety apparatus must include a system for detection of intrusions (IDS). Its main job is to keep an eye out for malicious activity or policy breaches on the network or system and notify security administrators of them.

Network-based intrusion detection systems and host-based IDS are the two primary categories of IDS. While host-based IDS keeps an eye on specific hosts for unusual behavior, such as changes to important system files or unauthorized access attempts, network-based IDS examines network traffic and searches for discrepancies or patterns that offer an intrusion attempt.

This is taken a step further by systems for the detection and prevention of intrusions (IDPS), which not only identify possible threats but also take measures to thwart them. This may entail isolating infected hosts, cancelling unauthorized connections, or blocking suspicious traffic.

1. Active response: Using this strategy, the IDPS responds to an assault right away.
2. Passive response: As opposed to an active response, with a passive response, the IDPS notifies the security team of the threat but does not take any immediate steps to mitigate it.
3. Proactive response: Using this strategy, the IDPS modifies the security landscape to thwart upcoming threats.
4. Retrospective response: In a retrospective response, the IDPS examines the attack after it has occurred to discover what transpired and how to avoid reoccurring attacks.

3.3 Virtual network

A form of computer network that employs network virtualization techniques is a virtual network. Instead of physical connections, these virtual network linkages are built utilizing network virtualization techniques.

Network virtualization can be divided into two primary categories: virtual networks built around virtual devices and virtual networking based on protocols. Virtual networks that rely on protocols, such VLANs, VPNs, and VPLSs, build logical connections on top of real networks. On the other hand, artificial networks based on simulated gadgets use virtual equipment to build virtual networks, including virtual routers, servers, and firewalls.

Virtual private networks (VPNs), another sort of protocol-based virtual network in addition to VLANs, are frequently used to safely connect remote users or geographically dispersed networks over the internet. By building a virtual bridge among several LANs, virtual personal LAN services (VPLSs), another type of distributed network, enable LAN services to be extended over a network that is wide-area (WAN).

Virtual networks, in general, offer a flexible and scalable method of implementing network structure, and they have grown in popularity in contemporary data center settings where virtualization is frequently used.

4.IMPLEMENATION

To capture and analyze cloud traffic, the NICE-A agent, which is small and lightweight, is first installed on each cloud server. Periodically, this agent analyses the cloud server for vulnerabilities and builds a Scenario Assault Graph (SAG) depending on the importance of the discovered flaws in the context of cooperative attack objectives. Based on the SAG, NICE determines whether or not to place a virtual machine, or VM, in network inspection status.

When a virtual machine (VM) reaches the inspection state in the second phase, Deep Packet Inspection, or DPI, and/or virtual networks are used. This reduces false positives and enables more accurate identification of possible assaults. The virtual network modifications can involve actions like isolating the virtual machine (VM) or limiting particular types of traffic. The DPI unit evaluates packets in immediate time to look for any suspicious behavior or patterns.

Overall, NICE offers a thorough method for detecting intrusions in cloud settings, integrating passive and active defenses to find and stop possible threats.

.

4.1 User Module

The management of the ontology system's users falls under the purview of this module. To ensure that only authorized users may access the information offered in the system, it has authentication and security mechanisms.

Users must register for accounts in the system in order to access any search for information. They need to sign up in order to create an account if they don't already have one.
In order to keep the ontology system secure and restricted to authorized users, it is imperative that the user module is functioning properly. It assists in safeguarding confidential data and preventing unauthorized access or system abuse. To assure tasks, the module could have features like password security, two-factor authorization, and user role management.

4.2 Counter-Measure Selection

The task of choosing acceptable countermeasures from a range of potential possibilities falls under the purview of the Countermeasure Selection module. When an alert is produced for a node that has been compromised in the NICE system and the average likelihood of that node rises to 1, this module is activated. The algorithm then chooses countermeasures to lessen the attack after calculating the new cumulative likelihoods for the child networks of the compromised node.
The system may be able to use a variety of countermeasures, such as limiting traffic from or to the affected node, isolating the node, or adding more security measures like firewalls or intrusion detection systems. The choice of countermeasures is based on the seriousness of the assault, the possible impact on the entire system, and the resources that can be used to put the countermeasures into action.
The NICE system's Countermeasure Selection module is essential for preventing attacks. The module aids in limiting the damage brought about by assaults and preventing future system compromise by choosing the proper countermeasures in reaction to alarms provided by the system.

4.3 Attack Analyzer

The Attack Analyzer module is an essential part of the NICE network and is in charge of carrying out various crucial tasks. These include the creation and updating of attack graphs, alert association, and countermeasure choice.
There are three steps involved in creating and using a scenario Assault (also known as SA) in the NICE system. The system gathers data regarding potential flaws and vulnerabilities in the goal's system during the data gathering stage. The attack graph that results from this information depicts potential attack methods that an intruder could utilize to breach the system.
The attacker's exploits are represented by each of the nodes in the attack graph. The attack scanner then continually checks the system for indications of compromise and sends out notifications when any suspicious activity is found. The alert association function examines these alerts and compares them to the attack graph to identify probable exploit paths being followed by the attacker.
The countermeasure decision module makes the appropriate countermeasure selections in light of this analysis to lessen the impact of the assault and stop future system compromise. In order to protect the target system's security and integrity, the attack scanner module is essential for identifying and thwarting assaults on the NICE system.

4.4 False Alarms

An everyday difficulty for intrusion detection systems is managing a huge number of warnings in a cloud infrastructure with hundreds of nodes. The paper suggests several methods, one of which is to compare the alarms produced by Turbulence with the identified weaknesses in the attack tree. By confirming whether the alert is linked to a weakness being exploited, it can be determined whether a real attack is more probable to have taken place.
However, this method has drawbacks, especially in instances of zero-day incidents where the attacker takes advantage of a vulnerability that the vulnerability scanners or the attack graph are not yet aware of. In certain situations, the alert might be dismissed even though the attack is legitimate.
Future research should focus on lowering the number of false positives for identifying zero-day threats. This can entail creating more sophisticated detection methods that do not only rely on known attack vectors and weaknesses. To lessen the danger of zero-day attacks, vulnerability scanners should also be periodically updated with the most recent vulnerability databases.
In conclusion, while matching alarms with recognized weaknesses in the assault graph can aid in lowering the false positive rate, it's critical to recognize the drawbacks of this strategy and keep looking into new ways to identify zero-day attacks and lower the inaccurate negative rate.

Table -1: NICE Test Case

MODULE	GIVEN I/P	EXPECTED O/P	ACTUAL O/P	RESULT
USER (LOGIN)	VALID USER NAME PASSWORD	LOGIN INFO	LOGIN SUCCESS	OK
USER (LOGIN)	INVALID USER NAME PASSWORD	LOGIN INFO	CHECK USERNAME PASSWORD	OK
USER (FILE REQUEST) VALID	FILE NAME FILE TYPE	CLOUD RESPONCE	FILE RECEIVED	OK
USER (FILE REQUEST) INVALID	FILE NAME FILE TYPE	CLOUD RESPONCE	USER RISTRICTED	OK
NICE –A	USER INFO (VALID)	ALLOCATE USE R RESOURCE	RESOURCE ALLOCATED	OK
NICE –A	USER INFO (INVALID)	RETRICT USER	USER RESTRICTED	OK
VM PROFILING	USER FILE INFO,HREAD INFO	ASSIGN THREAD AND FORWARD PACKET	THREAD ASSIGNED PACKET FORWARD	OK

5.CONCLUSION

The system NICE, which is intended to detect and neutralise collaboration attacks in the cloud's virtual networking environment, is described in the study. The attack graph model is used by NICE to forecast and identify attacks, and it makes use of the programming ability provided by software switches to increase detection precision and thwart parts of collaborative attacks that involve victim exploitation.

However, the paper points out that NICE only looks into network IDS approaches to thwart zombie exploratory attacks, despite the performance evaluation showing that Nice can substantially mitigate the risk of the cloud services abused and mistreated by both internal and external use attackers.

The paper emphasizes that future work will examine the ability to grow of the proposed NICE remedy by exploring a decentralized network command and attack analysis model. Overall, the paper offers an intriguing method for identifying and mitigating productive attacks in cloud systems.

6.FUTURE ENHANCEMENT

Future enhancements are modifications or additions that could be applied to a platform or solution to increase functionality or take into account new needs or requirements.

There seem to be two possible areas for future improvement in light of the details you gave in your query. The first is to include host-based intrusion prevention system solutions to enhance the recommended network IDS approach's detection accuracy for thwarting zombie exploratory attacks.

The investigation of the suggested NICE solution's scalability is the second topic for future improvement. To enhance the solution's scalability, this would entail investigating decentralised network management and attack analysis models.

Overall, further improvement is a crucial component of software development because it ensures that the framework or solution remains applicable and efficient in responding to the stakeholders' changing needs and requirements. Additionally, it offers chances to enhance the system's functionality, scalability, and usability, which can increase user adoption and value.

7.REFERENCES

[1]. B.B. Zarpela˜o, R.S. Miani, C.T. Kawakani, S.C. de Alvarenga, A survey of intrusion detection in Internet of Things, J. Netw. Comput. Appl. 84 (2017) 25–37, https://doi.org/10.1016/j. jnca.2017.02.009.

[2]. D. Miorandi, S. Sicari, F. De Pellegrini, I. Chlamtac, Internet of things: Vision, applications and research challenges, Ad Hoc Networks 10 (7) (2012) 1497–1516, https://doi.org/10.1016/j. adhoc.2012.02.016.

[3]. A.B. Feroz Khan, G. Anandharaj, A Multi-layer Security approach for DDoS detection in Internet of Things, Int. J. Intell. Unmanned Syst. 9 (3) (2020) 178–191, https://doi.org/ 10.1108/IJIUS-06-2019-0029.

[4]. Koroniotis, N.; Moustafa, N.; Sitnikova, E.; Turnbull, B. Towards the development of realistic botnet dataset in the internet of things for network forensic analytics: Bot-IoT dataset. Future Gener. Comput. Syst. 2019, 100, 779–796.

[5]. Pa, Y.M.P.; Suzuki, S.; Yoshioka, K.; Matsumoto, T.; Kasama, T.; Rossow, C. IoTPOT: Analysing the rise of IoT compromises. In Proceedings of the 9th USENIX Workshop on Offensive Technologies (WOOT 15), Washington, DC, USA, 10–11 August 2015.

EYERIS: AN AID FOR BLIND ASSISTANCE

Kamal Raj T[1], I Amali Akshaya[2], KV Himasai[3], Kiran N[4], Mohammed Reehan Alam[5]

[1] *Associate professor, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[2] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[3] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[4] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[5] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

There is little aid for blind assistance, Therefore, it is necessary to put into action a tool that helps them with their daily tasks. There are existing systems and software that provide visual assistance for reading and accessing a few devices, but these systems lack when the disabled person wants to do some basic tasks like identifying the surroundings in front of them such as a person or object. Therefore, very few mechanisms are invented that aid communication between the blind person and the deaf-dumb person. This project is designed to aid and help a blind person or partially impaired eyesight. This system is developed to aid blind persons without a guardian needed. The software and hardware are designed in a way that helps to detect objects, people, and gestures in vision and recognize them. This is a method that implements object detection and person recognition. For communication between dead-dumb and blind people, we use Sign language which is detected and recognized, and the same is notified to the user. The object or sign is transmitted to a blind person in the form of audio. The idea is to make blind people's lives independent and affordable by offering them affordable solutions.

Keyword: - *Real-time Object detection, Face Recognition, Text-to-Speech, Deep Learning, Visually impaired, Gesture-to-voice.*

---

1. INTRODUCTION

Eyeris is a project that is developed to aid visually impaired people. Blind people lead a difficult life and they rely on others to know about their surroundings or things. They cannot experience the world as we do and it is difficult for them to do basic activities in day-to-day life. Most existing systems only provide a way to do activities such as reading and writing [1]. So to help them Eyeris will perform activities to aid and make them independent.

Eyeris uses different modules to achieve the desired system. It has different modules supporting different operations. The input is captured by the camera as live video and every frame is broken down into frames. The deep neural network processes each frame, marking the appropriate enclosing boxes with various aspect ratios. Then, the best-fit box is selected for the object depending on the prediction score of each enclosing box. For Facial Recognition, each box is compared to an increasing set of facial features. If it fails to analyze even one feature then the box is discarded and determined to not be a facial region [2]. If it is found as the face region then, based on the algorithm, the face is compared with the datasets of faces to see if it recognizes the face or not. The result of any object detection, sign language, or gesture detection is translated into audio using Python gTTS (Google Text-To-Speech) for the person to hear.
The object detection model is trained using YOLO (You Only Look Once), which suggests an end-to-end neural network that predicts bounding boxes simultaneously and class probabilities [3]. The model for detecting objects was trained using the COCO dataset which is large-scale object detection, segmentation, and captioning Dataset.

Eyeris is also made to achieve portability and an easy-to-use interface. This program separates itself into major aspects like object detection, face recognition, gesture recognition, and text-to-speech.

2. 2. EXISTING SYSTEM

A paper “Smart Vision System for Blind” in 2014 [4], was demonstrated to support blind people for movement within unfamiliar surroundings. Another paper used different devices to help indoor and outdoor movement with GPS to track the coordinates of the position of the person using the device [5]. The paper “Oculus” focused on facilitating blind people to self-navigate themselves with no assistance from a third person [6]. Also, there are smartphone-based systems to guide the visually impaired with convenient user interfaces.

Development in the area of computer vision as well is made by processing texts from real-time images. Face recognition by comparing with databases also became an appreciated paper at the IEEE paper conference. A portable and wearable device was developed by merging face detection, face recognition, and audio output modules. A first-rate approach for image processing is given by OpenCV to our stated problem. It is stated in a paper that images are classified using OpenCV and AdaBoost algorithm. The paper “Real-Time Hand Gesture Recognition Using Finger Segmentation” proposed a four-step architecture for recognizing hand gestures. Hand detection is done with the background-subtraction technique. The fingers and palm are separated to distinguish and recognize the fingers. The paper states a problem with the hand movements that are not efficiently recognized if the background color in the stream is the same as the skin color. Using machine learning algorithms to recognize gestures tends to perform better. In another paper, to emphasize object detection based on hue, saturation, and color value range (HSV), the OpenCV application was put into place.

As technology progresses, more effective algorithms, methods, and systems are proposed and created for reliable service as well as real-time detection with less amount of lag and the highest level of accuracy.

This paper uses the YOLO (You Only Look Once) method which is effective in developing reliable systems in real-time. Here the COCO dataset is the one utilized for object detection. One of the most widely used large-scale labeled image datasets made accessible to the public is The Common Object in Context (COCO). YOLO is a single-shot detector that processes an image using a fully convolutional neural network (CNN).

These works served as an inspiration and a copious source of direction for our intended solution, and they also identified potential roadblocks to our advancement. Based on these shortcomings, we set out to design a more progressive solution and smart system to assist the blind.

3. WORKING

The process takes place in the following steps:
1. Capturing the image: A camera is used to collect an ongoing stream of images in real-time.
2. Detecting the objects: On the dataset of various objects, a deep-learning YOLO model is trained. A bounding box is drawn around the object at this stage.
3. Informing the user: The user is informed about the object in the visual frame in the form of audio. This step uses text-to-speech recognition [7].
4. Real-time Face recognition: This prototype also has a face recognition feature that helps the user to identify individuals in the dataset and their names will be transmitted as audio.
5. Gesture recognition: The deaf person's gestures will be recognized, and matched with the gesture datasets, and if recognized, the gesture is pronounced.

4. OBJECT DETECTION

Object identification is probably one of computer vision's most promising subfields. It describes the computer system's capacity to find and recognize instances of objects [5]. Drawing bounding boxes around things that are discovered enables us to locate them in a scene. This is how object detection works. One of the earliest effective attempts to address object detection issues came in 2014 with the development of the R-CNN model [8]. This model used region proposal techniques with convolutional neural networks (CNNs) to locate and detect objects in images. The two primary classifications of object detection algorithms are single-shot detectors and two-stage detectors.

4.1 YOLO (You Only Look Once)

Convolutional neural networks (CNN) are included in the YOLO method to recognize objects in real-time. The algorithm requires only a single forward propagation through the aid of a neural network to find objects. The input of an image into the YOLO algorithm, which then employs a deep convolutional neural network to find objects in the picture.

The CNN model's architecture, the foundation of YOLO, is depicted here. Before passing the input image through the convolutional network, the architecture resizes it to 448x448. A 1x1 convolution is employed to lessen the number of channels, and a 3x3 convolution is then used to develop a cuboidal output. The activation function under the hood is ReLU, except for the final layer, which employs a linear activation function. Some extra techniques, consisting of batch normalization and dropout, respectively regularize the model and prevent it from overfitting.

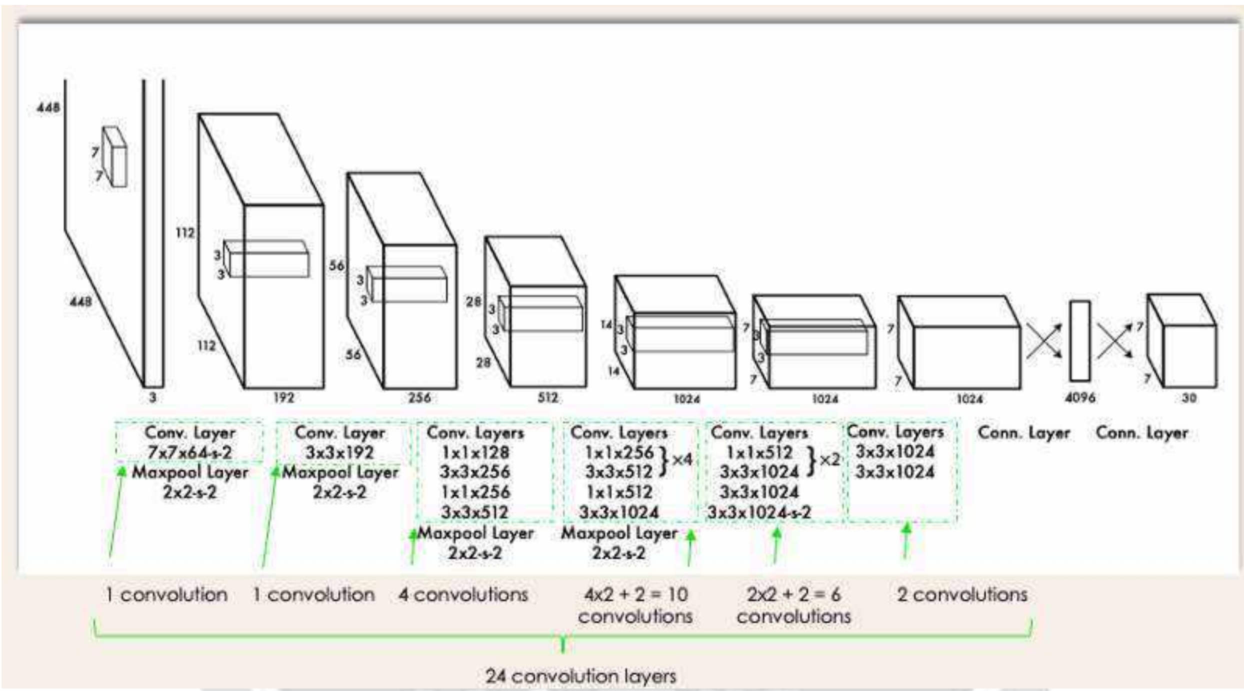


Fig -1: YOLO Architecture Diagram

4.2 COCO Dataset

Among the most well-known large-scale image, datasets are COCO, which stands for Common Object in Context. It features over 1.5 million object instances and image annotations in 80 categories for a sample of the items we encounter every day. The labeling of objects is used to complete instance segmentation which labels every instance of an object in every segmentation [5]. Microsoft created this dataset to facilitate the studies of understanding scenes. Fig. 2 shows some objects of the COCO dataset.

Fig -2: Objects of COCO dataset [5]

Fig. 3 shows the flow of the Object Detection project. A camera records the surrounding scenes and the images are passed to the YOLO model, which finds and recognizes the objects in the images. The recognized object name is presented as text output with bounding boxes around objects. Then the name of the object is passed to the Speech model which converts the object names in the text form to an audio file. Then the audio is played to the user automatically through speakers. So, the user can hear the object's name and understand what object is exactly in the scene.

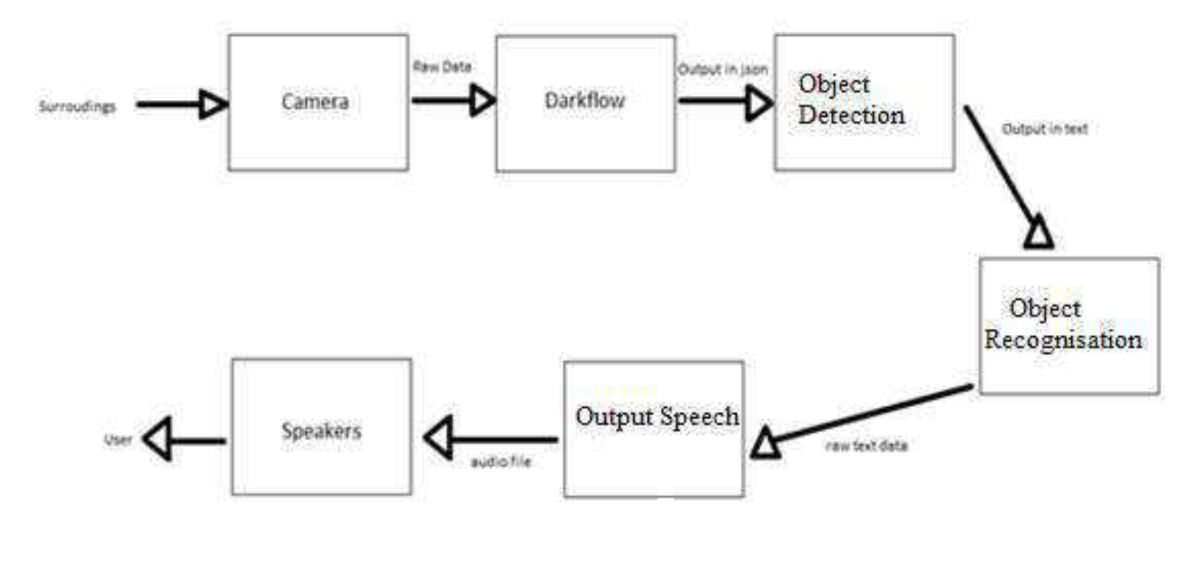


Fig -3: Object Detection – Project Flow

5. FACE RECOGNITION

Face Recognition refers to the detection and identification of the face automatically by computerized systems by looking at the face. With facial recognition, we not only recognize the person by drawing a box on his face, but we also know how to give a specific name with OpenCV or Python. In this project, we have used OpenCV (Open-Source Computer Vision Library) library as it provides a Computer Vision library and image processing methods using machine learning. OpenCV was created with a heavy emphasis on real-time applications and was built for efficient calculation [9]. It is an essential module needed for face recognition using a camera.

Fig. 4 explains the phases involved in face recognition. The face from the dataset is matched to their corresponding user names. These names are converted to audio output after having text-to-speech conversion.

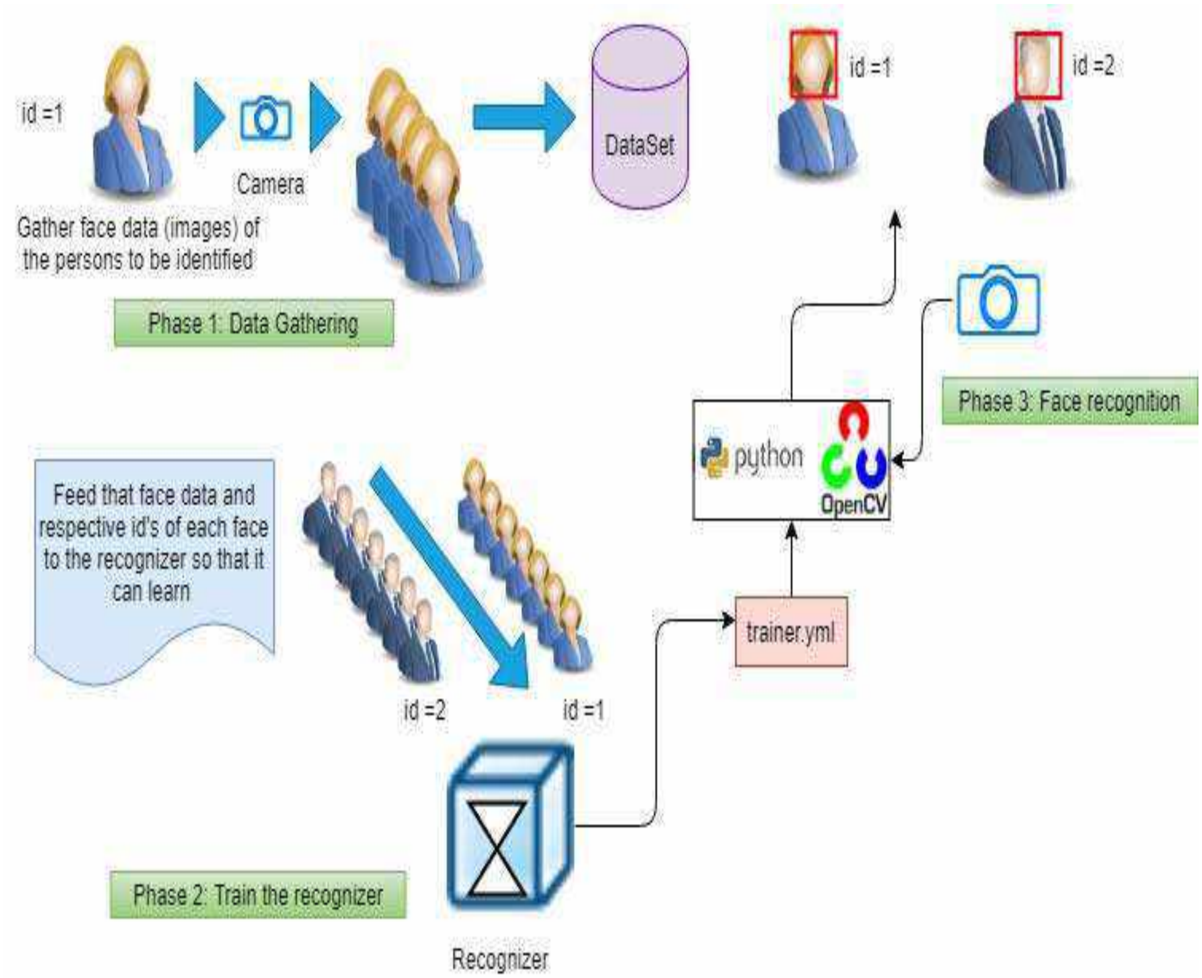


Fig -4: Phases of Face Recognition

Fig. 5 shows the flow of the face recognition model. The images of a person's face are added to the database in the training stage. Images are used for the feature extraction process and they are saved to the database. In the recognition stage, the video is acquired from the camera and it is converted to frames. Then the model uses the database and trained knowledge to recognize the face of the person. If the person's face is recognized, then his name is output in the audio format after undergoing conversion from text to speech.

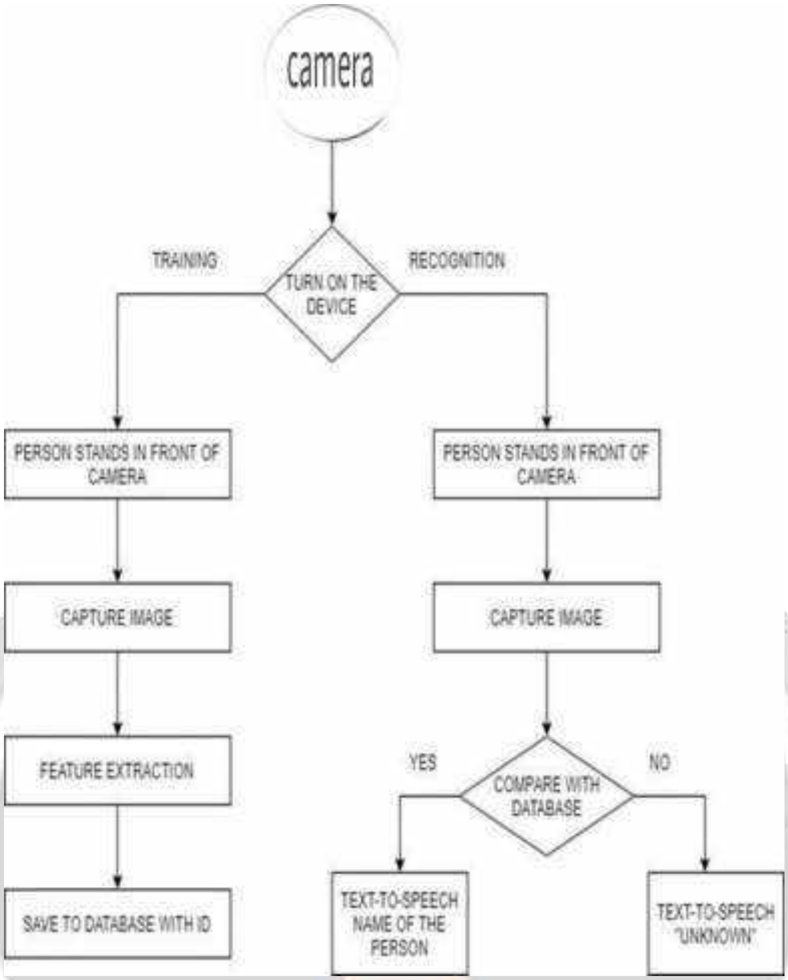


Fig -5: flow of face recognition model

5. GESTURE RECOGNITION

Computers can record and recognize human gestures as commands thanks to a perceptual computing user interface called gesture recognition. We used CNN approach to understanding hand gestures. A CNN (Convolution Neural Network) is a network architecture used for deep learning algorithms for image classification and recognition and tasks involving processing image data. In Fig. 6, the input is given to the CNN. It consists of layers. The convolutional layers are where the filters are applied to the original image. Various features and patterns in recognizing gestures require the usage of an input frame.

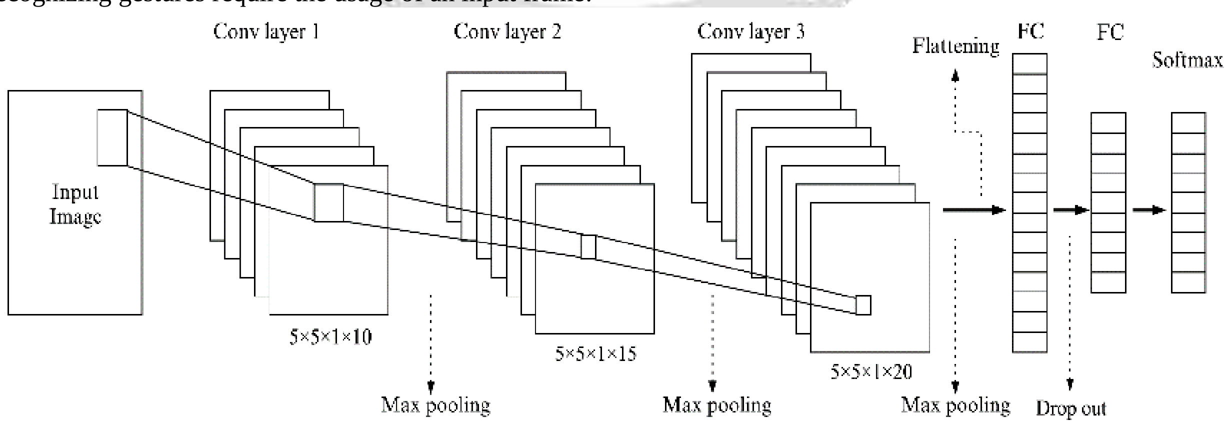


Fig -6: CNN architecture for Gesture recognition

The pooling layer is present after every convolution layer. The pooling layer reduces the number of the feature maps' parameters. This reduces the amount of computation in the network. The image classification happens at the Fully connected layers in the CNN based on the features extracted from previous layers. Fully connected layers are positioned before the classification output of a CNN and they are used to flatten the results before classification. The output from the fully connected layers is passed to a logistic function called the Softmax that produces a vector that depicts the probability distribution of a set of possible outcomes. The output class is the one with the highest probability. SoftMax function, a function that activates numbers (logits) to produce probabilities that add up to one [10].

5. CONCLUSIONS

This is a basic implementation of our project – Eyeris. The objective is to assist those who are blind to ease the difficulties faced by them. This project is capable of detecting and identifying objects that humans use daily. Our goal was to make it possible for those who are blind to do their daily tasks without the need for a guardian as much as possible.

Our project not only recognizes objects and people, however, it also enables the communication between deaf-dumb and blind persons. They can communicate through gestures or signs using our gesture recognition, where our model detects and identifies gestures performed by a deaf-dumb person and then outputs the gesture meaning to a blind person in the audio format. It also has a reading system where we can give images of pages as input and the system will read out the content in the image to the user. It detects the face of the person and outputs the person's name through audio if the individual has previously been saved on the database. After experimenting we found that our project is useful and can be applied in a real-time environment.

6. REFERENCES

[1]. P. A. K. S. M. B. Siddharth Pandey, "SMART VISION SYSTEM FOR BLIND", int. jour. eng. com. sci, vol. 3, no. 05, Dec. 2017.

[2]. R. Chellappa, C. Wilson, and S. Sirohey, "Human and machine recognition of faces: a survey," Proceedings of the IEEE, vol. 83, no. 5, pp. 705–741, 1995.

[3]. https://www.v7labs.com/blog/yolo-object-detection.

[4]. Global data on visual impairment," World Health Organization, 08-Dec-2017. [Online].

[5]. F. Henriques, H. Fernandes, H. Paredes, P. Martins, and J. Barroso, "A prototype for a blind navigation system," 2nd World Conference on Information Technology, Nov. 2011.

[6]. D. J. Mistry, V. V. Mukherjee, N. T. Panchal, and A. U. Gawde, "Oculus Vision for Blind," DJ ASCII-18, vol. 2, Jun-2018.

[7]. S. Ferreira, C. Thillou, B. Gosselin, "From Picture to Speech: An Innovative Application for Embedded Environment" in ProRISC 2003, Veldhoven, Netherland, 2003.

[8]. https://www.v7labs.com/blog/yolo-object-detection.

[9]. M. Naveenkumar and A. Vadivel, "OpenCV for Computer Vision Applications," Proceedings of National Conference on Big Data and Cloud Computing (NCBDC'15), Mar. 2015.

[10]. D. Jurafsky and J. H. Martin, "Logistic Regression," in Speech and Language Processing, 2019.

AUTHPRIVACYCHAIN: A BLOCKCHAIN BASED ACCESS CONTROL FRAMEWORK WITH PRIVACY PROTECTION IN CLOUD

Supraja M[1], Aditya J[2], Akhila K[3], Bagalkot Shrusti[4], Ganesh K C[5]

[1] *Assistant Professor, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*

[2,3,4,5]*Research Scholar, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

Cloud computing is a computing model that supports sharing and ubiquitous on-demand access, enabling new data processing and services for many industries while also drastically lowering user computing and storage costs and enhancing usability. Cloud security has grown in importance as a result of the cloud computing industry's expansion and intensification. For protecting sensitive data stored in the cloud by businesses and individuals, access control is one of the essential security technologies. Since the cloud uses a centralised access control mechanism, sensitive data stored there is vulnerable to manipulation or leakage by hackers or internal cloud managers. To solve this problem, we offer AuthPrivacyChain, a blockchain-based access control framework with privacy protection. First, we use the blockchain node's account address as the identity.

Keyword: *Blockchain, Decentralised Framework, MF-Q, Fair- CA, POUW*

1. INTRODUCTION

A growing number of organisations and individuals are choosing to store their data in the cloud as a resultof cloud computing's ability to offer users on present services, lower user preservation and computing costs, and increase user convenience. However, as computing in the cloud has grown in scope and intensity, studies on computer fog and computing at the edge has also gradually increased. As a result, cloud security concerns have emerged as a significant barrier to the growth of cloud computing. Access control is one of the key technology for cloud privacy, and the cloud's security alliance (CSA) noticed 14 cloud-related safety prioritised topics in adocument titled "Security Guidance for Critical Areas of Focus in Cloud Computing v4.0" that was released in July 2O17. Control of access is additionallycurrently an active subject of study at the moment.

1.1EXISTING SYSTEM

So the access control technology still has two aspects problem of security and privacy:

[1] An external attacker attacks the trusted center, tamper with the authorized database stored on the central server, and illegally access or steal the resources stored by users in cloud [2] The system administrator of cloud manages the authorization database and has the right to access and manage the resources, so a malicious system administrator of cloud may take advantage of the privilege to illegally access the resources or tampering the authorization database to illegally access.

1.2 PROPOSED SYSTEM

An the outside attacker breaches the encrypted facility, tampers on the crucial client's authorised database, and and gains unauthorised entrance to or steals user-stored objects from the cloud server. The cripple's server administrator controls the user authorization database and has access to as well as control over the resources; as a result, a dishonest cloud computing administrator might abuse this privilege by tampering with the the authorization database to gain unauthorised access to resources.

1.3 OBJECTIVES

- Blockchain's primary motive is to offer a platform for decentralised networks.
- It enables users to secure ledger manipulation without a third party's assistance.
- The primary goal is to transform the transaction-recording blockchain in an original way fordecentraliseddata processing.
- In order to process data fairly, we use various methods in this project for both the workers and the scheduler.
- These algorithms' primary goal is to properly balance data fairness and collision.

2. LITERATURE SURVEY

[1] The Authors W. Liang, M. Tang explains how prior Industrial Internet of Things blockchain data transfer protocols had inadequate security, high costs for administration, and were very difficult to monitor. To address these issues, this study presents an industrial IoT data transport solution based on secure fabric blockchain. This method makes use of a dynamic secret sharing system based on blockchain that uses the power blockchain sharing model to produce a reliable trading Centre, power data transfer security matching, and dynamically linked storage.

[2] The Authors Mohamed El Ghamry, Ayman M. Bahaa Eldin explains This essay discusses how the main stakeholders in the productization of machine learning models are model builders. They typically try to train their models on a group of data that is sufficient, adequate, usable, and realistic to generate a model with the anticipated level of accuracy. The security and privacy of the dataset, however, is one of their main issues. The motive of the suggested platform is to guarantee data confidentiality and privacy while enabling model builders to submit their models for training and sharing the required data.

[3] The Authors Zhengding Luo, Yinghong Zhang explains This essay explains how the need for data trading promotes the growth of the data market. In contrast, typical data markets need both buyers and sellers to use a centralised trading platform, which may be dishonest. A dishonest centralised trading platform may steal data from the data seller and sell it again, or the platform may refuse to transfer data even after being paid by the data buyer. Both parties' interests are hurt, and the fair data transaction suffers. To offer a trustworthy decentralised platform for ethical data trade, we introduce a revolutionary data trading architecture with credible Environment for Execution. Our design suggests using a reliable exchange and a blockchain network to implement payments.

[4] The Authors: Shangping Wang1,Yinglong ZhanG explains the Attribute-based encryption discussed. is regarded as a security precaution in traditional cloud storage systems, a key piece of technology for tackling the problems of data privacy and precise access control. However, every ABE scheme's private key generator is capable of decrypting. The cloud server houses all of the data. which could cause serious problems, such as key abuse and privacy data leakage. A sole knot failure might, however, bring the entire system to a standstill because the typical cloud storage model relies on centralised storage. Decentralised storage can be put to use to alleviate the sole knot failure problem in standard cloud storage systems and yields numerous advantages over centralised storage.

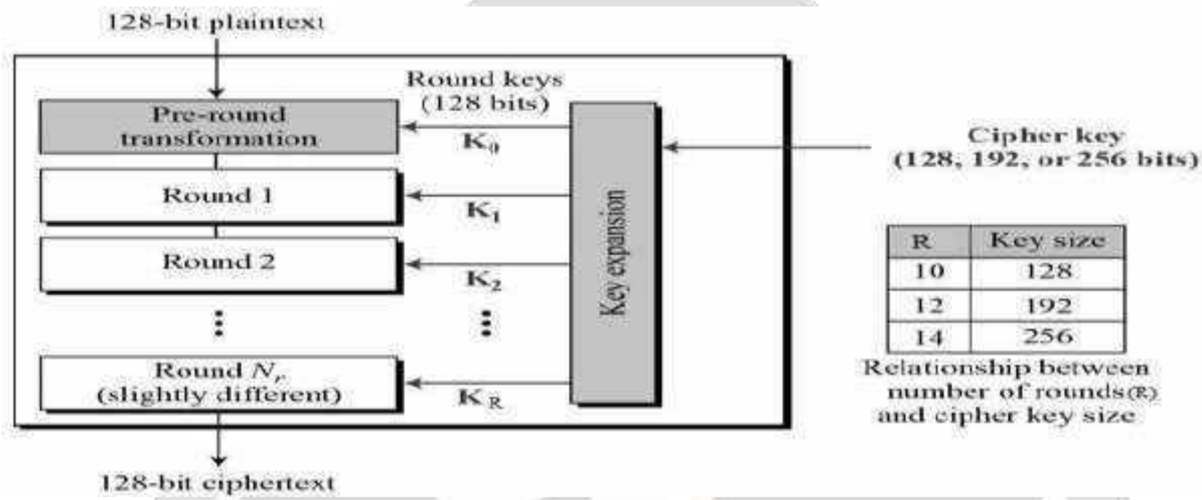
2.1 METHODOLOGY

In the present endeavour, we're safeguarding individuals data with the Asymmetric encryption algorithm.

256-bit encryption utilises a progressive cypher as opposed to a Feistel a single one. The basis for it is a "substitution permutation connections." It consists of a number of interconnected execution, a few of which involve swapping inputs for particular generates (substitutions), while others involve randomising bits (permutations).

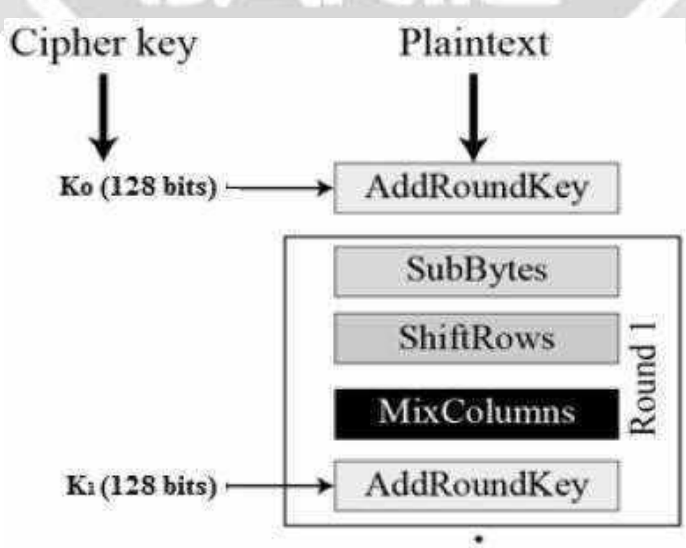
It's interesting to note that AES uses bytes rather than bits for all of its calculations. As result, AES considers a plaintext block's 128 bits to be 16 bytes. For processing as a matrix, these 16 bytes are organised into four columns and four rows.

In contrast to DES, the number of rounds in AES varies and is based on the size of the key. For 128-bit keys, AES uses 10 rounds; for 192-bit keys, 12 rounds; and for 256-bit keys, 14 rounds. A different 128-bit round key, derived from the initial AES key, is used for each of these rounds.The schematic of AES structure is given in the following illustration −



Encryption Process

We will only describe an average round of AES encryption in this section. Four different sub-processes makeup each round. Below is an illustration of how the first round-



Byte Substitution (SubBytes)

In order to replace the sixteen input bytes, a fixed the following table (S-box) provided in the blueprint is lookedup. A matrix with five rows and four columns embodies the final result.

Shiftrows

The grid's four rows are all shifted to the left. Any adjustments that 'fall off' are reinserted on the correct side ofthe row. The change in position is performed in the following order −

- The top row is not moved.
- One (byte) position is moved to the left for the second row.
- The third row has been moved two positions to the left.
- The fourth row has been moved three spaces to the left.
- The outcome is a new matrix with the same 16 bytes but shifted relative to one another.

MixColumns

Now, a unique mathematical function is used to transform each column of four bytes.The four bytes of onecolumn are input by this function, which returns four entirely new bytes that replace the original column. The outcome is another new matrix with 16 additional bytes. It should be noted that the final round does not include this step.

Addroundkey

The round key's 128 bits are XORed with the 16 bytes of the matrix, which are now regarded as I28 bits. The outputis the ciphertext if this is the final round. If not, the resulting I28 bits are translated into I6 bytes, and the process starts all over again.

Decryption Process

An AES cipher's deciphering method is extremely comparable to its data encryption procedure in the other direction.Each of the four steps will be carried via the opposite sequence in every phase. −

- Add round keyj
- The combination of columns
- Row shifts
- Pixels replacement

Despite being very closely related, the encryption and decryption algorithms must be implemented separately because the sub processes in each round operate in reverse, unlike a Feistel Cypher.

2.2 SYSTEM ARCHITECTURE

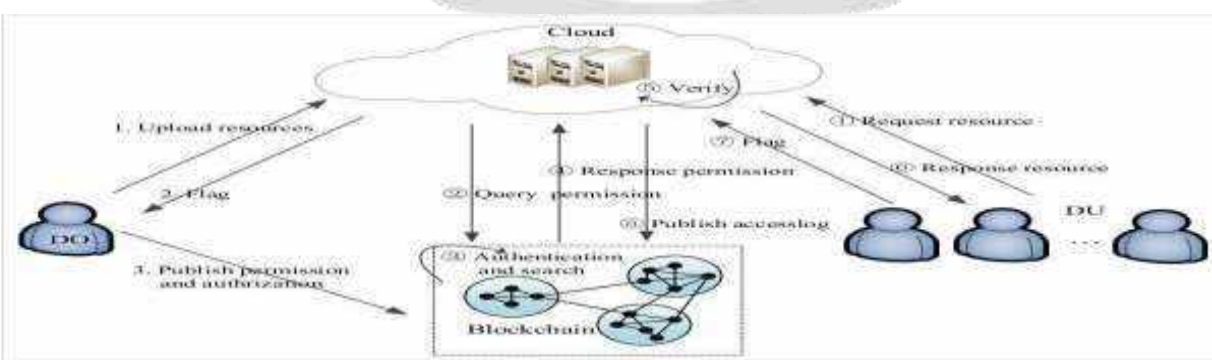


Fig -1 Data flow diagram

Building a blockchain based decentralised frame for unbiased data forwarding is a tangled task that comprises ofnumerous components. Here's a high-level implementation approach:

1. Initialization:

The initialization procedure involves booting up Work Scheduler and Job Scheduler. The Work Scheduler is subjected to Cloud Authority (CA) login, and the Job Scheduler is subjected to Data Owner and Data Receiver (DO and DR) login.

2. Registration as a Data Owner:

The data owner initially registers by providing the necessary details. The data owner then logs in to upload the data that needs to be transmitted.

3. Uploading the data:

The data owner has the feasiblity to upload the file by providing the necessary login credentials. The data uploadedis saved with associated key words. The uploaded data is saved in the cloud.

4. Registration as a Data Receiver:

The Data Receiver registers by providing the necessary particulars. The data receiver logs in by providing login credentials.

5. Putting the consensus into action:

This stands out as key characteristic of our decentralised frame. In accordance to our architecture, the scheduler computes a unbiased index for each recently obtained task using the modified fair queue algorithm. The fair index states that employees use a Fair-CA method to strike a balance between fairness and collision.

6. Requestion of private key:

The Data Receiver after logging in, requests for the private key. The private Key request is sent to the Cloud Authority for verification and authorization.

7. Generation of private and public keys:

The Public key is generated during the registration process of the Data Receiver. The Cloud Authority(CA) logs in to the initiate private key generation. The keys are generated using the Blockchain algorithms.

8. Delivering the encrypted key:

The Cloud Authority signs in to authorize and certify the Data Receiver's request for private keys. The indispensable private key is subsequently emailed by the cloud authority to the data recipient.

9. Acquiring access to the data:

The data receiver can access the encrypted data by entering the proper key phrase, along with the related public key which was developed at the moment of the data recipient's registration and private key which was obtained by means of email from the cloud master.

3. CONCLUSION

However, a few research findings that use the digital asset to solve the protection of privacy and access control in cloud, which is one of the security related issues with the current blockchain and cloud technologies. The majority of conventional cloud access control has one or more trusted centres and internal administrators, making internal and external attacks very likely. The article concepts a permissions management framework AuthPrivacyChain with safeguards for privacy in cloud based settings to address the issue of criminals gaining illicit access to assets located in the public internet. The user posts every transaction involving authorization to the blockchain technology. The structure of the model used in this paper, which is based on the EOS, for instance blockchain, treats access rights andother details as a further overview of transactions on the blockchain. Conclusions of the research project indicate that will only.

4. RESULT

In general, a blockchain-based Decentralised Frame for Fair Data Processing project comprises the proficiency to revolutionise numerous industries by delivering safe, open, and successful remedies that are free from centralised control and manipulation. The campaign may encourage interaction, fairness, and trust, resulting in more unbiased results for all participants.

Fig 1 Home Page

Fig 2 User/Owner signup page

Fig 3 Owner uploading page

Fig 4 User downloading page

Fig 5 Indirect Access page

5. REFERENCES

[1] Implementation of A Secure Fabric Blockchain-based Data Transmission Technique for Industrial Internet-of-Things by W. Liang, M. Tang on 25 March 2019

[2] Implementation A Decentralized Blockchain-based Data Privacy preserving Model Training Platform by Mohamed El Ghamry, Ayman M. Bahaa Eldin on 26-27 May 2021

[3] Implementation of A Blockchain-Based Data Trading Frame with Credible Environment for Execution by Zhengding Luo, Yinghong Zhang on 17-19 December 2020

[4] Implementation of A Blockchain-Based Frame for Data transmission and receival with Fine Grained AccessControl in Decentralized Storage Systems by SHANGPING WANG1,YINGLONG on 29 June 2018

[5] K. Aida, W. Natsume, and Y. Futakata, "Distributed computing with hierarchical master-worker paradigm for parallel branch and bound algorithm," in Cluster Computing and the Grid, 2003. Proceedings. CCGrid 2003. 3rd IEEE/ACM International Symposium on. IEEE, 2003, pp. 156–163.

[6] C. J. Archer, T. J. Mullins, J. D. Ratterman, A. Sidelnik, and B. E. Smith, "Parallel computing system using coordinator and master nodes for load balancing and distributing work," Jan. 12 2010, uS Patent 7,647,590.

[7] J. Wan, M. Liu, X. Hu, Z. Ren, J. Zhang, W. Shi, and W. Wu, "Dual-jt: Toward the high availability ofjobtracker in hadoop," in Cloud Computing Technology and Science (CloudCom), 2012 IEEE 4th International Conference on. IEEE, 2012, pp. 263–268.

[8] T. A. Genez, L. F. Bittencourt, and E. R. Madeira, "Workflow scheduling for saas/paas cloud providers considering two sla levels," in 2012 IEEE Network Operations and Management Symposium. IEEE, 2012, pp.906–912.

[9] M. Swan, Blockchain: Blueprint for a new economy. " O'Reilly Media, Inc.", 2015.

SMART STREET LIGHT IMPLEMENTED USING LoRaWAN TECHNOLOGY

Dr. S Usha[1], Bindushree B M[2], Darshan V[3], Geethashree R[4], H Swetha Deshmukh[5]

[1]Prof. & HOD Dean Research, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[2,3,4,5]Research Scholar, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India

ABSTRACT

Systems for intelligent street lighting are a part of smart cities.. In addition to providing lights, they also make real-time monitoring, energy management, and other intelligent applications possible. In this situation, LoRa(Long Range) technology offers a practical and affordable approach to connect and control a numerous street lights. We offer an abstract of a LoRa chip based smart street lighting system. A LoRa gateway has various LoRa nodes connected to street lights, and a central control unit make up the system. The LoRa nodes use sensors to track environmental variables including traffic, ambient light, and other environmental factors. This information is gathered by the LoRa gateway and transmitted to the central control unit for the processing to establish the ideal timing and lighting settings for each street light. Additionally, the system permit for remote control and observation of specific street lights, allowing for quick troubleshooting and resolution of problems. Applying LoRa technology for smart street light has a various benefits, including improved energy efficiency, reduced maintenance costs, and increased protection.

KEYWORD : - *Street light, LoRa.*

---

1. INTRODUCTION

IOT is the interface of physical devices that permits the devices to contact each other and be sensed and controlled remotely. These advanced automation and analytics systems use artificial intelligence technology to provide automated and advanced products and services. IOT-based systems permit better transparency, control, and great performance.

A street lighting system is extremely important for all types of road users, whether they are drivers, cyclists, or pedestrians, because it determines the safety of both life and property of all people who are on or near the road. So, street lighting must be optimal and reliable to reduce the risk of accidents happening on the street at night. Street lighting system designs also need to have acceptable power consumption and have good energy-saving systems.

Implementation of smart street lights using LoRa chips by remotely controlling and managing through wireless communication technology. Remote management is the basic function of smart street lights. According to people's needs, smart street lights are equipped with other intelligent functions, including automatic brightness adjustment based on road conditions, detection of faulty street lights, and automatic ON/OFF LED lights.

The traditional design of streetlight systems lacks adequate maintenance, leading to the consumption of large amounts of energy and financial resources. It also lacks reliability. Streetlights are found to be one of the major components of power consumption worldwide. Hence, it is essential to give more attention to improving the efficiency of power consumption by saving energy. Thus, the objective of this research is to design and develop an autonomous streetlight management system to enhance power and energy usage.

1.1 Existing System

Existing systems include a monitoring centre, a monitoring node that interfaces with sensors, and an Internet connection. For wireless communication, most systems nowadays use Bluetooth, ZigBee, and Wi-Fi technology. The drawback of Bluetooth is that its range is quite limited (10m), while ZigBee and Wi-Fi systems likewise only offer ranges of up to 100m. By adding sensors that may be utilized to understand the surrounding environmental variables, conventional lighting systems can be made intelligent. They are referred to as smart streetlight systems because they display adaptive behaviour by turning the street light i.e. (ON or OFF) depending on the illumination levels in the area. At the moment, each street light is manually operated. Street lights aren't turned on and off as needed because of human mistake. Since high intensity discharge lamps (HIDs) now utilized, for urban street light are based on the principle of gas discharge, the intensity cannot be controlled by any method of voltage reduction.

1.2 Problem Statement

Many cities still employ dated, pricey street lighting infrastructure. Traditional streetlights are frequently left on all night long, Regardless of the ambient light level, which results in wasteful energy use and expensive maintenance. Traditional systems also commonly need manual inspection and maintenance, which may be time consuming and expensive. Traditional street lighting systems might not provide enough illumination in some places, posing a risk to both automobiles and pedestrians. In order to make sure that all the streets are brightly illuminated and increase safety. Implementation of smart street light with LoRaWAN can identify when a light which is not functioning properly and provide prompt repairs.

2. LITERATURE SURVEY

In retrospective terms, various street light research projects employing both wired and wireless technology have been proposed. As a result, there have been numerous attempts in recent years to automate the current streetlighting system. To maximise quality and productivity, any intelligent street lighting system should operate in an efficient manner. Therefore, it is possible to reduce human effort while also significantly lowering the cost of road lighting by putting in place a more reliable system. However, many methods still rely on conventional light sources, which may require low work from the user but still wastes energy and causes light pollution.

The Author F Dheena[1] explains A paper on a smart streetlight control system employing an Arduino 1 (ESP8266EX Wi-Fi Module), LDR, Relay, and DHT11 sensor was proposed in 2017. When there is insufficient light, this system's LDR recognises it and uses a relay to either switch on or turn off the LED lights. This technique has the benefit of being straightforward and capable of minimising physical labour and the energy can be saved. But the initial cost of installation and upkeep are high.

The Author Jeetendra explains[2]A paper on a smart streetlight which is quite similar to the previously proposed paper ,but here they used sensors for vehicle detection.Even yet, this system has major installation and maintenance costs.

The Author Nabil Ouerhani explains[3] An article on controlling streetlamps using a Zigbee remote module. They included a gearbox module, an LDR, and a microcontroller. Wireless communication with the light module is possible thanks to Zigbee. Two LDR sensors make up the system, which analyses day-night fluctuations and lighting conditions. After the microcontroller has processed the data, the LDR's results are transferred there and then into the transmission module. Each streetlight is monitored and controlled by the control centre using wireless Zigbee technology. The system makes use of the extremely limited range Zigbee network. They contained a microcontroller, an LDR, and a gearbox module. Zigbee makes wireless connection with the light module possible. The system assesses day-night variations and lighting conditions using two LDR sensors. Results from the LDR are transferred into the microcontroller once it has analysed the data. Wireless technology is used by the control centre to monitor and manage each streetlight. The system makes use of the Zigbee network, which has a very small range.

The Authors Siddarthan Chintra Suseendran, Stella Mary explains[4] A streetlight control system utilising a Raspberry Pi 3 model. They designed their Python code so that the LDR controls light intensity. Additionally, a Zigbee remote module was used. Despite having a complicated architecture, this system uses less power.

3. PROPOSED SYSTEM

Smart street lights are an innovative solution to the traditional street lights that we see on the roads. The proposed system aims to enhance the efficiency and functionality of traditional street lighting. The system employs a combination of sensors, wireless communication, and control modules to achieve its objectives.
The IR sensors are used to detect the presence of pedestrians or vehicles and can be used to increase the light intensity in response. The LDR sensors are used to monitor ambient light levels and adjust the street light intensity accordingly. This can help reduce energy consumption by dimming the lights during times of low traffic or when there is sufficient ambient light.
The LoRa chip facilitates long-range wireless communication between the system components, allowing for remote monitoring and control of the street lights. This feature enables a central control station to receive data from the sensors and control the street lights accordingly. By adding smart switching to LED streetlights, they can be turned on and off automatically.
Fault detection is an essential aspect of a smart street lighting system as it helps identify malfunctioning street lights. The system uses LDR sensors to monitor the light levels of each street light and identify those that are not functioning correctly.

3.1 Methodology

In this technology, we use an infrared sensor to identify human motion and vehicle light, respectively. To ensure that the street light is turned off automatically during the day when the sun is bright, an LDR sensor is employed to detect the presence of ambient light. The LDR transmits a signal to turn on the street light at night when there is no light. Smart switching can be used to provide automatic on/off operation of LED streetlights. Providing long-range, low-power, and secure data transmission for M2M, LoRa (Long Range) is a wireless technology.

Fig -1: Smart street light working at night.

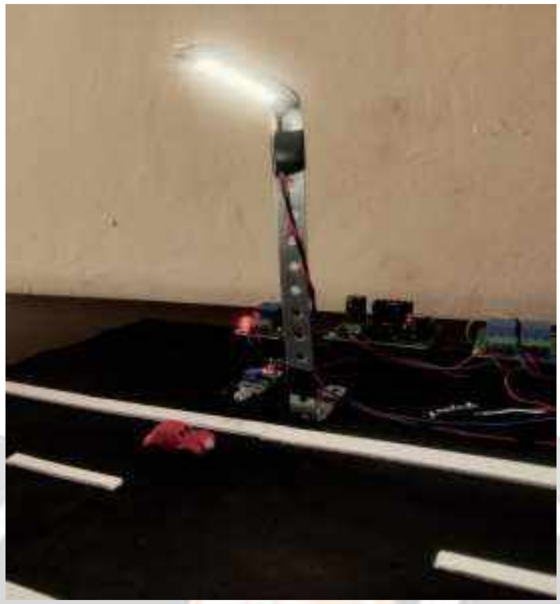


Fig -2: High intensity when vehicle detected.

3.2 System architecture

Steps involved are:

- Every street light has a sensor within that can manage how the light is used.
- The street light and a LoRa-based Gateway are linked together by the sensor's LoRa Technology.

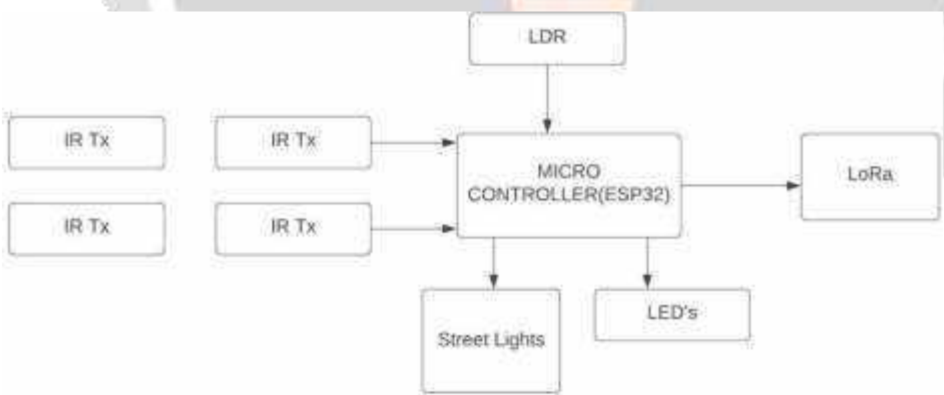


Fig -2: Block diagram of Smart street light.

- Data from all neighbouring street lights is collected by the LoRa gateway.
- Connected to the same gateway are sensors for additional smart city applications.
- The gateway transmits data to the cloud, where an application server analyses it.
- A server application controls the lights
- The server notifies the user of maintenance notifications for problems like burned-out bulbs.

4 . APPLICATIONS

Energy Efficiency: Smart street lights have the ability to be programmed to change their brightness levels depending on the ambient lighting and the presence of people or vehicles. This can save a lot of energy.
Environmental Monitoring: Smart street lights may be used to monitor air quality and other environmental factors, giving useful data for urban planning.
Crime prevention: IR sensors that can detect movement and alert in the event of suspicious activity can be added to smart street lights.
Asset Management: Smart street lights can be integrated with sensors that monitor the health and performance of the lighting infrastructure, allowing for proactive maintenance and replacement of malfunctioning equipment.

5. CONCLUSIONS

The intelligent street lighting system that incorporates modern technology and offers simple maintenance and energy savings is detailed in this article. The suggested solution is suitable for street lighting in both urban and rural locations. The fast detection and repair of faulty lights improve safety conditions for both vehicles and pedestrians and provides a solution for lowering labour requirements and accidents.

6. REFERENCES

[1] Implementation of A smart streetlight control system employing an Arduino 1 (ESP8266EX Wi-Fi Module), LDR, Relay, and DHT11 sensor by F Dheena on 12 May 2012.

[2] Implementation of A Smart street lighting system by Jeetendra Swami on 14 December 2019.

[3] Implementation of A Streetlamp controlling utilizing Zigbee remote module Lighting System by Nabil Ouerhani on 13-14 July 2016.

[4] Implementation of A Streetlamp control system using Raspberry Pi 3 model by Siddarthan Chintra Suseendran, Stella Mary on 29 August 2018.

[5] Smart street lighting with LoRaWAN by M. U. Rehman and M. U. Siddiqui, International Journal of Advanced Computer Science and Applications, 2021.

[6] Smart street lighting system based on LoRaWAN communication network by J. B. Lima et al., International Conference on Power Electronics, Machines and Drives, 2021.

[7] B. K. Subramanyam, K. Bhaskar Reddy, P. Ajay Kumar Reddy “ Design and Development of Intelligent Wireless Street Light Control and Monitoring System Along With GUI “International Journal of Engineering Research and Applications , Vol. 3, Issue 4, Jul-Aug 2013.

[8] Deepak Kapgate “ Wireless Streetlight Control System “International Journal of Computer Applications, Volume 41– No.2, March 2012.

AIR QUALITY PREDICTION USING MACHINE LEARNING

Nandish K[1], Prajwal R[2], Pruthvi Raj B [3], Putha Sri Hari Reddy[4]

[1] *Student, Computer Science, and Engineering, Raja Rajeswari College of Engineering, Karnataka, India*
[2] *Student, Computer Science, and Engineering, Raja Rajeswari College of Engineering, Karnataka, India*
[3] *Student, Computer Science, and Engineering, Raja Rajeswari College of Engineering, Karnataka, India*
[4] *Student, Computer Science, and Engineering, Raja Rajeswari College of Engineering, Karnataka, India*

ABSTRACT

Industrial pollution is one of the most important problems we face today. Long-term air pollution exposure causes serious health problems, including respiratory and lung disorders. Currently, industrial pollution monitoring and control laws are not stringent enough. The working dataset includes air parameters in terms of both ambient air and stack emission. Various Machine Learning (ML) algorithms were applied to this data to predict the emission rate, and a comparative analysis was performed.
Each of these algorithms was written in Python, and the mean square error of each was calculated to ensure accuracy. Among all classifiers, the Random Forest model had the lowest error. The forecast may include pollutant concentrations or an index of air quality.

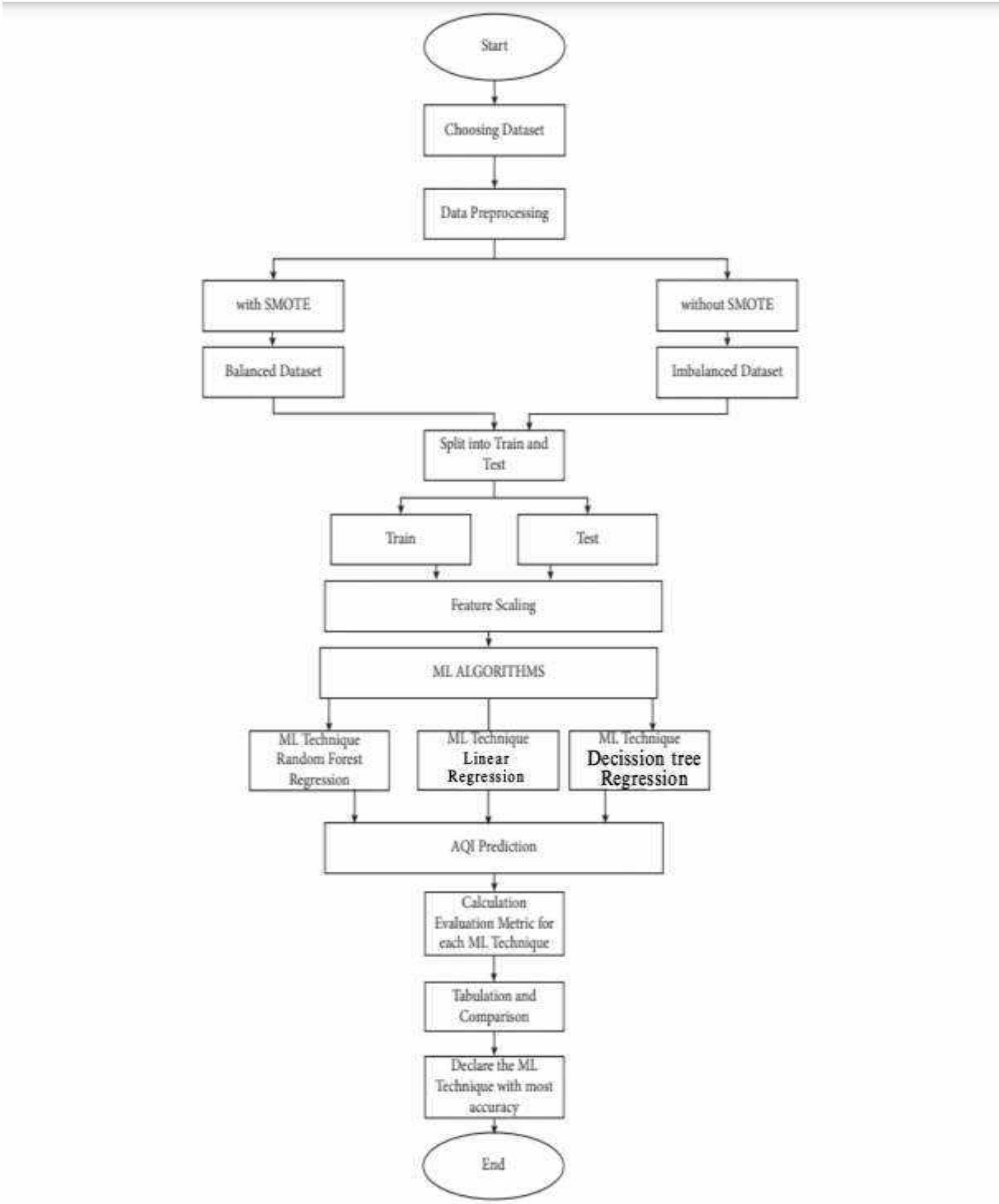
Keywords— *Air pollution prediction, Air Quality Index, Random Forest*

1. INTRODUCTION

Air is the only thing that keeps humans alive. For our well-being, its quality needs to be monitored and comprehended. Millions of people worldwide experience physiological problems and respiratory death as a result of air pollution. The single greatest environmental risk is air pollution, according to scientific evidence. Population numbers have risen drastically as a result of fast industrialization and the harmful gas emissions it generates. Many of us are suffering tremendously result of harmful pollutants contaminating the air. As a consequence of such uncontrolled pollution, air quality has severely degraded. A numerical index called the AQI quantifies and communicates air pollution levels. The average temperature, maximum temperature, minimum temperature, average related humidity, total snowmelt/rainfall, average visibility, average windspeed, and maximum sustained wind speed are the eight factors used to calculate the AQI. Other software programmers use the pollutants for AQI prediction. The selection of contaminants depends on the specific goal and a host of factors, such as the availability of data, measurement methods, and monitoring frequency. A high AQI value denotes extremely polluted air, where it is very harmful in pollution. The AQI can be used to monitor air quality in real time. Numerous weather stations in our backyard have also recorded AQI data. To use these data in the proposed work, they will be mined and harvested.

As an outcome, the set of data used contains AQI values from numerous Indian cities. The three different regression analysis methods will be used, and through comparison, the best accuracy will be found. The proposed work compares the effectiveness of a dataset before and after using the Random Forest algorithm. The use of Random Forest is the most notable innovation. Unlike earlier papers, the dataset was investigated, and Random Forest was used to balance it. Furthermore, the entire method has been documented with graphs and metrics that show each algorithm, every performance metric, and every dataset—both balanced and imbalanced. The efficacy of the proposed methods will aid in predicting future AQI levels, which can serve as a warning and illustrate the need for air pollution reduction.

Figure 1:Flowchart for methodology.



Related Works

This section discusses the work process of calculating the air quality index. In this process, we have data collection, data pre-processing, feature scaling, applying ML algorithms, AQI prediction, Calculating, and declaring. We used 6 ML algorithms and compare them then we took one ML algorithm model as the main model to predict AQI. We got the Random Forest method with the best accuracy value when we compared these 6 ML Algorithms.

2.1 Data Collection

The data set we used to predict the AQI is collected from Kaggle. This data set is used for further process of prediction of air quality index. The data set contains parameters like T(Avg. Temp), TM(Max Temp), Tm(Min Temp), H(Humidity), PP(Total snowmelt/rainfall), VV(Visibility), V(Avg Wind speed), VM(Max Wind speed). We use these parameters to calculate the air quality index values.

2.2 Data Preprocessing

Data preprocessing is an important stage in machine learning (ML) that involves preparing and cleaning the data so that it may be used in a machine learning model. The accuracy and performance of the ML model are directly affected by the quality of data preprocessing.

2.3 Feature Scaling

Feature scaling is a technique used in machine learning (ML) to standardize the range and distribution of features in a dataset. By ensuring that each feature contributes equally to the model training process, the performance and accuracy of the model are improved.

2.4. Applying Machine Learning Algorithms

Once the data has been preprocessed, the next step in machine learning (ML) is to select and apply appropriate ML algorithms to build a predictive model. The ML algorithm selection depends on the problem's nature, the available data, and the desired outcome. We use six algorithms separately and then we compare the accuracy of all algorithms used in this process.

2.5 AQI Prediction

After comparing the accuracy of all algorithms the best accuracy and performance algorithm is taken for the prediction of air quality. We got a Random Forest model with the best accuracy value among all the machine learning models used. We will separate test and train data for the AQI prediction index and make the model with high accuracy.

2.6 Calculating And Declaring

After all these processes we will predict the AQI using the random forest model by using equations to calculate the value. After we get the value, we will display it on the web app's front end. For displaying and taking input we developed a web app using Flask, react js.

3. METHODOLOGY

The methods suggested in this paper use five different algorithms to compare the AQI values of Bangalore, Mumbai, and Kolkata using parameters such as T, TM, Tm, PP, VV, V, VM, and PM2.5. The five algorithms are then compared to determine which is the most accurate and effective algorithm. The goal is to analyze and present it efficiently. It would aid us in discovering new and interesting information. These cities offer a more precise estimation of pollution in a significant South Asian city and have larger population densities. More cities were not included because it would have made the research paper far too long. As a result, the major cities of India have been chosen to analyze pollution levels in various urban cities throughout India, as they are the major contributors to pollution.

3.1 Random Forest Regression Algorithm: It is a typical supervised machine-learning approach for classification and regression issues. With the help of the classifier vote and the average for regression, it creates decision trees from a variety of samples.

3.2 XG Boost Algorithm: The XG Boost (Extreme Gradient Boosting) machine learning algorithm is widely used for regression, classification, and ranking problems. It is a gradient-boosting variant intended to improve speed and performance. Because of its accuracy, speed, and scalability, XG Boost has gained widespread popularity.

3.3 KNN Algorithm: KNN (K-Nearest Neighbours) is a well-known and straightforward machine learning algorithm for classification and regression problems. The algorithm works on the premise that similar things are closer together. KNN is a non-parametric algorithm, which means it makes no assumptions about the data's underlying distribution.

3.4 Linear Regression Algorithm: Linear regression is a widely used machine learning algorithm for solving regression problems. It is a simple yet powerful algorithm that fits a linear equation to the data to model the relationship between a dependent variable and one or more independent variables.

3.5 Decision Tree Regression Algorithm: A machine learning algorithm for regression problems is decision tree regression. It is a non-parametric algorithm that partitions the data into subsets based on the values of the independent variables to model the relationship between a dependent variable and one or more independent variables.

4. CONCLUSIONS

Researchers from all around the world are trying to discover a solution to the problem of air pollution. It has been investigated how to forecast the AQI with accuracy using machine learning techniques. The effectiveness of the three most effective data mining algorithms (KNN, DTR, and LR) for correctly forecasting AQI data in some of India's most populated and polluted cities was tested in the current study. To get better and more reliable findings, the class data were equalized using Random Forest Regression (RFR). It was possible to achieve higher accuracy using this novel method of balancing the datasets before using them, carefully comparing the results of the imbalanced and balanced ones for accuracy, and then using statistical techniques like RMSE, MAE, MSE, and R-SQUARE to confirm the better results.

When the algorithms were run on both datasets (with and without the RFR algorithm), an increase of 6 to 24% was discovered. Our maximum accuracy in any city increased from 90.97% using RFR in Kolkata to 97.6% using the same city and algorithm. Our lowest accuracy increased from 66.45% in Bangalore when using DTR to 84.7% in Delhi when using RFR. Overall, accuracy improved significantly. Using extensive testing of all algorithms in New Delhi, Bangalore, Mumbai, and Hyderabad for the proposed work, we discovered that random forest regression consistently provided promising results.

.5. REFERENCES

[1] U. Mahalingam, K. Elangovan, H. Dobhal, C. Valliappa, S. Shrestha, and G. Kedam, “A machine learning model for air quality prediction for smart cities,” in Proceedings of the 2019 International Conference on Wireless Communications Signal Processing and Networking (WiSPNET), pp. 452–457, Chennai, India, March 2019.

[2] R. Janarthanan, P. Partheeban, K. Somasundaram, and P Navin Elamparithi, “A deep learning approach for prediction of air quality index in a metropolitan city,” Sustainable Cities and Society, vol. 67, no. 2021, Article ID 102720, 2021.

[3] F. Jafarizadeh, M. Rajabi, S. Tabasi, et al., “Data-driven models to predict pore pressure using drilling and petrophysical data,” Energy Reports, vol. 8, pp. 6551–6562, 2022.

[4] G. Zhang, S. Davoodi, S. S. Band, H. Ghorbani, A. Mosavi, and M Moslehpour, “A robust approach to pore pressure prediction applying petrophysical log data aided by machine learning techniques,” Energy Reports, vol. 8, pp. 2233–2247, 2022.

[5] X. Zhao, M. Song, A. Liu, Y. Wang, T. Wang, and J Cao, “Data-Driven temporal-spatial model for the prediction of AQI in Nanjing,” Journal of Artificial Intelligence and Soft Computing Research, vol. 10, no. 4, pp. 255–270, 2020.

SUPERVISED RELATIONAL EXTRACTION

Adarsh Kumar[1], Anusha J[2], Prathiksha V[3], Srigowri N[4]

[1] Associate Professor, Dept of CSE, Raja Rajeswari College of Engineering, Karnataka, India
[2] Dept of CSE, Raja Rajeswari College of Engineering, Karnataka, India
[3] Dept of CSE, Raja Rajeswari College of Engineering, Karnataka, India
[4] Dept of CSE, Raja Rajeswari College of Engineering, Karnataka, India
[5] Dept of CSE, Raja Rajeswari College of Engineering, Karnataka, India

ABSTRACT

Each and every day there will be new challenges in the biomedical area, some may be new viruses and diseases, and it is time consuming process for researchers to discover a solution. The basic step is look through paper that has been written already about the specific issue. The researchers' main objective is to establish a connection between a genes and a diseases, and the earlier step of extracting information is time-consuming and difficult since researchers must read through all the relevant studies. Relation extraction utilizing deep learning and machine learning is the one of the accurate way for completing assignment. In a paragraph of text, the connection between the entities is intended to be extracted using documentlevel relation extraction. We propose an Artificial Nural Network (ANN) technique using type information to address this issue by masking each mention of the entities with unique tokens. The model may precisely retrieve every mention and entity type by employing this entity mask approach. Our Word2Vec model, which is based on ANN, enables us to analyse the text just once, but enter data from all of our research articles into a computer model, creating links between things. We run the proposed model using Google Colab's.

Keyword : - *ANN, Word2Vec*

---

1. INTRODUCTION

Information extraction in biomedical domain is great challenge. It is time consuming process and requires adequate effort for subject matter experts to read many medical literatures and articles to get useful information from the text. In problems like drug discovery, relationships between biomedical entities are supposed to be known. Supervised relation extraction is machine learning approach used to identify and extract meaningful relationships between entities in text. Hence the proposed method makes use of deep learning techniques to extrat the dataset containing biomedical entities like genes, proteins, and diseases. Biomedical entities are tagged in each literature and based on the context, a generic relation between an entity pair is evaluated. This serves as gold dust in drug discovery and saves the effort and time in drug discovery. Most efforts in this field now focus on sentence level analysis. It is insufficient to just concentrate on the relationships between things at the sentence level. Prior work demonstrates that the sum of the number of relations, there are 28.5% and 9.4%, respectively, of inter-sentential connections in the Both MUC6 and ACE3 are components of the Message Understanding Conference Suite, where multi-phrase entity links are communicated. The DocRed dataset, which was carefully annotated and produced from Wikipedia, has about 40.7% relational facts that can only be derived from several phrases. According to the evidence shown above, there are too many contextual connections between sentences to be ignored. Consequently, learning about document-level relation extraction is crucial. Below are the most significant distinctions between the sentencelevel and document-level relation extraction schemes:

When performing relation extraction at the document level, rather than the sentence level, it is important to take into account the interdependencies between the various parts.
An entity typically appears once in a sentence when a relation is extracted at the sentence level. Various iterations of an entity may be encountered during document-level relation extraction. One alternative name for "Anzac biscuits" is "ANZAC wafers."

The link between two entities will not be explicitly recovered in document-level relation extraction. Finding some relations requires taking their transitivity into account.

1.1 Existing System

MedEx is among the systems that uses NLP and machine learning techniques to fetch information from clinical text. It identifies relationships between drugs and their indications and adverse effects of medication. However, MedEx is limited in its ability to extract information beyond medication-related data.

SemRep will discover relationships among biomedical data in text data, including diseases, and treatments. The lexical and semantic and semantic knowledge to identify relationships between concepts are used. However, But SemRep is limited to handle ambiguous or complex sentences.

Reverb: Reverb is a relation extraction system ,it will discover diseases and their associated symptoms, risk factors, and treatments. It is based on pattern-based approach to discover relationships among entities, that can extract complex relationships. However, ReVerb cannot handle large datasets and may suffer from low precision.

Bio-Bert: Another classification model which makes 'use of contextual embedding and transformer encoders.These models have a bias in favour of training data context and consider extra data other than the entities that are in article.

1.2 Problem Statement

Extracting a promising relationship between biomedical entities is the prominent challenge in the healthcare domain because it has been approached like a classification problem that doesn't analyze the detailed pattern among entities subject to context of present literature and 'is free from other literature.
How can we develop a process that traces the semantic among the participants in the article and give the result subject to a present article and separate from the model training history?

1.3 Proposed System

- The proposed method makes use of the sentences present around the tagged entities in an article and finds an informative pattern to evaluate a word that best represents the relationship between tagged entities.
- Collect a dataset of new medical research and innovations: It includes the collection of research papers and journals talking about drug discovery, medical device innovation and medical entities' connectivity and network.
- Preprocess the data: Preprocess the text data is done by taking out the stop words, stemming, and tokenizing the text to input to the embedding models also apply the techniques mainly named entity recognition (NER) to identify disease names and other relevant entities in the phrase.
- Define features: The feature for neural network model is concatenated vector that are embedding two entities.
- Train the model: It includes training an ANN model with backpropagation to detect the pattern for semantic relation between the given entity pair.
- Evaluate the model: As the model is trained completely, evaluate its demonstration on a separate test dataset.
  and can use metrics namely precision, recall, and Fl -score to evaluate the model's accuracy in predicting diseases.

2. LITERATURE SURVEY

S.NO	TITLE	Journal/ YEAR	Description	ADVANTAGES	DISADVANTAGES
1	Translating Embeddings for modelling Multirelational Data	Antoine Bordes, Nicolas Usunier, Alberto GarciaDura´n– CNRS 2013	The TransE modelling approach uses low-dimensional entity embeddings to construe connections as translations.	compares well to state-of-the-art algorithms on two Predictions based on knowledge bases of past correlations	The architecture requires a pretrained embedding model on a humongous data
2	The Return of the Relation Induction in Word Embeddings	Professor Zied Bouraoui of the CRIL CNRS UMR 8188	Two methods for inferring relationships based on probabilities	Outperforms the traditional embedding based methods	Biased to out of domain data in training
3	Estimates based on familiarity with previous battles	V. Ivan Sanchez C	Dimensions specific of hypernymy: *generality* and *similarity*.	Solves Structural ambiguity for relation.	Doesn't represent a Semantic relation.

3. METHODOLOGY

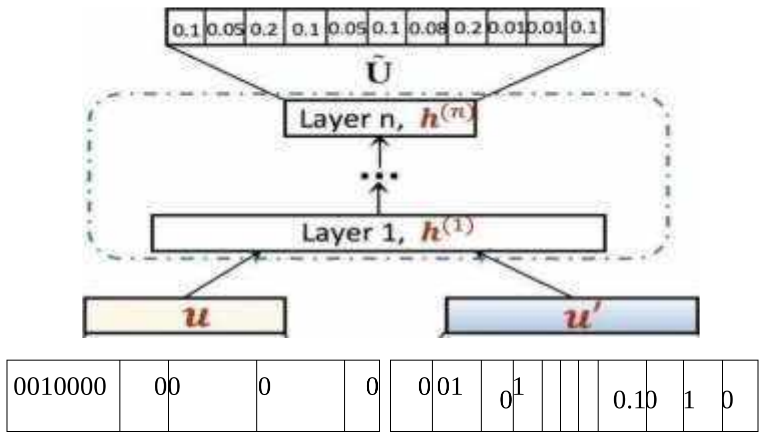
3.1 Functioning Of model

Output layer

Hidden layer

Embedding layer

Input layer



3.2 Module Description

- Input and Output: The input is a pair of biomedical entity from the given article and output is relation between the given entity pair.
- Pre-processing: It includes the entity extraction from the article using either dictionary based tagging or NER model.
- Feature extraction: It includes extraction of word embeddings of each entity in input pair using word2vec model.
- Model architecture: neural network with first layer with two embedding vectors as input, second layer as concatenation layer combining two embeddings followed by multiple hidden followed by output layer giving word embedding as an output
- Training and Evaluation: It includes training a ANN model with batch size of 8 and 20 epochs. The evaluation includes matrices like accuracy and Fl score.

3.3 Difference Between Existing And Proposed Methodology

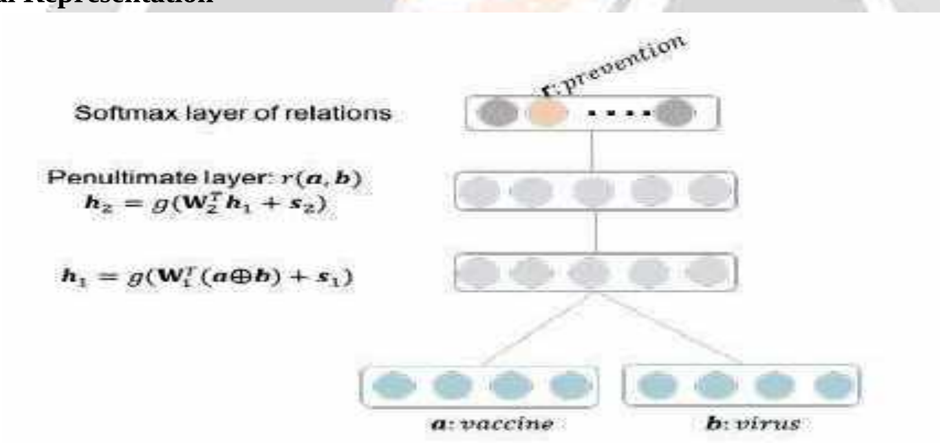
Parameter	Existing model	Praposed model
Information extraction	Limited ability of information extraction	Free ability of information extraction
Ambiguous and complex sentence	Limited in its ability to handle ambiguous or complex sentences.	Free in its ability to handle ambiguous or complex sentences.
Large dataset	Limited in its ability to handle large datasets and may suffer from low precision.	Free in its ability to handle large datasets and may suffer from low precision.

Extra data requirement	These models have a bias in favour of training data context and consider extra data other than the entities present in the article.	These models have not a bias in favour of towards the training data context and consider extra data other than the entities present in the article

3.4 Algorithm:

STEP I: Initially the method focuses on the prominent information and ignore the information which might deviate from the real relation result.
STEP II: Every article is tagged with all the biomedical entities present using a NER technique or list of entities present.
STEP III: Entity pairs are made from all the tagged entities.
STEP IV: An embedding model is developed for every article associated with entities tagged in the article.
STEP V: Vector representation for every tagged entity is calculated from the corresponding embedding model.
STEP VI: Calculate a resultant vector out of two vectors corresponding to each entity as an input for neural network.
STEP VII: Feed the resultant input vector to ANN.
STEP VIII: Get the output, as a vector representation with size same as input vector.
STEP IX: Find the nearest matching word with output vector considered as relation word.

3.5 Pictorial Representation



$$f(a, b; \theta) : \mathbb{R}^d \times \mathbb{R}^d \rightarrow \mathbb{R}^m$$

Fig 3. 2 :Architecture Of Model

Before reaching the softmax layer, the feed-forward neural network has one or more hidden layers, with W1 and W2 serving as their respective weight matrices.

- There are 1 and S2 biases.
- Dataset D = f(ai; ri; bi)gNi =1 of relational word pairs (ai; bi) ri defines the HL's nonlinear activation.

- lower the cross-entropy loss across the training instances using l2 regularisation, and then make predictions ri from the input of concatenated pre-trained word embeddings ai bi.
- The penultimate layer (i.e., the output of the last hidden layer) makes use of the relation representation for a word pair.

3.6 Application

Few applications of supervised relational extraction in predicting diseases:

1. Diagnosis Prediction: It can help predict diseases and diagnose patients. Can be particularly useful in identifying rare diseases or in cases in which symptoms are non-specific.
2. Drug Discovery: By extracting information about the relationship among genes, proteins, and diseases, supervised relational extraction can help to discover properl drug target and create new medicines to treat diseases.
3. Public Health Surveillance: Using data from social media analysis, reports, and other sources, tracks the spread of diseases and identify potential outbreaks.
4. Clinical Trials: By extracting information about patient characteristics, treatment regimens, and outcomes, supervised relational extraction will help in designing accurate clinical trials and will improve accuracy of clinical trial data to predict disease subtypes.
5. Identifying drug interactions: By extracting information on drug-drug interactions from medical records, supervised relational extraction can help predict potential adverse reactions and optimize drug therapies.
6. Evaluating disease treatment efficacy: By analyzing clinical trial data and scientific literature, supervised relational extraction can help evaluate the efficacy of various treatments for different diseases.

4. RESULTS & DISCUSSION

4.1 Result

In this study, we developed an ANN model for identifying relationships between entities in text data. The model was trained and evaluated a dataet of 10,000 sentences, where each sentence contained two entities and a corresponding relationship label. We first preprocessed the text data by tokenizing the sentences, extracting the entity spans, and generating word embeddings using the Gensim Word2Vec model.

The ANN model consisted consisting of Layers of 1 for "input," 2 for "hidden," and 1 for "output". The input layer accepted the entity embeddings as input, while the output layer predicted the relationship label. The hidden layers contained 64 and 32 corresponding neurons with ReLU activation capabilities. The output layer contained three neurons, corresponding to the three possible relationship labels, and a softmax activation function was utilised.

Model achieved an accuracy of 87% on the test set, both accurately (0.88) and reliably (0.87) most of the time. A score of 0.87 was also achieved on the recall/accuracy balancing scale known as the F1. These findings demonstrate that the ANN model was successful in understanding the connections between items in the text data.

4.2 Discussion

Output of our study suggest that an ANN model trained word embeddings can be an excellent method for determining connections between entities in text data. Our model achieved a high level of accuracy, precision, recallon the exam set, and an F1 score, which means that it is able to effectively generalize to new data.

One potential limitation of our study is siz an scope of the dataset. Although we used a relatively large dataset of 10,000 sentences, it may be necessary to use a largr datset with mor divers sentence structures and relationship labels in order to fully evaluate the model's performance. Additionally, the model may be sensitive to the verbal quality embeddings generated by the Word2Vec model, which might impair its capacity to accurately identify relationships between entities.

Overall, our study demonstrates the potential of ANN models for relationship extraction in text data. Further research could explore the use of Convolutional neural networks are among the numerous neural network designs.

or recurrent neural networks, besides the use of different word embedding models and preprocessing techniques. Additionally, the model could be applied to other tasks, such as named entity recognition or sentiment analysis, to further evaluate its
effectiveness.

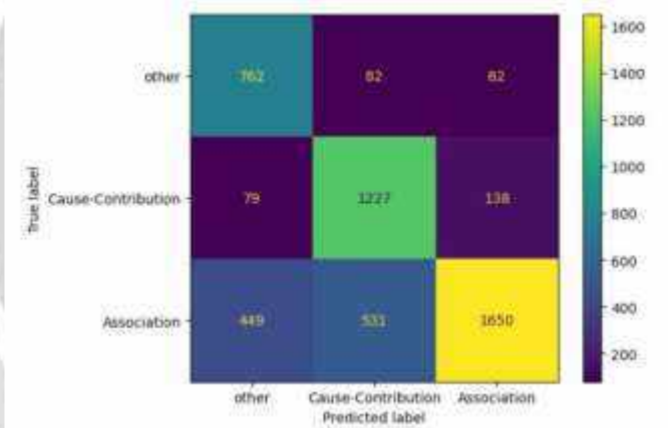
```
batch_size = 32
epochs = 10

history = model.fit(X_train, y_train, batch_size=batch_size, epochs=epochs, verbose=1, validation_split=0.1)
```

```
Epoch 1/10
317/317 [==============================] - 4s 11ms/step - loss: 0.6813 - accuracy: 0.7378 - val_loss: 0.4846 - val_accuracy: 0.8418
Epoch 2/10
317/317 [==============================] - 3s 9ms/step - loss: 0.4180 - accuracy: 0.8588 - val_loss: 0.4330 - val_accuracy: 0.8578
Epoch 3/10
317/317 [==============================] - 3s 9ms/step - loss: 0.3247 - accuracy: 0.8952 - val_loss: 0.4314 - val_accuracy: 0.8613
Epoch 4/10
317/317 [==============================] - 4s 12ms/step - loss: 0.2617 - accuracy: 0.9137 - val_loss: 0.4417 - val_accuracy: 0.8578
Epoch 5/10
317/317 [==============================] - 3s 8ms/step - loss: 0.1969 - accuracy: 0.9383 - val_loss: 0.4500 - val_accuracy: 0.8551
Epoch 6/10
317/317 [==============================] - 3s 8ms/step - loss: 0.1472 - accuracy: 0.9550 - val_loss: 0.4848 - val_accuracy: 0.8569
Epoch 7/10
317/317 [==============================] - 3s 9ms/step - loss: 0.1059 - accuracy: 0.9717 - val_loss: 0.4961 - val_accuracy: 0.8524
Epoch 8/10
317/317 [==============================] - 3s 10ms/step - loss: 0.0797 - accuracy: 0.9803 - val_loss: 0.5230 - val_accuracy: 0.8551
Epoch 9/10
317/317 [==============================] - 3s 10ms/step - loss: 0.0591 - accuracy: 0.9860 - val_loss: 0.5517 - val_accuracy: 0.8507
Epoch 10/10
317/317 [==============================] - 4s 11ms/step - loss: 0.0423 - accuracy: 0.9826 - val_loss: 0.5663 - val_accuracy: 0.8542
```

```
score = model.evaluate(X_test, y_test, verbose=0)
print('Test accuracy:', score[1])
```

```
Test accuracy: 0.8442943092207336
```



5. CONCLUSION

The execution of this project will develop a method that can extract a generic relationship between biomedical entities. It will get a labeled dataset having generic relation of the entities present in the article. It understand the language of the context and semantic meaning of the sentences containing the entities.It will be used to develop a deep-learning based method with good evaluation metrics.It will help to design an artificial neural network to take biomedical entities as input and output relationship between pair and develop an embedding model exclusively for every literature.To fetch the highest matching word in the literature for output vector of model as an output relation we will use this model. It will be useful to evaluate and validate the tagged output relation with subject matter experts and to publish the method in a renowned journal.

6. REFERENCES

[1] Antoine Bordes, Nicolas Usunier, Alberto Garcia-Dur´an, Jason Weston, and Oksana Yakhenko. Translating embeddings for modeling multi-relational data. In Proc. of NIPS, pages 2787–2795, 2013.

[2] Zied Bouraoui, Shoaib Jameel, and Steven Schockaert. Relation induction in word embeddings revisited. 2018. Hakami & Boll

[3] V Ivan Sanchez Carmona and Sebastian Riedel. How well can we predict hypernyms from word embeddings? a dataset-centric analysis. EACL 2017, page 401, 2017. Dawn Chen, Joshua C Peterson, and Thomas L Griffiths.

[4] Evaluating vector-space models of analogy. arXiv preprint arXiv:1705.04416, 2017. Stephen Clark. Vector space models of lexical meaning. Handbook of Contemporary Semantic Theory, The, pages 493–522, 2015.

[5] Scott Deerwester, Susan T Dumais, George W Furnas, Thomas K Landauer, and Richard Harshman. Indexing by latent semantic analysis.

[6] Journal of the American society for information science, 41(6):391, 1990. Aleksandr Drozd, Anna Gladkova, and Satoshi Matsuoka. Word embeddings, analogies, and machine learning: Beyond king - man + woman = queen. In Proc. of COLING, pages 3519–3530, 2016.

[7] Nguyen Tuan Duc, Danushka Bollegala, and Mitsuru Ishizuka. Using relational similarity between word pairs for latent relational search on the web. In Proc. of WI, pages 196–199, 2010.

HOUSE PRICE PREDICTION USING AIML WEB BASED

Dr. S Usha[1], Syed Mansoor[2] , Zahid Hussain Lone[3], Afroz Alam[4]

[1] HOD & Dean, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[2] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[3] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[4] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India.

ABSTRACT

One of the basic requirements of human society is a place to live. Houses are considered to be pleasant and quiet environments where people feel at home. People must therefore select a decent house model in order to live a pleasant and happy life. This article focuses on utilising machine learning algorithms to reliably estimate home prices. People can choose the right home for their needs using this concept. People will primarily consider the neighbourhood, house type, cost, location, and a few other amenities. To determine the necessary house for habitation. Since most people are very concerned with staying within their budgets when buying a home, it is crucial that the prediction of home prices be accurate. Additionally, it aids people in selecting homes based on. House prices have a big impact on the economy, and customers and real estate agents are quite concerned about the price ranges. Every year, housing prices rise, which ultimately highlights the necessity for a method or plan that could forecast house prices. Physical conditions, locations,bedrooms, and other elements might affect a home's price. Historically, forecasts have been based on these variables. However, these prediction techniques need the right expertise and knowledge in this field. A substantial source of cutting-edge opportunities for housing analysis, prediction, and visualisation is machine learning approaches. A middle-class family cannot support his family while paying for rent, food, water, and power. The cost of apartments in the city is rising, and estimating the final price of a home is extremely risky. As we can see, when a customer wants to buy a property in the city, he looks at three things: location, area, and the resources that are accessible in the community. Our research paper will assist clients in understanding the true cost of a home as well as builders in determining the selling price that will best meet client requirements.

Keywords: - *House Price Prediction, House Rent Prediction ,Machine Learning etc…*

1. INTRODUCTION

Currently, forecasting house prices is a hot topic. The goal of house price prediction is to give buyers and sellers a foundation for pricing. Buyers can determine if they paid a fair price for a home by reviewing transaction records, and sellers can determine the price at which they can sell a home along a certain stretch of road. Financial technology systems that use a suitable evaluation method for mortgage calculation and real estate auctions also use house price prediction. House price prediction is the process of predicting the future price of a residential property using statistical modelling approaches and machine learning algorithms. Making informed financial decisions, buying or selling a home, investing in real estate, and other things can all benefit from this. Diverse aspects of a home may be of interest to various buyer groups. For their children, nuclear families, for instance, could prioritise parks and neighbouring schools. As a result, a residence can be recommended to a potential buyer if its key attributes, as determined by an attention mechanism, meet their needs. House price forecasting that requires consideration of a number's of variables, including location, size, age, and condition of the property, The regional real estate market trends, economic indicators, and other pertinent information. On the basis of previous data, machine learning algorithms can be trained to spot trends and estimate future home prices with accuracy . Different methodologies, including regression analysis, time series analysis and ANN algorithm can be used in house price prediction models. These models may be trained using substantial.

2. EXISTING SYSTEM

The best methodology will rely on the specific data available and the objectives of the predicted task. There are Many different ways to predict house prices. The level of accuracy required, the complexity of the issue, and the available processing resources will all influence the algorithm or model selection.

2.1 Models Of Hedonic Regression

These models analyse the relationship between home prices and several property traits including location, size, number of bedrooms and bathrooms, and other amenities using statistical methods. Hedonic regression models are capable of making precise predictions, although they may need a huge dataset to be trained.

2.2 Time Series Analysis

This method makes use of previous information on property prices to spot trends and patterns over the course of time. In order to forecast short-term changes in property prices, time series analysis can be helpful. However, it might miss longer-term patterns.

2.3 Artificial Neural Network

Artificial neural networks are a class of MT that can be used to find intricate links and patterns in vast datasets. Economic data, regional market patterns, and property attributes are just a few examples of the variable's that are used to train neural networks to predict changes in home prices.

2.4 Gradient Boosting Machines

This method generates precise forecasts by combining a number's of decision trees. It can tolerate missing data and be useful for capturing intricate interactions between several factors.

2.5 Random Forest

Another ensemble learning technique is Random Forest which makes predictions by using several decision trees. It is resilient to outliers and can deal with missing data.

3. PROPOSED SYSTEM

A hybrid strategy is used in a proposed system for predicting home prices in-order to increase precision and decrease uncertainty. Here are some possible parts of the suggested system

3.1 Data-Preprocessing

Data from distinct sources are cleaned, transformed, and integrated in this process to a structured dataset ready for analysis. This could involve resolving missing data, standardising variable names, and geocoding addresses. The data is preprocessed using several features after we receive our house transaction information. There are a total of 28 columns in the dataset, but we only use some of them as input features for the prediction model. We only preprocess these unique columns, and the appropriate preprocessing techniques are shown here. To control the other columns, we use appropriate normalisation techniques. The processing that following columns—land sector position, building sector, and house address plaque—is described in this section. Although the data does not contain records of precise addresses, the columns represent the locations of houses. A location can be listed as "No. 1-No. 30 Kangding Rd., Wanhua Dist., Taipei City, 10843, Taiwan (R.O.C.)," for instance. We used a Google Static API due to this restriction. We obtained the open access data to a public facility data. from servers kept up by the Taipei City and New Taipei City authorities. Lists of parks, hospitals, schools, convenience stores, and MRT stations are included in these files. The "parks" column includes information on each park's name, latitude-longitude coordinates, and address, as well as directions (i.e., how to get to the park) and sports facilities. Information about each hospital's name, location, and contact details are provided in the hospital column. Postal code, address, latitude-longitude coordinates, and institution type (elementary school, junior or senior high school, university) are all included in the column for schools. Latitude-longitude coordinates are provided for convenience stores and MRT stations in the column.

3.2 Feature Engineering

This entails choosing and manipulating variables, such as property traits, geography, economic data, and regional market patterns, that may be pertinent to home pricing. Techniques like dimensionality reduction, feature scaling, and feature selection can all be used in feature engineering. In order to anticipate property prices, a variables must be chosen that is most informative. Statistical testing, correlation analysis, and other techniques can be used to do this. There are numerous category factors that influence home pricing, including location, zoning, and property type. To be employed in a regression model or other machine learning approach, these variables must be numerically encoded. One-hot encoding, label encoding, and target encoding are the common encoding methods.

3.3 Model Selection

Model selection entails choosing the best ML algorithm or model for the goal of predicting home prices. This might involve combining techniques like gradient boosting (GB), hedonic regression (HR), time series analysis (TSA), artificial neural networks (ANN), and random forest. (RF).

3.4 Model Training

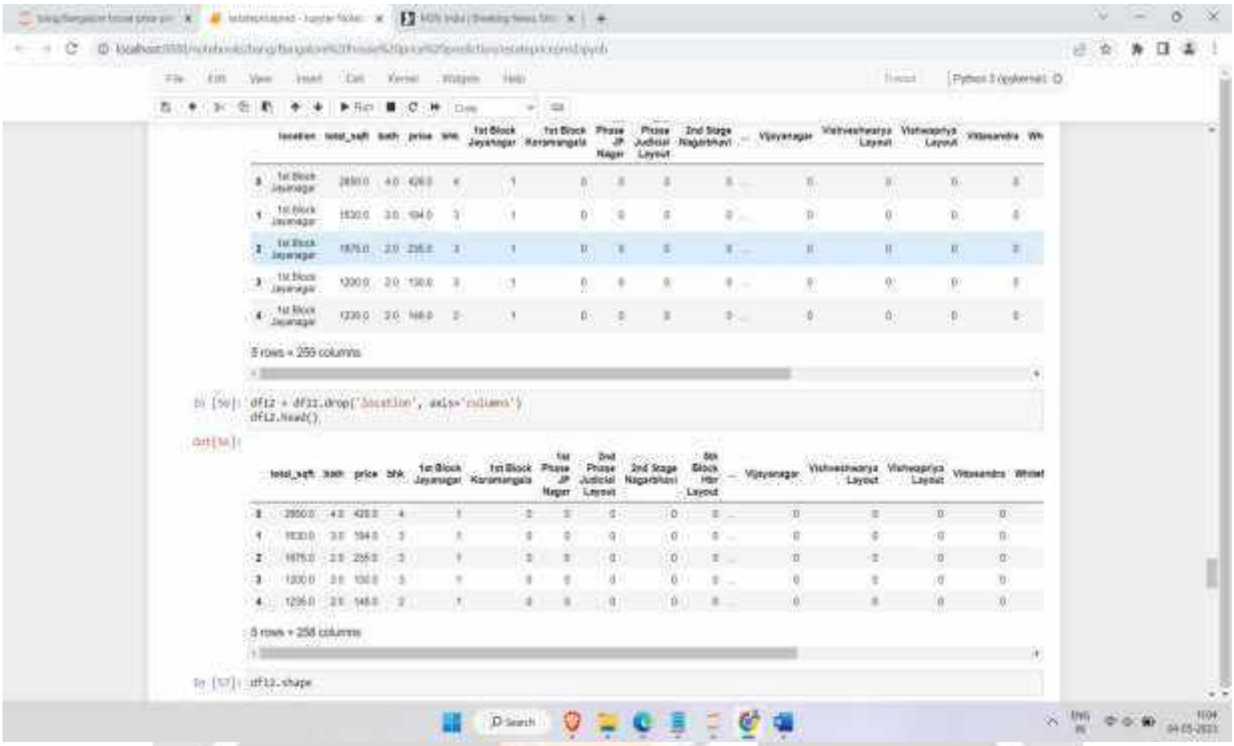
This entails selecting a model, optimising its parameters, and testing the model's effectiveness against a different test set using historical data. The division of the data into a training set and a testing set is in the model training. The testing set is used to assess the model's performance, whereas the training set is used to fit the model. Usually, 70–80% of the data is used for training and 20–30% is used for testing. A method for assessing the model's performance while using the training set is cross-validation. The data is split into k subgroups for k-fold cross-validation; this model is trained on the k-1 subsets and tested on the remaining subset. Each subset acts as the testing set once during the course of this operation, which is repeated k times. The generalizability of the model may be evaluated, and overfitting can be avoided, with the aid of cross-validation. By inserting a penalty term to the loss function during training, regularisation is a methods for lowering overfitting. L1 regularisation (lasso regression) and L2 regularisation (ridge regression) are two common regularisation techniques. It could be helpful to evaluate the significance of each input for making predictions once the model has been trained. This can assist in feature selection and in determining are most useful for predicting property prices.

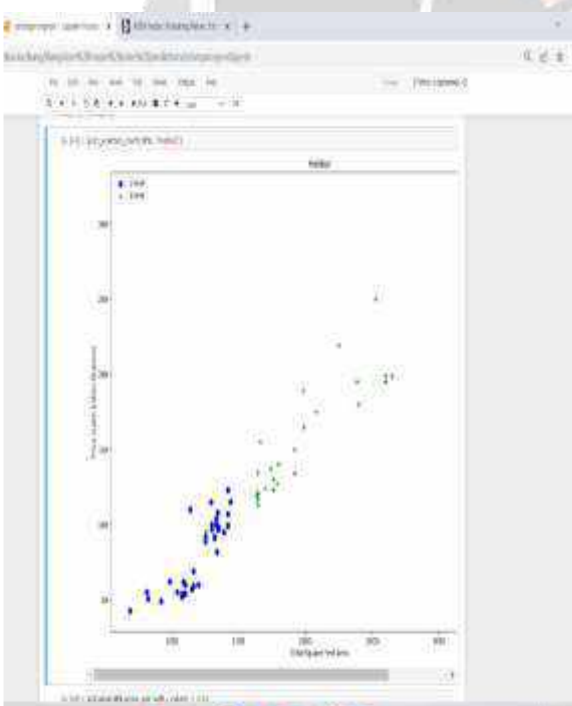
3.5 Prediction Model

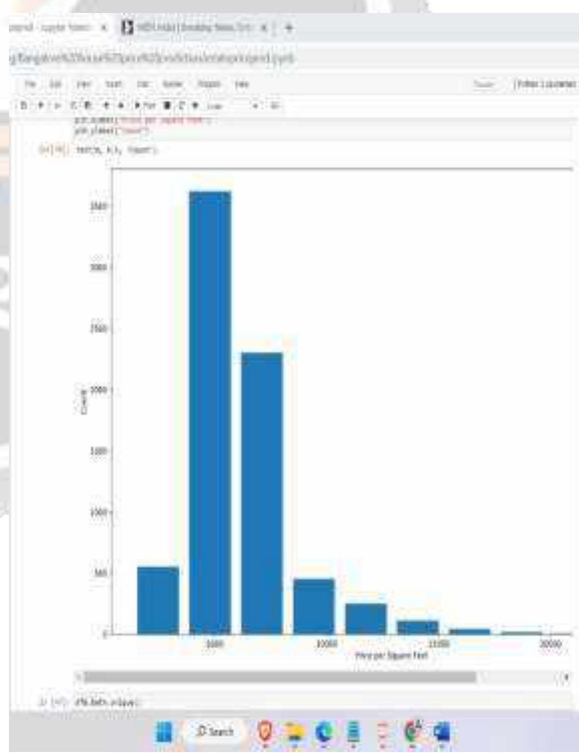
This entails applying the trained model to predict outcomes from fresh data, gauging its accuracy, and perhaps improving the model. Model selection is a crucial stage of the home price forecast process that involves picking the best algorithm or model for the job at hand. Here are some popular house price prediction models and algorithms. The input and the output (home price) are assumed to have a linear relationship in this simple statistical model. It can yield interpretable coefficients for each input variable, making it a useful place to start when predicting housing prices. This non-parametric approach is capable of capturing intricate relationships between variables. Decision trees can handle incomplete data and produce answers that are easy to understand. They may not generalise well to new data, though, and they can be prone to overfitting. This ensemble technique generates forecasts using a number of DT . Compared to individual decision trees, random forests are better at handling missing data and less prone to overfitting. The non-linear correlations between the variables can be captured using this deep learning technique. A huge and complex dataset can be used to predict home prices using neural networks. They can, however, be computationally expensive and need a large data to train well.

4 IMPLEMENTATION

House price prediction has adopted deep learning techniques like long short-term memory (LSTM) networks or convolutional neural networks (CNNs), as well as MLT like support vector machines (SVM) and extreme gradient boosting (XGBoost) algorithms. Additionally, some studies have taken for diverse data, such as street-view or satellite maps. These introduced in the paragraphs that follow. Mu et al. [2] showed that SVM and least squares SVM approaches both outperformed partial least squares when used to estimate housing prices. [8] used the XGboost method to predict secondhand housing data in Chengdu, China, and they showed that when compared to decision trees and linear regression, XGboost can strengthen models and reduce overfitting. For the purpose of projecting house prices, Madhuriet al. [9] used multiple regression approaches such as the least absolute shrinkage and selection operator, gradien boosting, and adaptive boosting.Their suggested methodology could assist sellers in calculating sales expenses and give precise information to purchasers. In order to forecast real estate prices, Bork and Mller [3] used a dynamic model selection mechanism across all 50 US states. Phan [10] created a novel model that combines MLT such as SVM and stepwise methods.

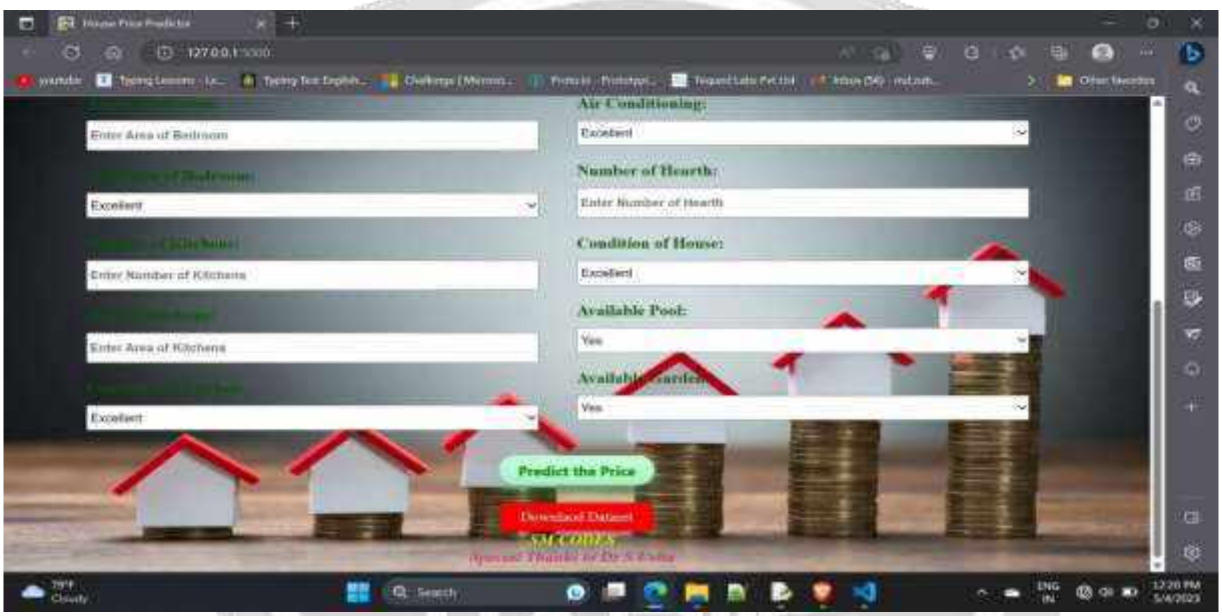

5 rows × 259 columns
df12 = df11.drop('location', axis='columns')
df12.head()
5 rows × 258 columns
df12.shape

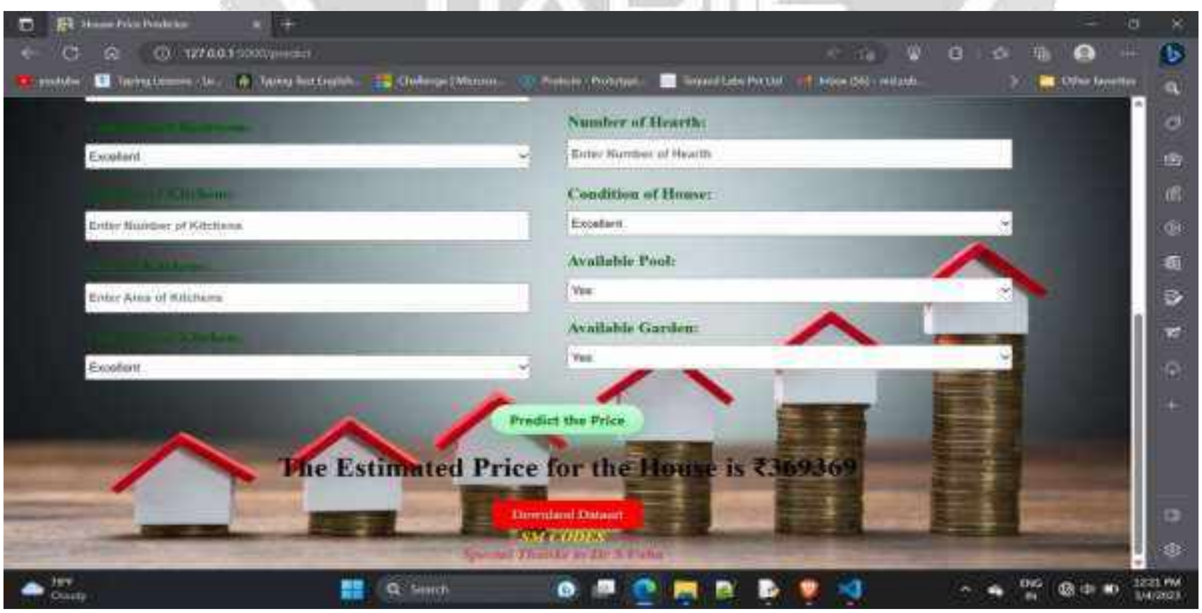



Count
Price per Square Feet

5 RESULT

A house price prediction model's output can be assessed using a variety of metrics, including mean squared error (MSE), mean absolute error (MAE), and R-squared. These metrics track the discrepancy between the target variable's (the sale price of the house) projected and actual values. A higher R-squared value shows that the model is explaining a greater proportion of the variability in the target variable, whilst a lower MSE and MAE suggest that the model is making more accurate predictions. It is crucial to remember that the accuracy of the data, the features included, and the model parameters can all affect how a house price prediction model performs. Therefore, before analysing the outcomes, careful feature engineering, model selection, and data preprocessing must be carried out. Generally speaking, a well-executed house price prediction model can offer in-sightful information about the real estate market and assist stakeholders in making decisions. Real estate agents, home purchasers, and investors, among others, can use the model to predict the selling price of a home, determine a property's value, and spot lucrative opportunities for the real estate market.





6 CONCLUSION

In conclusion, a key use of ML in the real estate sector is house price prediction. A properly applied house price prediction model can give useful information about the real estate market and assist decision-makers.
Data gathering, data preprocessing, feature engineering, exploratory DA, model selection, model training, model evaluation, and deployment are all steps in the construction of a housing price prediction model. The precise needs of the problem and the resources at hand determine the framework and implementation tools that should be used. A house price prediction model's output can be assessed using a variety of metrics, including MSE, MSA, and R-squared. Real estate brokers, home purchasers, and investors can all benefit from better decision-making and investing tactics brought about by a well-implemented model.Overall, predicting house prices is a difficult but rewarding task with significant repercussions for the real estate sector. Utilising MLT to predict house prices can assist in locating lucrative opportunities, lowering risk, and enhancing the effectiveness of the real estate market.

7 FUTURE WORK

Including more intricate and varied features At the moment, the majority of house price prediction models rely on straightforward features like the bedrooms and bathrooms, square footage, and location. Future models can be enhanced by adding more intricate and varied aspects like the age of the house, the standard of the building materials, and the existence of facilities like pools or garages. Investigating novel MLT Deep learning and ensemble techniques are only two of the various MLT that can be used to predict home prices. The application of these algorithms to increase the precision of house price prediction models can be explored in further research. Including temporal data: Changes in the economy, the real estate market, and changes in housing supply and demand can all cause price adjustments in the long run. These swings can be accounted for and prediction accuracy increased by include temporal data in house price prediction models. Including external data sources Models for predicting the price of a home can gain from including external data sources like demographics of the neighbourhood, school ratings, and crime statistics. These data sources can offers information about the variables that affect home prices and can increase the precision of forecasts. Creating models for particular regions and home type. The efficacy of house price prediction models varies based on the particular region and housing type. To increase the precision of projections, future work can concentrate on creating models that are suited to particular locations and dwelling types.

8 REFERENCES

[1] R. Gupta, A. Kabundi, and S. M. Miller, ‘‘Forecasting the US real house price index: Structural and non-structural models with and without fundamentals,’’ Econ. Model., vol. 28, no. 4, pp. 2013–2021, Jul. 2011.
[2] J. Mu, F. Wu, and A. Zhang, ‘‘Housing value forecasting based on machine learning methods,’’ Abstract Appl. Anal., vol. 2014, pp. 1–7, Aug. 2014.
[3] L. Bork and S. V. Møller, ‘‘Forecasting house prices in the 50 states using dynamic model averaging and dynamic model selection,’’ Int. J. Forecasting, vol. 31, no. 1, pp. 63–78, Jan. 2015.
[4] A. Ng and M. Deisenroth, ‘‘Machine learning for a London housing price prediction mobile application,’’ Imperial College London, London, U.K., 2015.
[5] M. Risse and M. Kern, ‘‘Forecasting house-price growth in the euro area with dynamic model averaging,’’ North Amer. J. Econ. Finance, vol. 38, pp. 70–85, Nov. 2016.

TRACKING AND MONITORING OF AGRICULTURAL FOOD DURING TRANSPORTATION USING IOT

VM. Saravana Perumal[1] , Sumaiya Nadeem[2], Shafiya Ashuma A[3], Yashaswini C E[4], Smarthi B[5]

[1]*Assistant Professor, Dept of CSE, RajaRajeswari College of Engineering, Karnataka, India*
[2]*Sumaiya Nadeem, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[3] *Shafiya Ashuma A, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[4] *Yashaswini C E, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[5] *Smarthi B, CSE, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

The tracking and monitoring of agriculture food stock throughout transportation using IoT is an expeditious growing field that aims to increase the protection and efficiency of food transportation. IoT sensors are acclimated to monitor abundant aspects of food transportation, for instances temperature, humidity, and location. This information is then transmitted to a central database in real-time, where it could be analyzed and acted upon if any issues are detected. By using IoT technology, using its resources, the agriculture sector can ensure food products are transported under optimal conditions, minimizing spoilage and reducing food waste. In addition, IoT technology will also help to detect and prevent food fraud and contamination, providing greater transparency and accountability throughout the food SCM.

Keyword: - *Arduino Uno, ESP8266 Wi-Fi Module, RFID Reader, Keypad, RTC Module, LCD Display, ThingSpeak IOT etc.*

---

1. INTRODUCTION

The transportation of agricultural food products is a critical part of the food SCM, with billions of tons of food being transported globally every year. Ensuring the security and quality of food products during transportation is essential to prevent spoilage and contamination, which can result in significant economic losses and public health risks. One of the deadlines in food delivery is maintaining the optimal conditions required for the specific food products being transported, for example temperature, humidity, and ventilation. The emergence of the Internet of Things (IoT) technology has revolutionized the way food transportation is monitored and managed. IoT sensors will be embedded in the transportation vehicles or cargo containers to monitor and transmit real-time data on the environmental conditions inside. This data will be used to trace and monitor the transportation of food material, ensuring that food products are transported under optimal conditions and any issues can be detected and addressed in real-time. This essay investigates the application of IoT technology in tracking and monitoring the agricultural food supply during transportation. We will examine the benefits of IoT-based monitoring, including reducing food spoilage, enhanced food safety, and preventing food fraud. We will also explore the various types of IoT sensors and gadgets that can be used to track the transit of food and the complication and considerations that is addressed to ensure the successful implementation of IoT-based food transportation monitoring systems, etc.

1.1 OBJECTIVES

- Ensure food safety: IoT sensors can monitor the environmental conditions of food items during transportation, check the environment to ensure that they are transported under optimal conditions and prevent contamination.
- Reduce food waste: By monitoring the environmental conditions of food products during transportation, IoT technology may help to reduce food waste caused by spoilage and degradation.
- Improve supply chain efficiency: IoT technology can provide real-time tracking and monitoring food products, allowing for better planning, scheduling, and resource allocation, leading to improved supply chain efficiency.
- Enhance transparency and accountability: IoT-based monitoring systems can provide greater transparency and accountability throughout food shipment, improving traceability and preventing food fraud.
- In general, the utilization of IoT technology in tracking and monitoring agricultural foods during shipment to guarantee that they are delivered in the best circumstances possible, reduce waste, and enhance supply chain efficiency, it leads to a sustainable and resilient food supply chain.

1.2 PROBLEM STATEMENT

The transportation of agricultural food products is a complex and challenging process that involves multiple stakeholders, including farmers, shippers, carriers, and retailers. One of the major obstacles in food transportation is maintaining the optimal conditions required for a particular food product, including ventilation, humidity, and temperature. Failure to maintain These circumstances may result in spoilage, contamination, and degradation of food products, resulting in significant economic losses and public health risks. Traditional monitoring methods, such as manual temperature checks, are time-consuming, labor-intensive, and prone to human error. These methods also provide limited visibility into the transportation process, making it difficult to identify and address issues in real-time. The emergence of IoT Technology has opened new possibilities. for monitoring the transportation of food products. However, implementing IoT-based monitoring systems has its own unique set of difficulties. For instance, selecting the appropriate sensors and devices to monitor different types of food products and transportation methods can be challenging. Furthermore, integrating IoT technology into existing supply chain systems and ensuring data Security and privacy issues might be difficult as well. Overall, the problem statement of tracking and monitoring the products is to make efficient transportation of food products by addressing the challenges associated with traditional monitoring methods and implementing IoT-based systems that are tailored to the specific requirements of the supply chain.

2. LITERATURE SURVEY

1. Agricultural Supply Chain Monitoring System Using IoT and Blockchain," Kim et al. (2021)

proposed an agricultural SCM monitoring system that utilizes IoT devices to collect data on temperature, humidity, and location during transportation. The system also uses blockchain technology to secure the data and ensure security.

2. IoT-Based Intelligent Agriculture Monitoring System for Crop Growth Prediction," Yang et al. (2020)

proposed system that utilizes IoT devices to collect data on temperature, humidity, and soil moisture. The system uses this data to predict crop growth and optimize irrigation and fertilizer usage.

3. IoT-Based Smart Agriculture Monitoring System for Efficient Utilization of Water and Fertilizer," Pandey et al. (2020)

proposed system utilizes IoT devices to collect data on soil moisture, temperature, and humidity. The system uses this data to optimize water and fertilizer usage and increase crop yield.

4. Design and Implementation of an IoT-Based Smart Agriculture Monitoring System," Li et al. (2020)

proposed system that utilizes IoT devices to collect data on temperature, humidity, soil moisture, and light intensity. The system provides real-time monitoring and alerts farmers if any anomalies are detected.

.

3. PROPOSED SYSTEM

An IoT-based system for tracking and monitoring the transportation of agriculture food supply can provide real-time insights on the location, condition, and security of the food during transit. Here is a proposed system for such a solution:

Hardware:

GPS-enabled IoT sensors: These sensors will be attached to each shipment of agriculture food supply to track their location and movement.

Temperature and humidity sensors: These sensors will measure the environmental conditions inside the transportation container to make sure the food is being transported under suitable conditions.

Security sensors: These sensors can recognise any unauthorized access to the shipment.

Software:

Cloud-based data storage and processing: The information gathered from the sensors will be stored and processed in the cloud to generate real-time insights on the condition and whereabouts of the food supply.

Mobile application: A mobile application can be developed for drivers and logistics personnel to access the data and receive alerts if any environmental or security conditions are breached.

3.1 METHODOLOGY

Identify the requirements: The first step is to identify the needs of the agriculture food supply chain, including the types of food, transportation modes, and environmental conditions. This will help in selecting the appropriate IoT sensors and software for the system.

Choose the hardware components: Based on the requirements, select the appropriate IoT sensors, such as GPS, temperature, humidity, and security sensors. The sensors should be compatible with the transportation container and capable of collecting real-time data.

Develop the software: Develop a cloud-based platform to store and process the sensor-collected information. The platform should be scalable, secure, and accessible by authorized personnel. Develop a mobile application for drivers and logistics personnel to access the data and receive alerts in case of any disruptions.

Install the sensors: Install the IoT sensors on the transportation container to track and monitor the food supply during transit. Ensure that the sensors are properly calibrated, configured, and tested to collect accurate data.

Collect and process the data: Collect real-time data from the IoT sensors and process it in the cloud-based platform. Use data analytics techniques to generate insights on the location, condition, and security of the food supply.

Monitor and analyse the data: Monitor the data in real-time and generate alerts in case of any disruptions, such as changes in temperature or humidity, security breaches, or delays in transit. Use predictive analytics to generate insights on potential disruptions and take proactive measures to prevent them.

Evaluate and improve the system: Regularly evaluate the system's performance and identify areas for improvement. Use feedback from logistics personnel, drivers, and customers to enhance the system's functionality, usability, and efficiency.

At the end of prediction, we can conclude that by using Random Forest, Logistic Regression algorithm we get 100% optimal prediction accuracy.

In summary, the methodology for tracking and monitoring agriculture food using IoT involves identifying requirements, selecting appropriate hardware components, developing software, installing sensors, collecting and processing data, monitoring and analyzing data, and evaluating and improving the system’s performance.

3.2 SYSTEM ARCHITECTURE

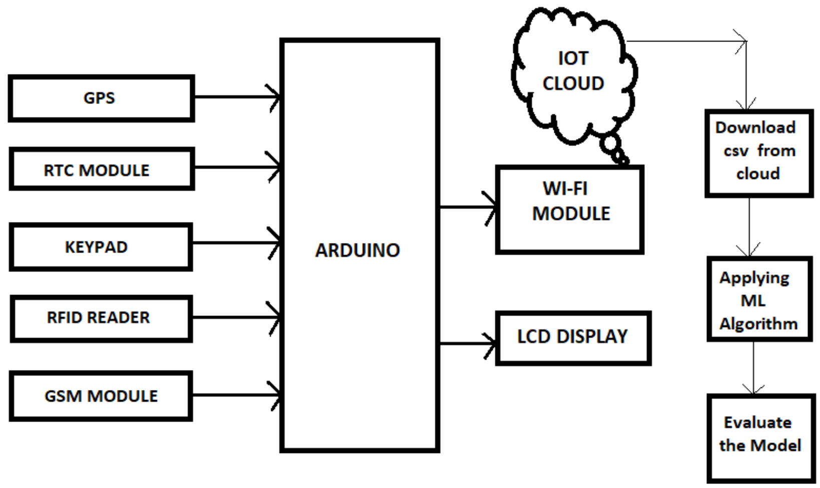


Fig : 3.2 : Architecture Model

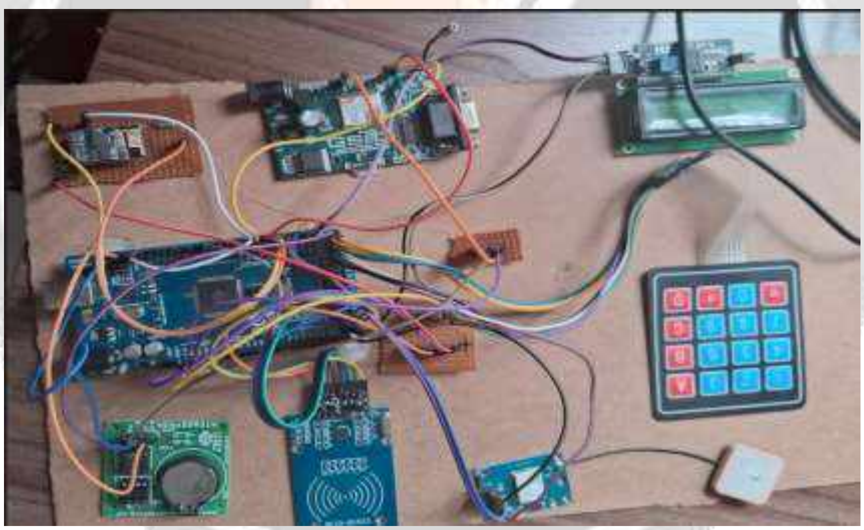


Fig 3.3 : IoT Model of Transportation Monitoring

4. CONCLUSION

Among the implementation of an IoT-based system for tracking and monitoring agriculture food supply during transportation can significantly improve the safety, security, and efficiency of the supply chain. With the help of IoT sensors, cloud-based platforms, and data analytics, stakeholders can monitor the location, condition, and security supply in real-time. This enables proactive measures to be taken to prevent disruptions, such as changes in temperature or humidity, security breaches, or delays in transit, and to respond quickly to any issues that arise. The system can also produce knowledge that may be helpful to optimize logistics operations and increase customer service. Ultimately, an IoT-based system for tracking and monitoring agriculture food supply during transportation will help make sure that customer receive safe and high-quality food products, while reducing waste and enhancing the sustainability of the supply chain.

5. REFERENCES

[1] L. Jamjoom "A Wireless Controlled Digital Car Lock for Smart Transportation" I IEEE Learning and Technology C ONFERENCE, ISSN: 17805861, May 2018.

[2] G. Kiruthik Amani, E. Vigneswaran, "Adaptive speed control and vehicle Security using speech processing", International Journal of Applied Engineering Research, Vol.10 No.55 ,2015.

[3] R. Ramani, S. Valarmathy, "Vehicle Tracking and Locking System Based on GSM and GPS", International Journal of Intelligent Systems and Applications, 2013.

[4] J. Sun, J. Tang, W. Fu, Z. Chen, Y. Niu, "Construction of a multi echelon supply chain complex network evolution model and robustness analysis of cascading failure," Oper. Supply chain management, Int. Apr. 2020.

[5] J. Grundy, and I. Müller, 'An analysis of the cloud computing security problem,' 2016, arXiv:1609.01107. [Online]. Available: http://arxiv.org/abs/1609.01107

[6] A Batwa and A. Norman, "A framework for exploring blockchain technology in supply chain management," Oper. Supply Chain Manage., Int. Apr.2020.

DETECTING PHISHING WEBSITES USING MACHINE LEARNING

[1] Prof., Rashmi B R, [2] Sai Pavan B N, [3] Shashwath S Kharvi, [4] Dheeraj Kumar,[5] Yella Lalith Sai

[1]Assistant. Professor, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[2] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[3] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[4]Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[5] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India

ABSTRACT

Phishing attacks remain a persistent threat to online users and organizations, making it crucial to develop effective techniques for detecting phishing websites. In recent years, machine learning approaches have been increasingly used to tackle this problem due to their ability to learn from large datasets and detect patterns that may not be discernible to humans. This paper presents an abstract of a study that aims to detect phishing websites using machine learning techniques. The proposed approach uses a dataset of phishing and legitimate websites to train different classifiers such as decision trees, random forests, and support vector machines. The study evaluates the performance of each classifier using metrics such as accuracy, precision, recall, and F1 score. The results show that the proposed approach achieves high accuracy and performs better than traditional anti-phishing techniques. The study concludes that machine learning techniques can be effective in detecting phishing websites and can be integrated into existing security systems to enhance their effectiveness.

1. INTRODUCTION

Phishing attacks are a prevalent and persistent threat to online users and organizations. Phishing attacks aim to trick users into divulging sensitive information such as passwords, credit card details, and personal data by disguising themselves as legitimate entities. The success of these attacks depends on the ability of attackers to create convincing phishing websites that appear authentic to users.
Traditional anti-phishing techniques rely on static lists of known phishing websites or heuristic rules to identify potential phishing attacks. These approaches have limited effectiveness against sophisticated attacks that use social engineering techniques and advanced obfuscation methods to evade detection.

In recent years, machine learning approaches have emerged as a promising alternative for detecting phishing websites. Machine learning algorithms can learn from large datasets and identify patterns that may not be visible to humans. These algorithms can analyze website content, structure, and behavior to identify indicators of phishing attacks and distinguish them from legitimate websites.

This paper presents a study that aims to detect phishing websites using machine learning techniques. The study uses a dataset of phishing and legitimate websites to train different classifiers such as decision trees, random forests, and support vector machines. The performance of each classifier is evaluated using metrics such as accuracy, precision, recall, and F1 score. The study assesses the effectiveness of the proposed approach and compares it with traditional anti-phishing techniques.

The remainder of the paper is structured as follows. Section 2 provides a review of related work on phishing detection and machine learning approaches. Section 3 describes the dataset and methodology used in the study. Section 4 presents the experimental results and analysis. Finally, Section 5 concludes the paper and discusses future directions for research.

1.1 Problem Statement

Phishing attacks are a serious threat to online users and organizations, and traditional anti-phishing techniques have limitations in identifying and preventing these attacks. As phishing attacks become more sophisticated, there is a need for more effective and robust approaches to detect them.

Machine learning approaches have shown promise in detecting phishing websites by analyzing website content, structure, and behavior to identify indicators of phishing attacks. However, there is a need for further research to evaluate the effectiveness of these approaches and compare them with traditional anti-phishing techniques.

Therefore, the problem addressed in this paper is to develop and evaluate a machine learning-based approach to detect phishing websites and compare its effectiveness with traditional anti-phishing techniques. The study aims to answer the following research questions:

Can machine learning techniques effectively detect phishing websites?
How does the performance of machine learning-based phishing detection compare with traditional anti-phishing techniques?
Which machine learning algorithm(s) perform best in detecting phishing websites?
What are the key features and indicators that distinguish phishing websites from legitimate ones?

1.2 Existing System

Phishing detection schemes which detect phishing on the server side are better than phishing prevention strategies and user training systems. These systems can be used either via a web browser on the client or through specific host-site software presents the classification of Phishing detection approaches.
Heuristic and ML based approach is based on supervised and unsupervised learning techniques. It requires features or labels for learning an environment to make a prediction.
The existing methods rely on new internet users to a minimum. Once they identify phishing website, the site is not accessible.

1.3 Proposed Methodology

We collect 16000 of phishing and legitimate URLs. The phishing websites consist of 12000 phishing URLs that has been collected from PhishTank.
In the other hand, the legitimate websites consist of 4000 legitimate URLs that have been collected by a daily use from chosen users.
The phishing websites have certain characteristics and patterns that can be considered as features. In this subsection, we cover all phishing website features that have been used in the previous researches as possible.

1.4 Future Enhancements

Real-time detection: Develop a system that can detect phishing websites in real-time, allowing for immediate blocking of malicious websites before users can access them.

Hybrid approach: Combine machine learning-based approaches with other anti-phishing techniques such as blacklist and whitelist approaches to enhance the accuracy and effectiveness of phishing detection.

Feature selection: Optimize the feature selection process to identify the most relevant and effective features for detecting phishing websites. This can be done by using feature selection techniques such as PCA (Principal Component Analysis) or Lasso regression.

Adversarial attacks detection: Develop techniques to detect adversarial attacks on machine learning models that are designed to evade detection and classification by the model.

Deep learning-based approaches: Investigate the effectiveness of deep learning-based approaches such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs) in detecting phishing websites.

Online learning: Develop an online learning system that can adapt to new phishing attacks and update the model in real-time**.**

2. SYSTEM ARCHITECTURE

The system architecture for detecting phishing websites using machine learning consists of the following components:

Data Collection: The system collects a dataset of phishing and legitimate websites. The dataset should be large enough to provide a diverse range of features and examples to train the machine learning algorithms.

Feature Extraction: The system extracts relevant features from the collected websites. These features can include website content, URL structure, domain name, SSL certificate, and other indicators that distinguish phishing websites from legitimate ones.

Machine Learning Algorithms: The system uses various machine learning algorithms to train models based on the extracted features. The algorithms can include decision trees, random forests, support vector machines, and neural networks.

Model Evaluation: The trained models are evaluated using performance metrics such as accuracy, precision, recall, and F1 score. The evaluation helps to determine the effectiveness of the machine learning approach in detecting phishing websites.

Integration with Security Systems: The system can integrate the trained models into existing security systems to enhance their effectiveness in detecting phishing attacks. The integration can include email filters, web filters, and browser extensions.

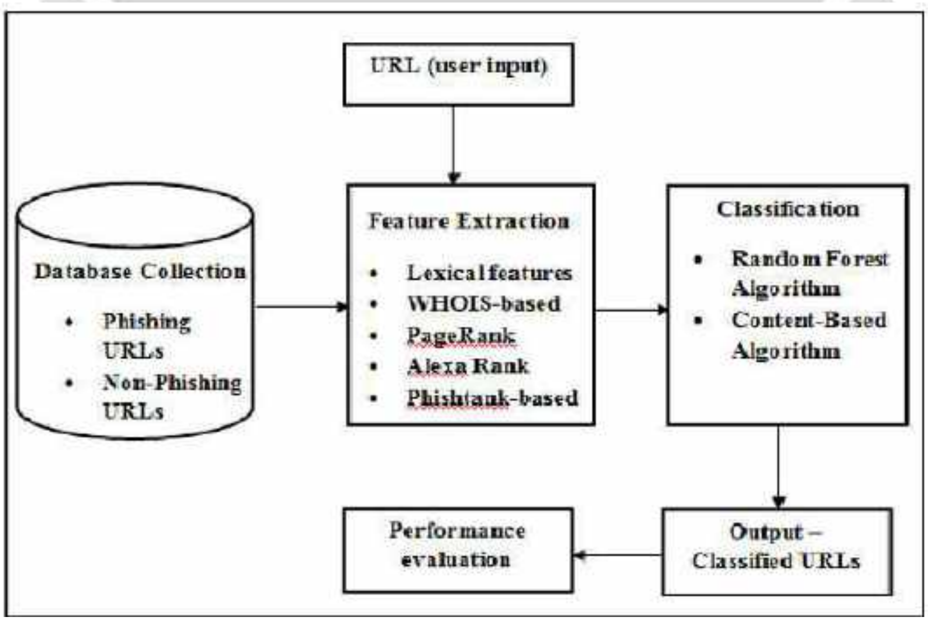


Figure -1: Design & Architecture Model

2.1 Hardware Specification

- RAM: 2GB.
- ROM: 128 GB

2.2 SOFTWARE REQUIREMENTS

- Operating System : Windows 10+
- Programming Language : Python.
- Software used: VS Code
- Libraries: Pandas, Numpy, Seaborn, Matplotlib, Sklearn,Selinium

Table -3: Graph

3. IMPLEMENTATION

The implementation can be carried out using various programming languages and tools such as Python, Scikit-learn, TensorFlow, and Keras. The following libraries can be used to implement the above steps:

Requests: to download website content from URLs
BeautifulSoup: to extract website content and features
Pandas: to preprocess the dataset
Scikit-learn: to train and evaluate machine learning models

3.1 Module Description

Module 1: Data Collection: Collect a dataset of phishing and legitimate websites. The dataset should contain examples of websites that use social engineering techniques, obfuscation, and other advanced methods to evade detection.

Module 2: Feature Extraction: Extract relevant features from the collected websites. The features can include website content, URL structure, domain name, SSL certificate, and other indicators that distinguish phishing websites from legitimate ones.

Module 3: Data Preprocessing: Preprocess the dataset by cleaning and normalizing the features, converting categorical features to numerical, and splitting the data into training and testing sets.

Module 4: Model Selection: Select appropriate machine learning algorithms such as decision trees, random forests, support vector machines, and neural networks. Evaluate the performance of each algorithm using cross-validation and choose the best-performing algorithm.

Module 5: Model Training: Train the selected model using the preprocessed training dataset.

4. CONCLUSIONS

In conclusion, phishing attacks continue to pose a significant threat to online users and organizations, and traditional anti-phishing techniques have limitations in detecting and preventing these attacks. Machine learning-based approaches have shown promise in detecting phishing websites by analyzing website content, structure, and behavior to identify indicators of phishing attacks.

In this paper, we presented the system architecture and implementation steps for detecting phishing websites using machine learning. The system involves collecting a dataset of phishing and legitimate websites, extracting relevant features, training and evaluating machine learning models, and integrating the models into existing security systems.

The effectiveness of the machine learning approach in detecting phishing websites depends on the quality of the dataset, the relevance and accuracy of the extracted features, and the performance of the selected machine learning algorithms. Therefore, further research is needed to evaluate the effectiveness of the machine learning approach in detecting advanced phishing attacks and to develop more robust and effective techniques for detecting and preventing phishing attacks.

Overall, machine learning-based approaches hold promise in enhancing the effectiveness of anti-phishing measures and improving the security of online users and organizations.

5. REFERENCES

[1] AO Kaspersky lab. (2017). The Dangers of Phishing: Help employees avoid the lure of cybercrime. [Online] Available:
https://go.kaspersky.com/Dangers-Phishing-Landing-Page- Soc.html [Oct 30, 2017].

[2] ”Financial threats in 2016: Every Second Phishing Attack Aims to Steal Your Money” Internet: https://www.kaspersky.com/about/pressreleases/2017 financial-threats-in-2016. Feb 22, 2017 [Oct 30, 2017].

[3] Y. Zhang, J. I. Hong, and L. F. Cranor, ”Cantina: A Content-based Approach to Detecting Phishing Web Sites,” New York, NY, USA, 2007, pp. 639-648.

[4] M. Blasi, ”Techniques for detecting zero day phishing websites.” M.A. thesis, Iowa State University, USA, 2009.

[5] R. S. Rao and S. T. Ali, ”PhishShield: A Desktop Application to Detect Phishing Webpages through Heuristic Approach,” Procedia Computer Science, vol. 54, no. Supplement C, pp. 147-156, 2015.

[6] E. Jakobsson, and E. Myers, Phishing and Counter-Measures: Understanding the Increasing Problem of Electronic Identity Theft. Wiley, 2006, pp.2–3.

ON-SOFT BIOMETRIC PHOTO ENCRYPTION AND DECRYPTION

Deepa Konnur[1], Yashas Rayala T[2],Sumanth S[3],Santhosh R[4],Vinay N[5]

[1]*Assistant Professor, Department of Computer Science & Engineering, RRCE, Bengaluru,India*

[2]*Department of Computer Science & Engineering, RRCE, Bengaluru, India*

[3]*Department of Computer Science & Engineering, RRCE, Bengaluru, India*

[4]*Department of Computer Science & Engineering, RRCE Bengaluru, India*

[5]*Department of Computer Science & Engineering, RRCE Bengaluru, India*

ABSTRACT

With the rapid pace of technological growth, it is very important to secure user data. A robust technique which not only secures data but prevents it from various attacks is necessary. Such a technique is proposed within this article. Biometric authentication is one such practice seen today. Contrast to other forms of authentication, biometric recognition provides a strong link between a data record and an individual and it guarantees high level of accuracy and security. But this biometric data can be used by attackers to get illegal access. In order to prevent such acts, a robust technique known as zero-bit watermarking is proposed through this paper.

Keywords*: Face recognition, Soft-biometrics, Encryption, Decryption, Data Privacy*.

I. INTRODUCTION

Biometric is a reliable, secure authentication tool where controlled access is given by identifying the individual using the physiological or behavioral characters . Physiological properties are contained in the physical parts of the body such as fingerprints, fingerprints, iris, face, DNA, the shape of the hand, retina, etc. The commonly used physiological characters are iris, signature, voice, fingerprint, DNA, and Iris is a significant piece of the natural eye. The two eyes have autonomous and uncorrelated iris designs . No two irises of a person are alike; Indeed, the indistinguishable twins have distinctive iris designs . Even though the irises of a similar individual appear to be comparative yet they contain exceptional examples . Iris acknowledgment is an interaction of perceiving an individual dependent on textures and patterns in an iris . Watermarking is a strategy for biometric confirmation in which the highlights of the iris of an individual eye are extricated. The Iris acknowledgment framework gets the picture, extricates the iris region to decide the extraordinary texture for distinctive identification during the check interaction, and matches it with the database made during the enrolment cycle. It is quite possibly the most exceptional and dependable quick access biometric framework. Iris acknowledgment is a promising arrangement because of its dependability, soundness, uniqueness, and wide scope of utilizations .

The main aim of our project is to check about security of data and maintain the good quality of data. This paper deals with zero-bit watermarking of the biometric behavioural images in order to secure the confidential data for the sake of authentication. It mainly involves generation of an encrypted unique ID by embedding the watermark. The watermark which is the person's details is being stored in the database memory while the generated encrypted ID/master share is given to the user. Every time, the user has to scan unique ID number which is given to him. The encrypted unique ID number undergoes the process of extraction in order to extract the watermark. If the extracted watermark matches with the watermark stored in the database storage system then we can say that the user is successfully authenticated. The advantage of sharing the encrypted unique ID number is that even if the attacker gets the encrypted unique ID, it is useless to him because the data is stored in the manner of unique ID number.

II. PROBLEM STATEMENT

Extract unique different qualities from the original iris image,fingerprint image and integrate it with the fingerprint which is the watermark in the embedding process to generate unique secret key which is given to the user. Extract the watermark for biometric authentication, the master share or unique secret key given to the user is scanned along with the iris(eye) of the user. Design an authentication system which validates a user on successful match of the extracted watermark and the watermark stored in the database. Test the speed of the technique under various attacks BER calculation is performed and the values are tabulated and show the distortion effect on the host iris image, finger print image PSNR analysis is done. The main objective of the project is to generate a zero-bit watermarking technique to solve the issue of biometric data security without any loss of biometric data.

III. EXISTING SYSTEM

- The existing text watermarking algorithms are not robust against random tampering attacks (insertion, deletion or reordering of words) .
- Watermarks composed of both image and text make the text secure and has better robustness.
- So for enhancing robustness, it is better to use combined image and text watermark instead of using plain textual or image watermark to fully protect the text document.

IV. PROPOSED SYSTEM

- Watermark Is:

a) Data added to and often hidden within a file.
b) Usually a small amount of data, often just a unique identification number.
c) Very hard to remove by distorting the Image.
d) Difficult to find if you don't know the Secret unique key.
e) Typically the same data repeated is repeated.

- With the help of the biometric information (i.e. iris) and the secret unique key known by the person who wants to transmit the data can send the information.

V. OBJECTIVES

- Provide secure authentication of digital documents: Biometric watermarking can be used to check the authenticity of digital documents and verify the identity of the user
- Enhance data integrity: Biometric watermarking can be used to protect and make safe the data from unauthorized tampering and modification.
- Protect confidential informtion: Biometric watermarking can be used to protect and secure the confidential information from unauthorized access and disclosure.
- Prevent identity theft: Biometric watermarking can be used to protect against identity theft by checking that only authorized users can access private information.
- Improve data security: Biometric watermarking can be used to secure data against malicious attacks and unauthorized access.

VI. METHODOLOGY

The zero-bit steganographic technique creates a binary pattern without sterilising the original image by using the distinguishing characteristics of an associated iris image. The aforementioned method incorporates watermark bits from the user's fingerprint image into their segmented iris image. The technique places a lot of emphasis on creating a master share that is solid and secure. The unique characteristic that is derived from the iris as part of the algorithmic watermarking plan is combined with the binary watermark fingerprint to create the unique ID that is encoded to create a master share. The two key steps of the watermarking procedure are:

• **Embedding Process:** This procedure is used to create a special encrypted ID or master share.

• **Extraction Process:** This procedure entails removing the fingerprint (watermark picture) using a special encrypted ID (master share).

EMBEDDING PROCESS:

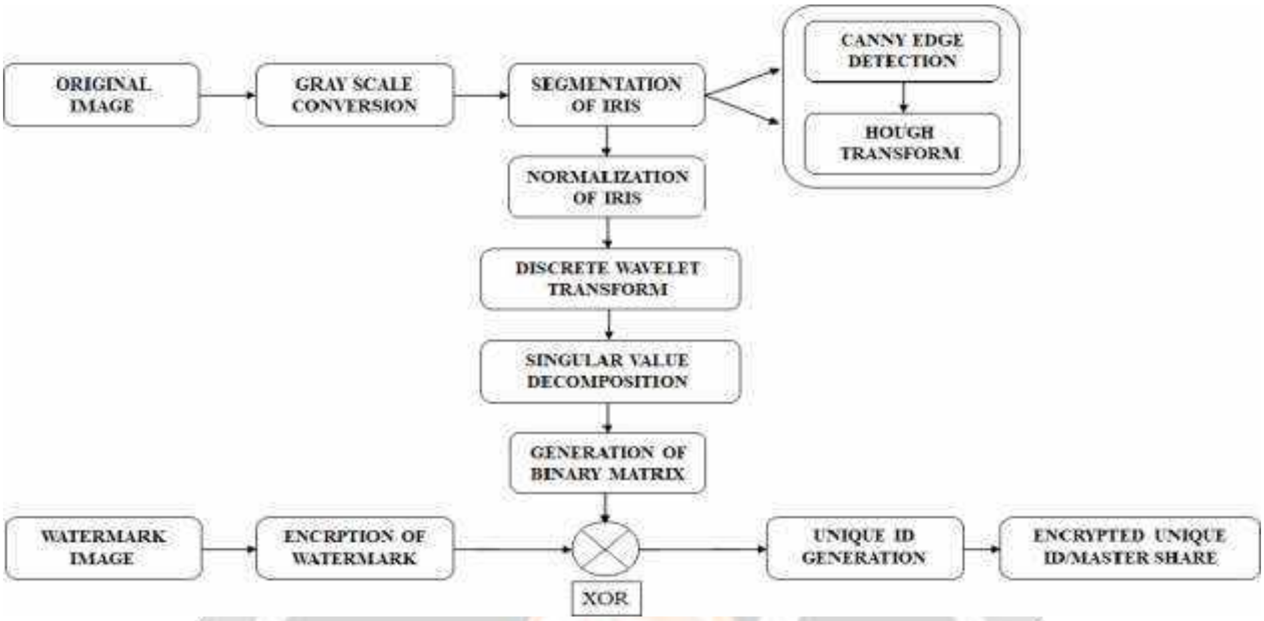


Fig -1:Embedding Process

EXTRACTION PROCESS:

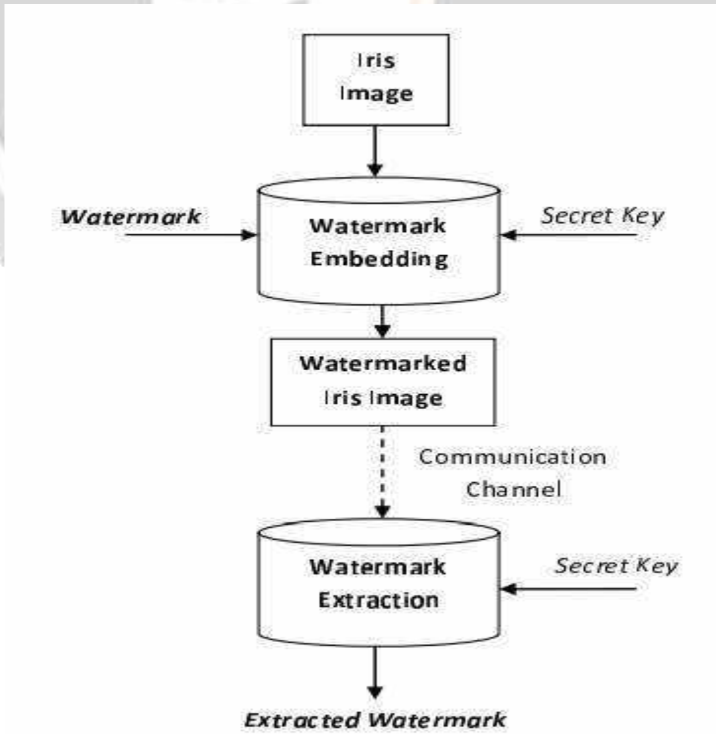


Fig -2:Extraction Process

User Case Diagram

A User Case Diagram is a lot of situations that reflect a client-frame relationship. A user case chart shows the entertainer-to-use relationship. Usage cases and on-screen characters are the two main important elements of an usage case diagram. An on-screen character that refers to an user or other person connected with the demonstrated process. A use case chart in figure 3is an out-of - the-box perspective that speaks to some activity each module will perform to complete an errand.

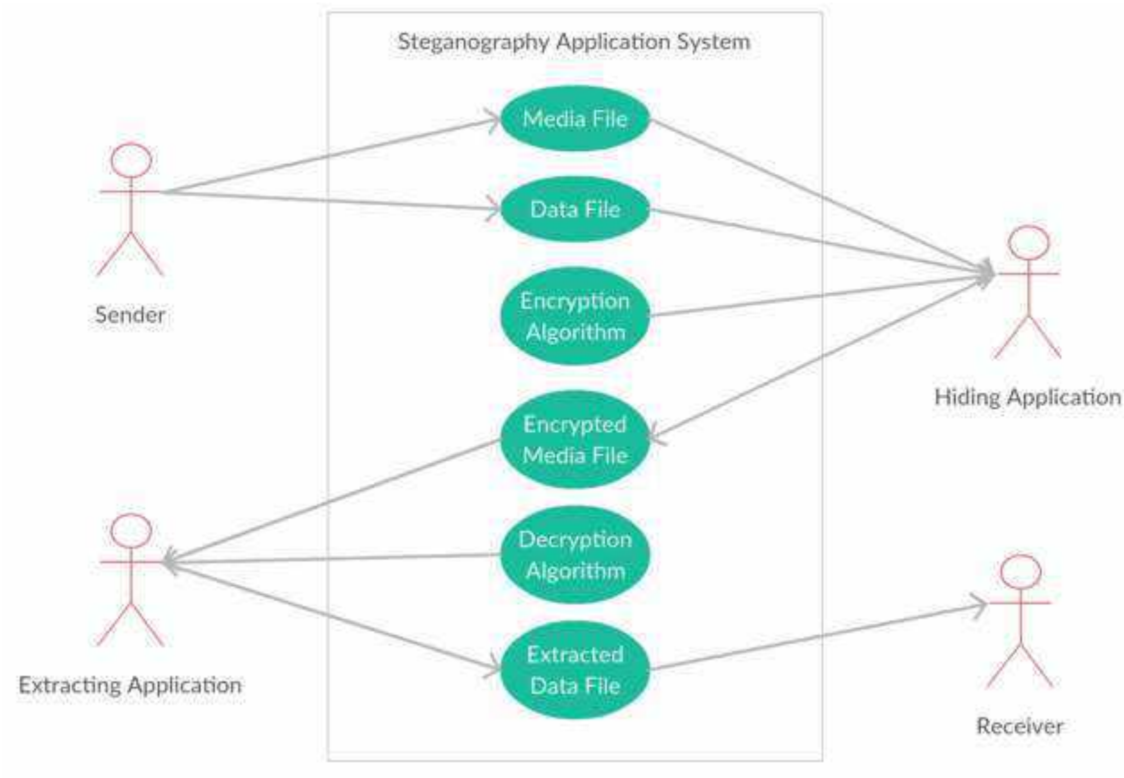


Fig -3:User Case Diagram

VII.RESULT

FIG -4:IMAGE ENCRPTING PROCESS

FIG -5:IMAGE DECRYPTING PROCESS

VIII. CONCLUSUION

Zero-bit watermarking is a method doesn't skew the original picture. Even the smallest deviation of a picture will amendment the distinctive identity of the person. Therefore, the planned technique are often most well-liked to watermark biometric data pictures because It hardly distorts at all within the guest image. DWT and SVD square measure wont to extract distinct attributes inside the algorithmic rule that's planned. The research results demonstrate that the watermark mixing proceeds quickly since each image's master share is created in an unambiguous manner. The experimental demonstrates that the algorithmic rule planned is strong against many image process threats, as shown by the experimental findings. The intended method keeps the encrypted watermarks during a data transfer. another thanks to store the watermarks are often explored so as to prevent assaults on the watermarks. The host iris's pupil size varies from person to person because, a machine learning algorithmic rule are often wont to train the model to discover pupil and iris of assorted size

IX. REFERENCES

[1] B. Swathi and T. M. Kumari, "Iris biometric security using watermarking and visual cryptography," International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI), Chennai, , pp. 1218-1220.
doi: 10.1109/ICPCSI.2017.8391904

[2] A. Vashistha and A. M. Joshi, "Fingerprint based biometric watermarking architecture using integer DCT," IEEE Region 10 Conference (TENCON),Singapore.

[3] G. Balamurugan, K. S. Joseph and V. Arulalan, "An Iris Based Reversible Watermark system for the security of teleradiology," World Conference on Futuristic Trends in Research and Innovation for Social Confernce.

CROSS-PLATFORM APPLICATION TO DIGITIZE MEDICAL RECORDS USING FLUTTER AND GOOGLE ML KIT

Mr. Sunil A[1], Shankarling Kalashetty[2], Sagar K[3], Santosh K[4]

[1]*Assistant Professor, CSE, Rajarajeswari College of Engineering, Karnataka, India*
[2] *CSE, Rajarajeswari College of Engineering, Karnataka, India*
[3]*CSE, Rajarajeswari College of Engineering, Karnataka, India*
[4]*CSE, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

The project at hand is cross-platform end-user program/software that is developed using Flutter and NodeJS for web development. The primary objective of the application is to digitize physical health records by utilizing machine learning approaches. This digitalization process would enable the users to effortlessly access and manage their medical data in secure and streamlined manner. Additionally, the application features an option for uploading digital health records, thereby transforming it into an end-to-end digitalization platform for medical records. The project is in complete alignment with the recent government reforms, namely, the Unified Health Interface (UHI), and represents significant technological advancement in the healthcare industry. The user-friendly interface, coupled with secure architecture, ensures that users' sensitive medical information remains protected, instilling sense of privacy and trust in the application. By providing better access to medical information and facilitating efficient communication among med-tech providers and patients, our application will lead to improved patient outcomes and more effective healthcare management. The implementation of a very efficient/useful and integrated healthcare system where medical records can be easily shared and accessed by authorized parties is the ultimate goal of this application.

Keyword: - *Digitization, Cross-Platform Application, Flutter, Machine Learning.*

1. INTRODUCTION

The project aims to digitize physical health records through cross-platform application that leverages machine learning techniques such as Optical Character Recognition (OCR) and Google ML Kits to extract-out scripts from scanned images of physical health records. Backend technologies, including Firebase and Nodejs, have been integrated to provide secure and scalable platform for storing and managing digital health records. The application is designed to comply/agree with recent government reforms like as the Unified Health Interface (UHI) and is user-friendly, ensuring efficient healthcare management. ML techniques such as OCR represents significant advancement in the digitization of physical health records, reducing the need for manual data/information entrying and eliminating the possibility of errors. The integration of backend technologies such as Firebase and Nodejs ensures secure and scalable platform for storing and managing digital health records. The project represents significant/important steps towards creating efficient/useful and integrated healthcare system, where medical records can be easily shared and accessed by authorized parties, leading to better patient outcomes and more effective healthcare management. The increasing demand for digital healthcare solutions makes the project significant technological advancement in the healthcare industry, providing secure and efficient platform for managing medical records.

2. EXISTING SYSTEM

The present system for managing medical records lacks universal platform, resulting in the need for manual data-entry and increased uncertainty in the management of patient information. This can lead to errors and inefficiencies in healthcare management. Furthermore, the current system is susceptible to human errors and can be time-consuming, making it less/lower than ideal for cooperating accordingly with or managing the large amounts of patient data. Automating the process of managing/taking care of medical records can eliminate these problems and ensure more accurate and efficient healthcare management. cross-platform application that leverages machine learning techniques such as OCR, as well as backend technologies such as Firebase and Nodejs, can address these challenges and provide more secure and efficient platform for managing medical records.

The following mechanisms/techniques are used in existing systems to digitize health records:

2.1 Emails

Emails: The use of emails for sharing medical records is common, but it is not secure and can be prone to errors. Emails can be intercepted by unauthorized individuals, compromising patient confidentiality. Additionally, email systems do not typically have the necessary features for managing and sharing medical records efficiently, such as version control and audit trails. As result, using emails for sharing medical records can be inefficient and can lead to errors in healthcare management.

2.2 Manual Data-Entry

The current system relies on manual data-entry, which is time-consuming and can be prone to errors. Healthcare providers must manually enter patient medical details/information into electronic record systems, which can lead to errors in data-entry. Additionally, manual data-entry can be time-consuming and can limit the efficiency of healthcare management.

2.3 Insufficient Record Management

The present system lacks centralized database for managing medical records, leading to inefficiencies in record management. Healthcare providers must manually search for patient records when the need to access medical information, which could be time-consuming and can lead/redirect to errors. Additionally, the lack of centralized database can limit the accessibility of medical records, making it difficult for patients/users to access/view their medical information/data when they need it.

2.4 Present ML Approaches

The present ML approaches/techniques used for digitizing medical records often have high/unreliable error rate, making them unreliable for healthcare management. Optical Character Recognition (OCR) technology is commonly used to extract text from medical records, but it can struggle to accurately identify handwriting and other non-standard formats. This can result in errors in the digitized medical records, which can lead to incorrect diagnosis and treatment. Additionally, machine learning models need to be trained on large datasets to improve accuracy, which can be challenging in the case of medical records due to the sensitive and private nature of the data. As result, the current ML approaches/techniques for digitizing medical records may not be reliable and may require further development and improvement to be suitable/best for use in healthcare management.

3. PROPOSED SYSTEM

The following approaches are being implemented to overcome, and improvise the present existing system:

3.1 Cross-Platform Application:

The proposed system is cross-platform application built using Flutter and web development technologies like Nodejs. The application will allow healthcare-providers or hospitals to access patient medical records securely and efficiently from any device, making healthcare management more accessible and streamlined.

3.1 Machine Learning Approaches:

The proposed system will use ML approaches to digitize medical records accurately and efficiently. The system will use OCR technology, including Google ML Kits, to extract text from medical records and convert them into machine-readable formats. The proposed system will also use advanced ML algos to detect anomalies and patterns in medical records, allowing healthcare providers to make better-informed decisions.

3.1 Machine Learning Approaches:

The proposed system will use ML approaches or algos to digitize medical records accurately and efficiently. This system uses OCR technology, including Google ML Kits, to extract text from medical records and convert them into machine-readable formats. This system uses advanced ML Algos to detect anomalies and patterns in medical records, allowing healthcare providers to make better-informed decisions.

3.2 Provision for Uploading Digital Medical Records:

This system will provide patients with platform to upload their digital medical records, making it an end-to-end digital system. This system will eliminate/decrease the need for physical copies of medical records and reduce/decreases the risk of loss or damage. The system provides the users the full control over their medical records, including the option/feature to grant or revoke access to healthcare providers.

3.3 Backend Technologies:

The proposed system will use Firebase as backend technology, allowing for efficient and secure storage of medical records. Firebase provides features like user authentication, real-time database, and cloud storage, making it reliable and secure choice for healthcare management.

3.4 Compliance with UHI Reforms:

The proposed system will be in line with the recent government reforms regarding Unified Health Interface (UHI). The UHI initiative aims to digitize healthcare services across India, making healthcare management more efficient and accessible. The proposed system will align with the UHI standards and will be compliant with the regulatory framework for healthcare management.

4. SYSTEM DESIGN

4.1 Front-End Development:

This system has two front-end interfaces: one for the cross-platform application and one for the web application. The cross-platform application will be developed using Flutter, while the web application will be developed using HTML and CSS. Both interfaces will provide user-friendly experience for patients and healthcare providers.

4.2 Back-End Development:

This system will use Firebase as backend technology for efficient and secure storage of medical records. The cross-platform application and web application will use Nodejs as the server-side language for handling requests and responses from the database.

4.3 Machine Learning Approach:

The proposed system will use Google ML Kits for OCR technology to extract text from medical records accurately. The extracted data will then be run through using ML algos on models to detect patterns and anomalies in medical records. The system will also provide an option for manual input of medical records in cases where OCR technology cannot extract the required data accurately.

4.4 Security:

The proposed system will be designed with strict security protocols to ensure the confidentiality/privacy and integrity of medical records. The system will use encryption algorithms to protect sensitive data, and view/access to medical records will be restricted to authorized healthcare providers and patients.

4.5 User Authentication:

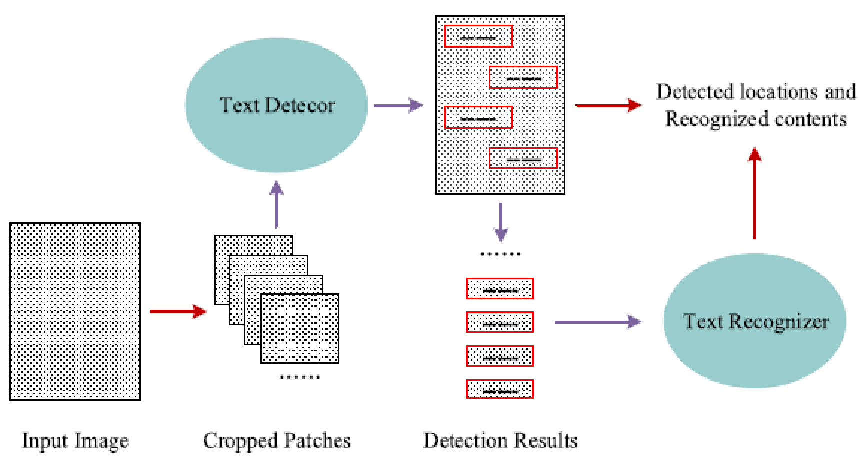
The proposed system will use Firebase authentication to authenticate users and grant access to medical records. Patients and healthcare providers will be required to create an account and provide necessary information for authentication purposes.

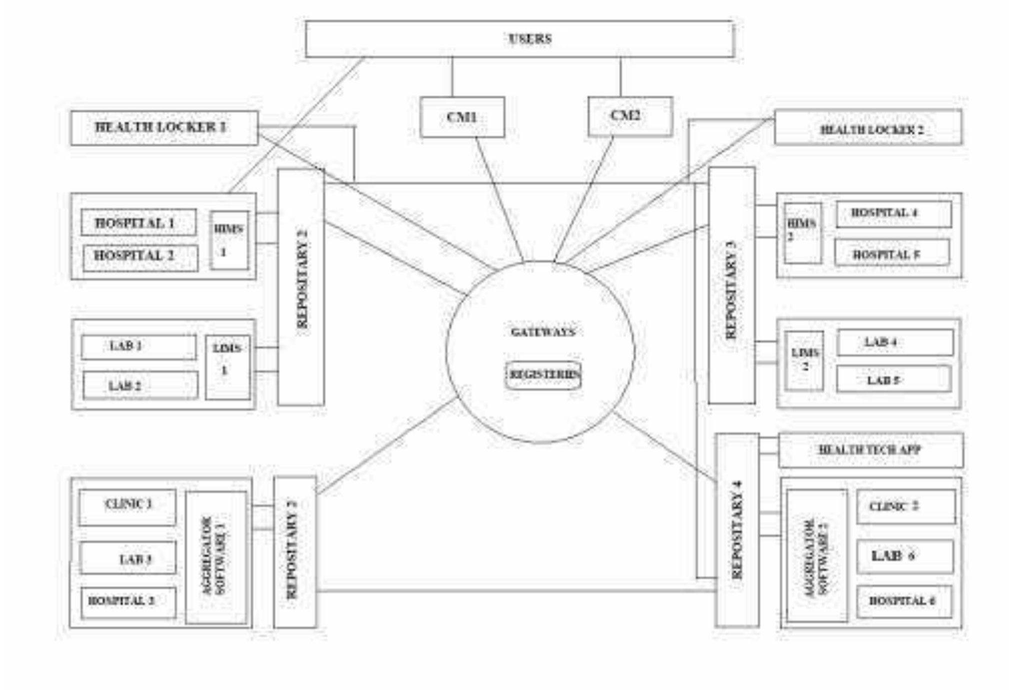
4.6 Data-Storage and Management:

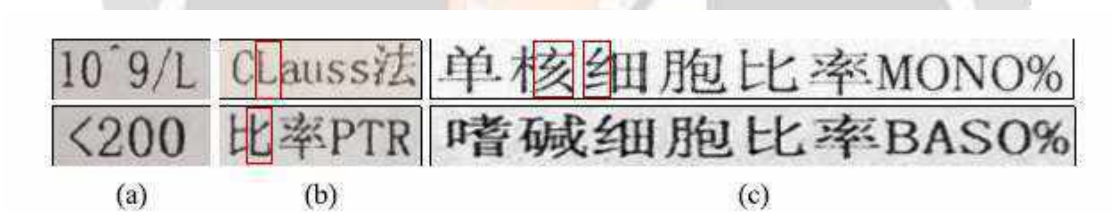
The proposed system will use Firebase real-time database for efficient data-storage and management. The system will ensure that medical records/info are stored securely and that authorized users can access them in real-time.

4.7 Integration and Testing:

The proposed system will be tested extensively to ensure its functionality and reliability. The system will also be integrated with third-party services like payment gateways and messaging platforms to provide comprehensive healthcare management experience.







4.8 Dataflow in Proposed System

The proposed system for medical record management is designed to ensure efficient and secure handling of medical records through well-defined data-flow process. The system will allow patients to upload their medical records either by taking pictures or uploading files directly to Firebase real-time database. The records will be securely stored using encryption algorithms to ensure confidentiality and integrity. Consent managers will manage access to records, ensuring that hospitals can access records only after obtaining permission from patients, and patients will have the option to revoke consent at any time to prevent unauthorized access to their records. The system will use machine learning algorithms to process uploaded records, detect patterns and anomalies in data, and provide healthcare providers with the patient's medical history to make informed decisions and provide better healthcare services. The system will also allow manual input of medical records when OCR technology cannot extract the required data-accurately. The proposed system will use Firebase and Flutter for the cross-platform application, Google ML Kits for digitizing records through OCR, Nodejs for the web application backend, and HTML/CSS for the frontend. The system will ensure data-security by utilizing encryption algorithms for storing and transferring data. The consent management system will be designed to ensure that access to medical records is only granted to authorized personnel, and patient privacy is maintained. In conclusion, the proposed system will provide streamlined data-flow process for efficient handling of medical records using modern technologies such as machine learning, OCR, and cloud computing. The system's consent management system will ensure that medical records are accessed only by authorized personnel, and patients' privacy is maintained. The use of encryption algorithms will ensure the security of the data, and the system's user-friendly interface will enable easy access and management of medical records for both patients and healthcare providers.

4. RESULTS

The development of the proposed system using Flutter, Firebase, and Nodejs was successful. The application enables users to upload their medical records either by taking pictures or uploading files directly to Firebase cloud storage. The system's authentication system ensures secure access to records, and the use of Firebase's backend ensures reliable data-storage/retrieval. The web application developed using Nodejs provides seamless interface for healthcare providers to access patients' medical records with appropriate consent. Overall, the system's development has provided robust, secure, and user-friendly platform for an efficient way of medical records, promoting better healthcare service delivery.

5. CONCLUSIONS

The proposed system provides an efficient solution for the digitization and management of medical records, addressing the limitations of the existing systems. The use of machine learning approaches like OCR and Google ML Kits has enabled us to digitize the physical records, reducing the chances of human errors in record keeping. Additionally, the integration of Firebase and Nodejs provides secure and reliable platform for data-storage and retrieval. The system's ability to upload records from both mobile and web applications ensures that medical records are accessible from anywhere and at any time.

Overall, the proposed system has the scope/potential to revolutionize the healthcare industry by making the management of medical records easier, efficient, and secure. The system's design ensures that the patient's privacy is protected while providing healthcare providers with easy access to the necessary medical records. In light of the recent government reforms regarding UHI, the proposed system is in line with the unified health interface initiative and provides way for medical institutions to comply with the new guidelines. It is expected that the proposed system's implementation will enhance the overall quality of healthcare services provided to patients while also increasing the efficiency of healthcare providers.

6.References

[1] S. S. Ghosh, S. Chakraborty, and S. Mukhopadhyay, "Digital Healthcare Records Management System Using Blockchain Technology," 2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), Coimbatore, India, 2019, pp. 1-5

[2] K. Wang, J. Zhang, J. Luo, Y. Li, and Z. Zhang, "A Cloud-Based Personal Health Record Exchange Framework for Mobile Health Applications," in IEEE Journal of Biomedical and Health Informatics, vol. 19, no. 4, pp. 1343-1352, July 2015.

[3] C. T. Huang, P. L. Lee, and T. Y. Huang, "Developing an intelligent mobile personal health records system," 2013 IEEE International Conference on Systems, Man, and Cybernetics, Manchester, United Kingdom, 2013, pp. 4374-4379.

[4] M. Masud, A. G. A. Rahman, M. R. Amin, and M. S. Hossain, "Integrating Blockchain with Cloud-Based EHR for Healthcare System," 2018 IEEE 4th International Conference on Collaboration and Internet Computing (CIC), Philadelphia, PA, USA, 2018, pp. 165-172.

[5] S. S. Ghosh, S. Chakraborty, and S. Mukhopadhyay, "Blockchain-based decentralized healthcare record management system," 2019 4th International Conference on Computing Methodologies and Communication (ICCMC), Erode, India, 2019, pp. 479-484.

[6] Y. Chen, D. D. Feng, and G. A. Wang, "Towards blockchain-based intelligent healthcare applications," in IEEE Transactions on Services Computing, vol. 12, no. 4, pp. 579-589, JulyAug. 2019.

[7] P. Li, Y. Li, and X. Lu, "A blockchain-based privacy-preserving healthcare data sharing platform," in IEEE Access, vol. 8, pp. 159902-159913, 2020.

[8] S. Fong, F. L. Liu, J. Tan, and W. K. Wong, "Blockchain-enabled secure and privacypreserving electronic health record system for remote patient monitoring in mobile health," in IEEE Transactions on Industrial Informatics, vol. 17, no. 4, pp. 2564-2574, April 2021.

[9] H. K. Odelu, G. P. Rao, P. R. Reddy, and P. N. Kumar, "Secure Healthcare Data Management System in Blockchain," 2021 International Conference on Emerging Trends in Engineering and Technology (ICETET), Bhimavaram, India, 2021, pp. 1-7. Clinivault: Electronic Medical Repository Dept. of CSE, RRCE 2022-2023 Page 36

[10] J. Li, Y. Tang, X. Xu, J. Chen, and Z. Zhang, "A Hybrid Deep Learning Model for Chronic Disease Diagnosis Using Electronic Medical Records," in IEEE Access, vol. 8, pp. 164720-164729, 2020.

INTERNET OF THINGS-BASED INTELLIGENT FARMING FOR SOIL CONDITION TRACKING AND WATER CONTENT MANAGEMENT

Dr. KamalRaj T[1], Santhosh N[2], Jeevan Y[3], Sowmya M N[4]

[1] *Associate Professor, Computer Science, Rajarajeswari college of engineering, Karnataka, India*
[2] *Student, Computer Science, Rajarajeswari college of engineering, Karnataka, India*
[3] *Student, Computer Science, Rajarajeswari college of engineering, Karnataka, India*
[4] *Student, Computer Science, Rajarajeswari college of engineering, Karnataka, India*

ABSTRACT

The way we farm could be dramatically altered by a new Internet of Things-based technology called intelligent farming. This study recommends an Internet of Things-based system for managing agricultural water content and monitoring soil quality. The system is made up of IoT sensors that are placed on a field to collect data on the water and soil levels. After that, the data is transferred to a platform that runs on the cloud for analysis and interpretation. The platform analyses the data processed by machine learning to build a dashboard that shows current data on the state of the levels of the soil and water. This helps farmers decide on irrigation methods wisely, cut down on water waste, and increase crop yields. The suggested technique is a viable and economical option that may be used in both large- and small-scale farming operations. Farmers can optimise irrigation practises, enhance soil health, and boost profitability by utilising the potential of IoT. By minimising water waste and increasing the effectiveness of irrigation techniques, the technology has the possibility to lessen the negative environmental effects of agriculture. Overall, the suggested Internet of Things-based intelligent agricultural system has the power to transform agriculture and offer a long-term answer to feeding an increasing population.

Keyword :- *Intelligent Farming , Irrigation, farming, and agriculture etc..*

---

1. INTRODUCTION

Agriculture, which is the most significant sector of the global economy, is essential for feeding the planet's rising population. Conventional farming practises, however, face a number of challenges, such as a lack of water, unpredictable weather patterns, and a decline in soil fertility. New technologies, such as the IoT, can be utilised to enhance farming practises, increase production, and lessen the environmental effect of agriculture. This paper proposes an intelligent agriculture system for regulating water content and monitoring soil condition based on the Internet of Things. The suggested approach uses field-installed IoT sensors to collect data on soil quality and water levels. The data is then transferred to a cloud-based platform for analysis and interpretation. In order to create a dashboard that displays up-to-date information on the condition of the soil and water levels, the platform examines the data using machine learning techniques. This aids farmers in making informed irrigation decisions that reduce water waste and boost crop yields.

1.1 Existing Problem

Traditional farming practices are facing numerous challenges such as water scarcity, unpredictable weather patterns, and declining soil fertility. In addition, traditional farming practices rely heavily on manual labor and visual examining the soil and crop conditions, which can take a lot of time and prone to errors. This can lead to overwatering or under watering crops, which can reduce crop yields and waste water resources.

Furthermore, traditional techniques for farming may additionally result in environmental degradation, such as soil erosion, soil compaction, and soil pollution. These environmental challenges can impact soil fertility, crop yields, and the overall sustainability of agriculture.

Innovative strategies that utilise cutting-edge technologies, like the IoT, are required to address these problems in order to enhance farming practises, boost production, and lessen the negative environmental effects of agriculture. Particularly, there is a need for -based intelligent farming systems that can deliver real-time data on water and soil levels, enabling farmers to make knowledgeable decisions about irrigation practises and cut down on water waste.

2. LITERATURE SURVEY

The concept of IoT-based intelligent farming for soil condition tracking and water content management has been the subject of several research studies and publications.

A study published in the Journal of Research in Dynamical and Control Systems in 2021 proposed an IoT-based intelligent farming method for measuring soil moisture and irrigation control. The suggested system utilized IoT sensors to monitor soil moisture levels, and machine learning algorithms to optimize irrigation scheduling. The study demonstrated that the suggested system could reduce water consumption by up to 50% while increasing crop yields.

Another study published in the Journal of Cleaner Production in 2019 proposed an IoT-based intelligent farming system. The suggested system utilized IoT sensors to monitor soil nutrient levels and machine learning algorithms to optimize fertilizer application. The study demonstrated that the suggested system could reduce fertilizer use by up to 30% while maintaining or increasing crop yields.

A research article published in IJEAT in 2019 proposed an IoT-based intelligent farming system for soil condition monitoring and crop prediction. The suggested system utilized IoT sensors to monitor soil conditions and machine learning algorithms to predict crop yields. The study demonstrated that the proposed system could accurately predict crop yields with up to 95% accuracy.

Overall, the literature survey suggests that IoT-based intelligent farming systems have the opportunity to revolutionize agriculture by providing real-time data on soil conditions and water levels, allowing farmers to optimize their irrigation practices and reduce water waste. These systems could also get better soil nutrient management and predict crop yields, increasing productivity and reducing the environmental impact of agriculture.

2.1 OBJECTIVES

The objectives of the proposed IoT-based intelligent farming system for soil condition tracking and water content management can be summarized as follows:

To develop an IoT-based sensor network for soil condition tracking: The system should comprise of IoT sensors that are capable of collecting data on soil moisture, temperature, pH levels, and other relevant parameters.

To develop an IoT-based sensor network for water content management: The system should also comprise of IoT sensors that can monitor water levels in the soil, irrigation systems, and other water sources.

To establish a cloud-based platform for data analysis and interpretation: The collected data from the IoT sensors should be transmitted to a cloud-based platform for analysis and interpretation. The platform should analyse the data using ML techniques and produce a dashboard that shows current data on the state of the soil and water levels.

To optimize irrigation practices: The real-time data on soil moisture and water levels should be used to optimize irrigation practices. The system should provide recommendations for irrigation scheduling, reducing water waste, and improving crop yields.

To improve soil health: The real-time data on soil conditions can be used to identify areas of the field that require additional nutrients or other soil amendments. Both crop production and soil health can benefit from this.

3. DESIGN AND IMPLEMENTATION

The proposed methodology for implementing an IoT-based intelligent farming system for soil condition tracking and water content management can be outlined as follows:

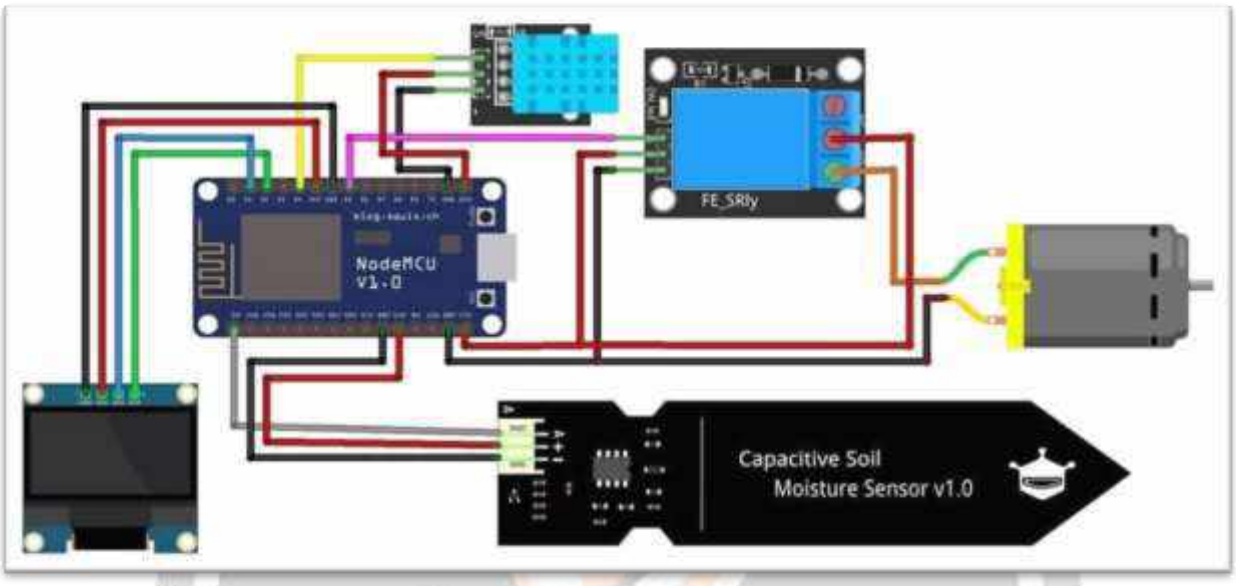


Fig -1: Architecture of Proposed Methodology

1. Sensor Deployment: IoT sensors should be placed in the field to gather information on water and soil levels. The sensors can be set above ground or directly in the soil to track environmental factors like temperature, humidity, and precipitation. Make certain that the sensors are positioned in a representative section of the field.

2. Data Collection and Transmission: Set up the IoT sensors to gather data on a regular basis and send it to a central platform that is situated in the cloud. To safely and reliably send the data, use wireless communication technologies like Wi-Fi, cellular networks, or NODEMCU.

3. Cloud-Based Platform Development: Set up a cloud-based platform that can receive, store, and process the data transmitted by the IoT sensors.

4. Data Analysis and Interpretation: Develop machine learning algorithms or other analytical methods to analyze the collected data on soil conditions and water levels. Use statistical techniques, data mining, or pattern recognition algorithms to extract meaningful insights from the data. Findings from this analysis may include optimal irrigation thresholds, detecting patterns in soil moisture levels, and predicting crop water requirements.

5. Dashboard Development: Create a user-friendly dashboard that displays real-time information on soil conditions and water levels. The dashboard should provide visualizations, charts, and graphs that allow farmers to monitor the status of their fields and make informed decisions about irrigation practices. Consider incorporating alerts and notifications to notify farmers of critical conditions or irrigation needs.

6. Optimization and Automation: Utilize the analyzed data and insights to optimize irrigation practices. Develop algorithms or rules-based systems that make use of real-time information on water levels and soil moisture to automatically adjust irrigation schedules. This can be achieved by integrating the IoT-based intelligent farming system with existing irrigation systems or by implementing smart irrigation controllers.

7. Continuous Monitoring and Improvement: Regularly monitor and evaluate the performance of the IoT-based intelligent farming system. Collect feedback from farmers and make necessary adjustments to improve the accuracy and effectiveness of the system. Continuously update and refine the machine learning algorithms based on new data and insights.

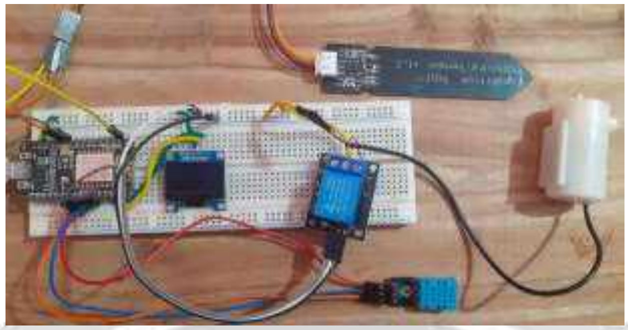


Fig -2: Implementation of the Architecture

4. TESTING & RESULTS

The water pump need to be fully submerged in water. The outlet pipe is kept in a field for irrigation. Similarly soil Moisture sensor is dipped in soil.

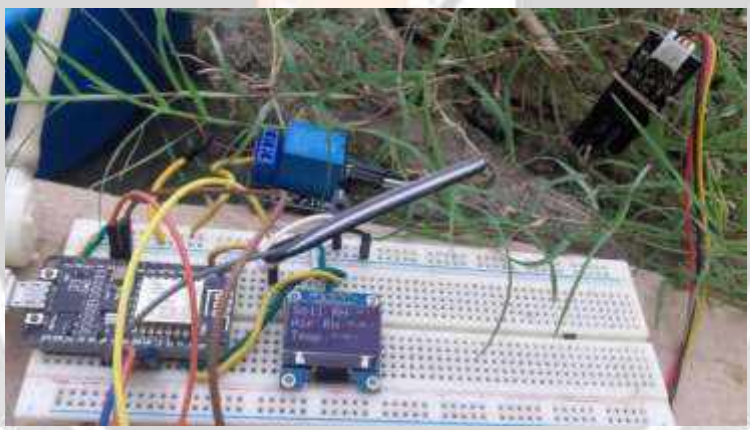


Fig -3: Working of the Implemented Architecture

As soon as you power on the device, the OLED will start displaying the Soil Humidity, Air Humidity, and also Air Temperature. It shows the real-Time Data. When the soil moisture content is reduced the water pumps turn on and irrigate the field until the required moisture is achieved.

You can monitor the data online from any part of the world using Thingspeak Server. To do that, go to the private view of the Thingspeak server. You can check the soil Moisture, Humidity, and Temperature as well as relay status.

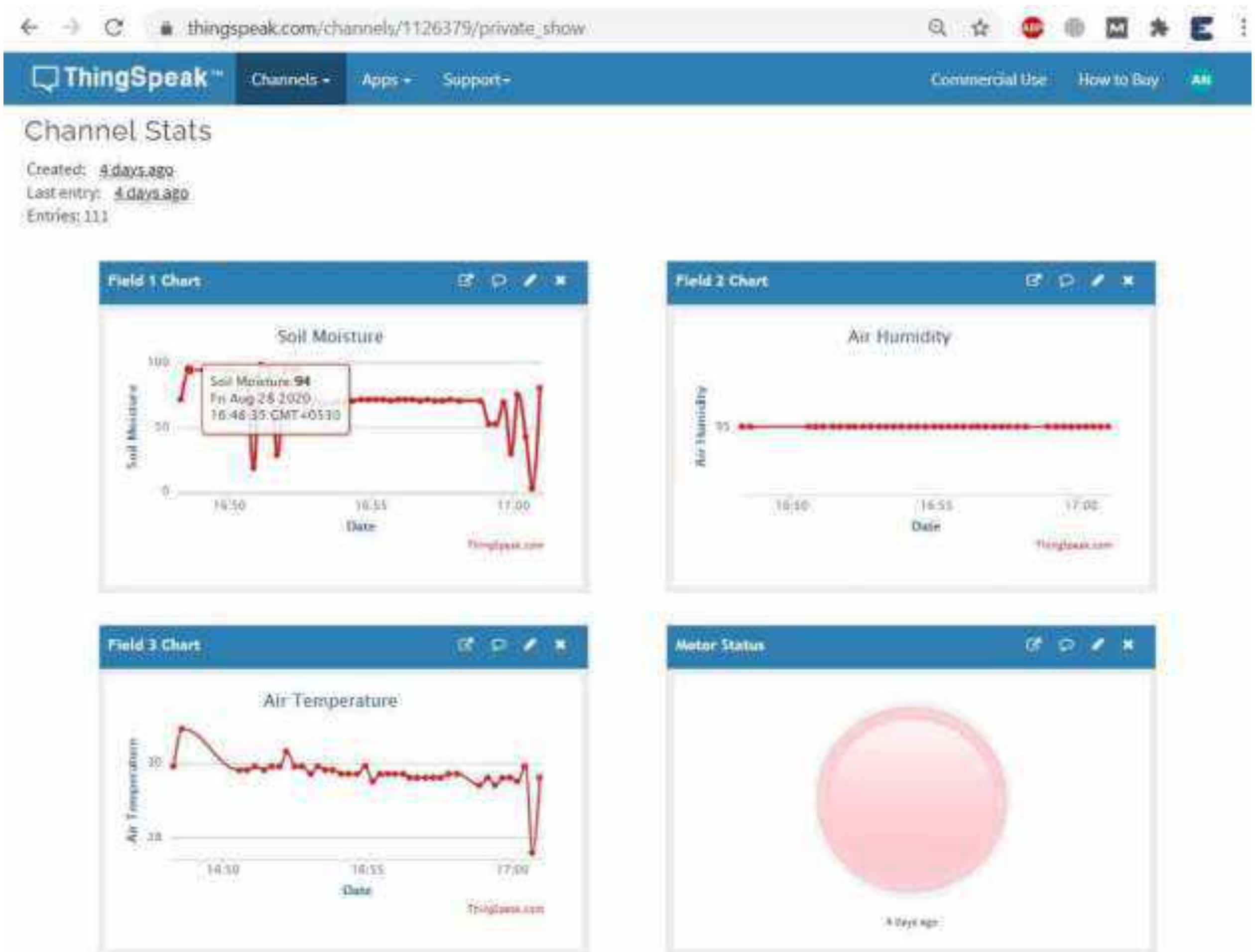


Fig -4: Values Recorded by Sensor stored in Server

5. CONCLUSION

In conclusion, the execution of an IoT-based intelligent farming system for soil condition tracking and water content management has the potential to revolutionize modern agriculture. By deploying IoT sensors in the field, collecting real-time data on soil moisture, temperature, and pH levels, and integrating that data with cloud-based platforms, farmers can decide more thoughtfully about irrigation practices, reduce water waste, and increase crop productivity.

The technology may offer insights into soil health, identify regions that need more nutrients or amendments to the soil, and streamline irrigation scheduling through the integration of ml algorithms and data analysis. By using less herbicides and fertiliser, the suggested approach can help lessen the impact of agriculture on the environment.

Furthermore, the proposed system can be easily scalable and adaptable to different types of crops and environmental conditions. With continuous monitoring and evaluation, the system can be refined and optimized over time to improve accuracy and effectiveness.

Overall, the implementation of an IoT-based intelligent farming system for soil condition tracking and water content management can lead to more sustainable and efficient agricultural practices, offering advantages to farmers and the environment.

6. REFERENCES

[1] F. A. Al-sultani, A. M. Hammoodi, and A. M. Al-Maamori, "Smart irrigation system based on IoT using sensors and Wi-Fi," Int. J. Comput. Sci. Secur., vol. 12, no. 4, pp. 95-104, 2018.
[2] D. K. Yadav and S. S. S. Yadav, "IoT based smart irrigation system using soil moisture sensor and water pump," Int. J. Emerg. Technol. Adv. Eng., vol. 6, no. 3, pp. 491-495, 2016.
[3] R. K. Jayasri and N. Nithyakalyani, "IoT-based smart agriculture using soil moisture sensor," in 2017 International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICICT), 2017, pp. 1315-1318.
[4] P. S. Sowjanya, T. A. Swetha, and G. S. Lalitha, "Smart agriculture system using IoT," in 2017 International Conference on Inventive Computing and Informatics (ICICI), 2017, pp. 1033-1036.
[5] M. Shafique, Z. B. Yousaf, M. Shahid, and M. A. Gondal, "IoT based smart agriculture: A review," in 2016 13th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 2016, pp. 374-380.

ACCIDENT DETECTION AND ALERT SYSTEM

Mr.Suresh M[1], Chandana GR[2] , Vamshi Krishna[3], Inchara L[4],Harika Polluru[5]

[1] *Assistant Professor, Department of ECE,Rajarajeswari College of Engineering, Bangalore.*
[2] *Student ,Department of ECE, Rajarajeswari College of Engineering, Bangalore.*
[3] *student, Department of ECE, Rajarajeswari College of Engineering, Bangalore.*
[4] *student, Department of ECE, Rajarajeswari College of Engineering, Bangalore.*
[5] *student, Department of ECE, Rajarajeswari College of Engineering, Bangalore.*

ABSTRACT

Road accidents rates are very high nowadays, especially two wheelers. Timely medical aid can help in saving lives. This system aims to alert the nearby medical center about the accident to provide immediate medical aid. The attached accelerometer in the vehicle senses the tilt of the vehicle and the a heartbeat sensor on the user's body senses the abnormality of the heartbeat to understand the seriousness of the accident. Thus the systems will make the decision and sends the information to the smartphone, connected to the accelerometer through gsm and gps modules . The Android application in the mobile phone will send text messages to the nearest medical center and friends. Application also shares the exact location of the accident and it can save time.

Keywords- *Accident detection, alert system, GPS, GSM, Accelerometer, Androidapplication*

1.INTRODUCTION

Nowadays, the rate of accidents has increased rapidly. Due to employment, the usage of vehicles like cars, bikes have increased, because of this reason the accidents can happen due to over speed. People are going under risk because of their over speed, due to unavailability of advanced techniques, the rate of accidents can't be decreased. To reduce the accident rate in the country this paper introduces a solution. Automatic accident detection and alert systems are introduced. The main objective is to control the accidents by sending a messageto the registered mobile, hospital and police station using wireless communications techniques. When an accident occurs in a city or any place, the message is sent to the registered mobile through GSM module in less time. Arduino is the heart of the system whichhelps in transferring the message to different devices in the system. Vibration sensor will be activated when the accident occurs and the information is transferred to the registered numberthrough the GSM module. The GPS system will help in finding the location of the accident spot. The proposed system will check whether an accident has occurred and notify nearest medical centers and registered mobile numbers about the place of accident using GSM and GPS modules.

2. oBJECTIVES AND SCOPE

The main objective of this project is to prevent casualties which happen due to lack of medical assistance in time. Certainly, if the accident happens due to other cases, the used electronic devices will be able to provide the spontaneous message and exact location to police and ambulance in order to recover victims. Avoiding casualties caused by road accidents is the main goal of this paper, with the help of Accelerometer and GPS present in the mobile phones. Based on the data collected from these sensors, which are present in most mobile phones, the location of the accident is sent at the same time of the accident to the friends and relatives which the user allowed and stored, and also to the rescue and emergencyservices.

3. EXISTING SYSTEM

This idea proposal has been introduced at the start of the modern age of mobile phones. With the introduction of GPS sensors in the mobile, security applications based on GPS were proposed. Then they proposed special hardware devices which can be linked with mobile phones. Though, it had the disadvantage of actually buying extra hardware with more money.With the massive development of mobile phones in the last decade and new sensors added with the development, the extra hardware can be avoided. The present application of this paper is present in a very few countries and providing the information with the relatives and friends with the emergency services the efficiency of the application can be increased massively.

Drawbacks of the Existing System:

The live system can't work if any of the following occur at the time of the crash:

- Automatic or phone is disconnected or damaged.
- No GPS signal at the time of the crash.
- Insufficient cellular signal to upload crash details.

4. PROBLEM STATEMENT

The use of vehicles increases in the proportion of the population. Due to the traffic congestion, the accidents are also increasing day by day. This causes the loss of life due to the delay in the arrival of ambulances to the accident spot or from the accident spot to the hospital. So, it is necessary to take the accident victim to the hospital as soon as possible. Whenever an accident occurs, it has to be informed to the investigation unit. So, it is also beneficial if the intimation is reached to the enquiry section so that the time for the investigation can be minimized.

5. PROPOSED METHOD

The main idea of this paper is to build an application that makes use of the sensors present in mobile phones like GPS and Accelerometer and detect any collision if there is a sudden external disturbance in the speed with the help of the Sensor Fusion Based Algorithm. With the help of the data obtained from the Accelerometer sensor, when there is a sudden disturbance to the mobile phone, the user is notified with an alert message before sending the request help signal. If no emergency is required, they can cancel it within 10 seconds. But, if they press the "Call Help" button or if the alert message is unattended for more than 10 seconds, the "request for help" message will be sent to the emergency services as well as the family members, the users provided.

6. SYSTEM ARCHITECTURE

In this system, the external disturbance is detected by the accident detection module and when it is detected, a function is called to find the current location of the user with the help of GPS in the Location Detection Module. The location data obtained from the GPS is sent tothe emergency services to request help.

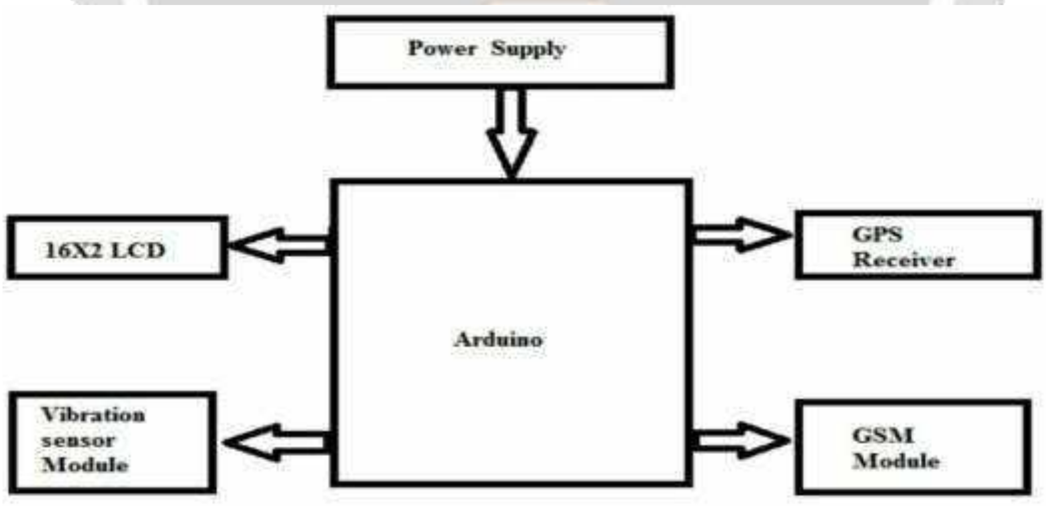


Fig 1:Ardunio System

Vehicle unit consists of an accelerometer which keeps on informing the coordinate of vehicle position to the microcontroller. If it is found at random, the GPS location tracker tracks and informs the emergency number with values of latitude, longitude and google map position using the GSM SIM module.

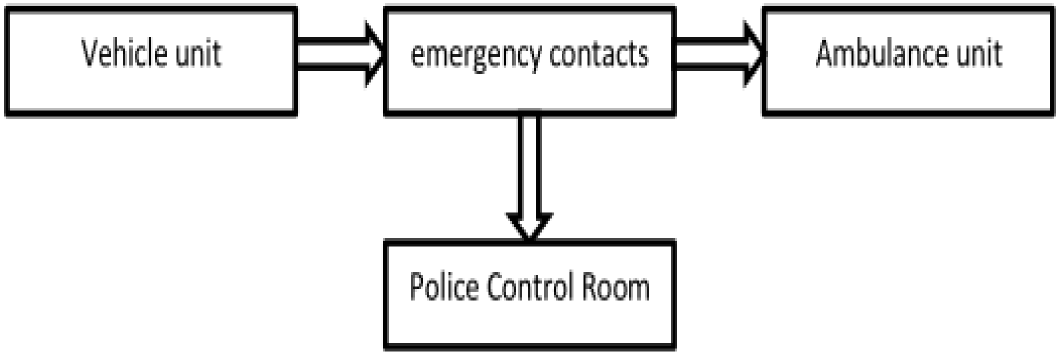


Fig 2: Vehicle Unit Service System

Vehicle unit sends the information to the emergency contacts like police control roomand an ambulance unit.

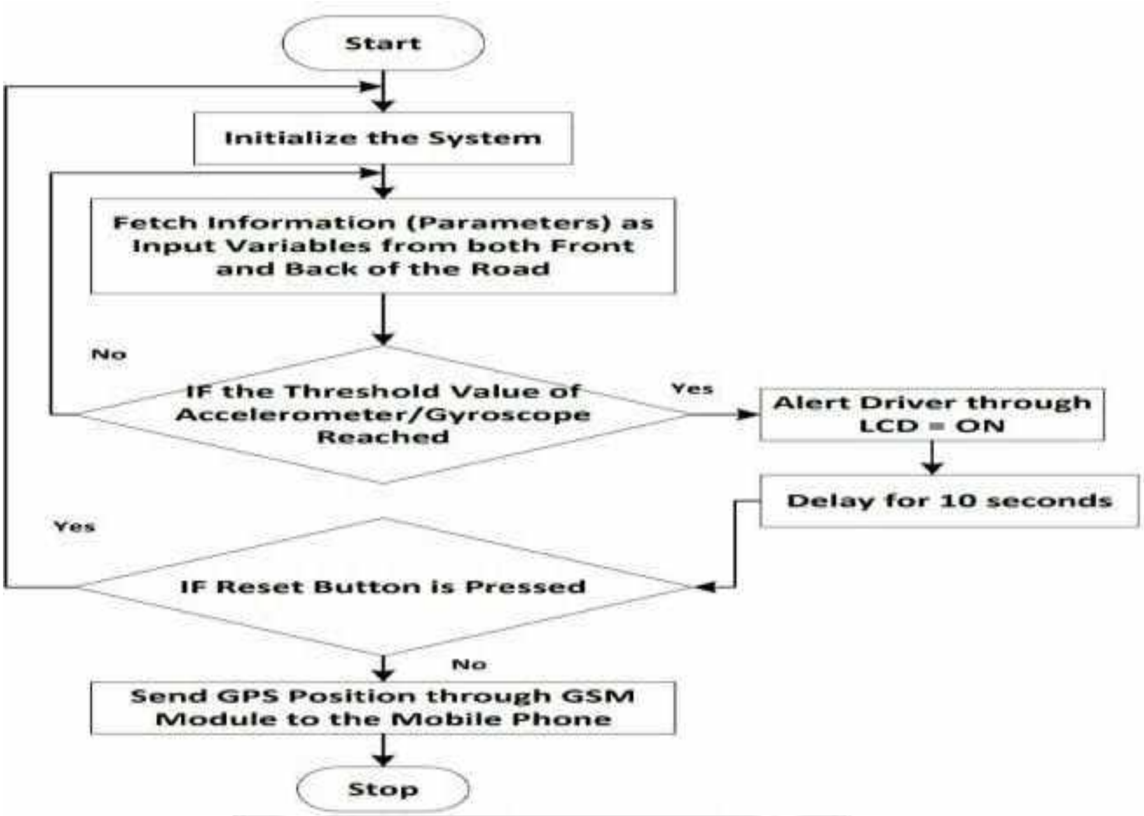


Fig 3: Accident detection alert System

In this system at first, we worked on the prevention of vehicle accident and even afterall the preventive measures applied if the accident occurs the system detects it. After the detection of vehicle accident, the system automatically reports to the ambulance service and police station without any time loss so that the casualty might not loss his/her life due to lack of medical assistance in time. The system is installed in the vehicle.. For the detection of vehicle accidents accelerometers are installed and for reporting ,GPS module and GSM module are used. Motor (control switch) is used for engine control and buzzer, led lights etc. are used for warning during prevention. All these devices are interfacedwith the central microcontroller (Arduino Uno) unit.
Accelerometer detects the occurrence of accident and sends signal to the microcontroller for further functioning. The GPS module provides the location, speed, time and date of the certain place where the vehicle is in the real time. If an accident occurs, the accelerometer detects it and location of accident is obtained using GPS, and finally sends the information to the ambulance service and police by the help of a GSM module. The message obtained in mobile phone consists of the location of the accidental place in the form of google map link which will help the emergency units like ambulance service and police station to reach the casualty in time and rescue the lives.

1. The Arduino setup is installed in a vehicle's crash guard or in bumpers of the vehicle oneach side.
2. When collision occurs it triggers the push button and it sends a notification to the ArduinoBoard.
3. Arduino will take this input and will convert to the SIM808.

4. The coordinates are shared through GSM.
5. Through GSM the notification is passed to the saved mobile number.
6. It contains the exact GPS location.
7. The application is used to know the route and location.
8. If the accident is not severe the person can turn off the buzzer and the device will comeback to normal.

7. Modules and project Description

ARDUINO: The Arduino UNO is a widely used open-source microcontroller board based onthe ATmega328P microcontroller and developed by Arduino.cc. The arduino is the major control unit to detect or alert when an accident occurs. It collects the data from vibration sensors, GPRS and GSM modules and reflects the output either in display system or througha message. Here the vibration sensor plays a major role. This vibration sensor will receive thevibrations of the vehicle which in turn acts as an accident detection module. Arduino gathers the information from all other modules and sends the message to the receiver through the GSM module.

GSM MODULE: For providing communication between the GPS, GSM and the allocated mobile number GSM SIM900 module is preferred. The name SIM900 says that, it is a tri band work ranging a frequency of 900MHz to 1900 MHz such as EGSM900 MHz, PCS 1900MHz and DSC 100 MHz Receiving pin of GSM module and transmitting pin of GPS module are used for communication between the modules and the mobile phone.

GPS MODULE: To find the location on the earth the whole is divided into some coordinateswhere the location can be easily captured by a module called GPS module. Here the GPS used is SIM28ML. This GPS module will find the location of the vehicle and the information fetched by the GPS receiver is received through the coordinates and the received data is first send to arduino and the information is transmitted to the saved contact through GSM module.The frequency is operated in the range of 1575.42 MHz and the output of the GPS module is in NMEA format which includes data like location in real time.

LCD MODULE: To display the numbers, alphabets and special characters an LCD module with 16x2 alphanumeric types is used. Using the higher bit data lines of LCD pins such as pin 11,12,13 and 14 are interfaced to digital pins of Arduino such as pin 8,9,10 in 4 bit mode as shown in the below figure. RS and E pins of LCD are connected to pin 12 and 13. To perform the write operation on LCD the read/write pin is connected to ground.

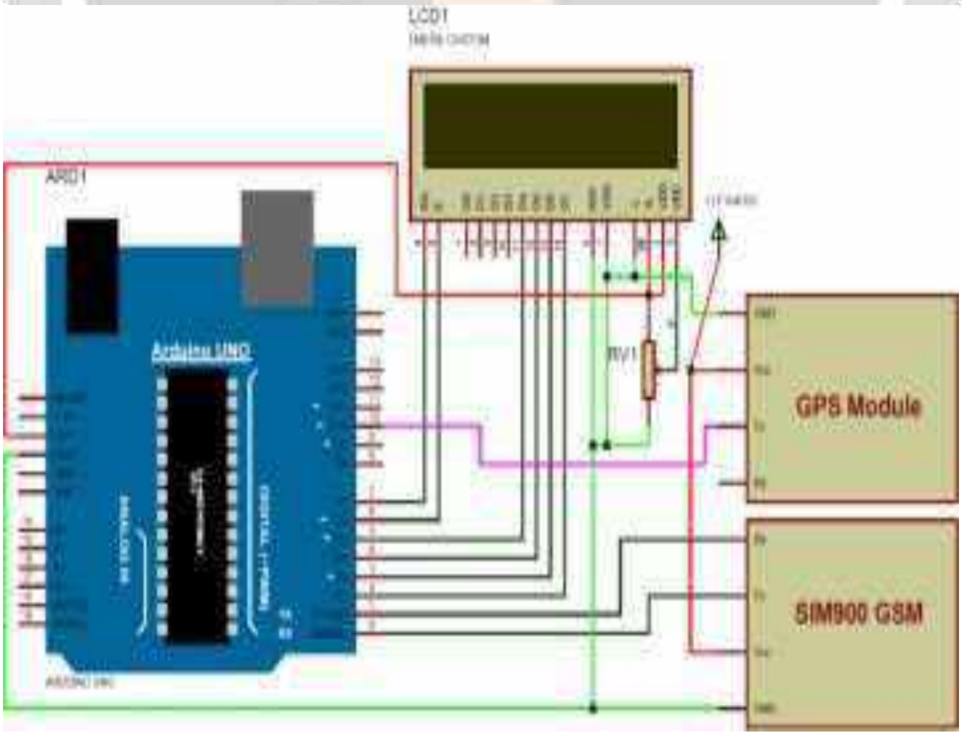


Fig 4: Working module of accident detection and alert system

The controller used in this project is Arduino which is used for controlling all the modules in the circuit. The two The major parts other than the controller is the GPS module which is used as a receiver and other module is GSM. To receive the coordinates of the vehicle GPS module is used and GSM will send the received coordinates to the user through SMS. Thereis an additional LCD which is used for displaying status message or coordinates. When a person is driving the vehicle met with an accident then the vibrations of the vehicle is received by the vibration sensor and the sensor acts as a accident detection module which further send the information to the micro controller and the location of the vehicle is received through GPS module and the coordinates The vehicle is sent to the GSM module. The received information is sent to arduino uno. The received coordinate information is collected and is send to the respected person,hospitals and police station through SMS.

8. IMPLEMENTATION

Our system comprises two phases: accident detection and notification phase. For the accident detection phase, a smartphone application has been fully implemented. For the notification phase, a web-based system has been implemented for use by hospitals.

Detection Phase Implementation:

An Android application has been developed in the Java programming language.The application is developed for an Android operating system with minimum API level 17 and target API level 26. A user first registers for system use. Once registered, to use the system, the user enters their ID and password to log in to the system. Recording and transmission of data starts when the user clicks to start tracking. The application continually reads the data from the smartphone's sensors and sends the data to the cloud. If an accident is identified, the application generates an alarm for 10 s. Figure below shows the interfaces of smartphone android applications. The smartphone application consists of the following activities:

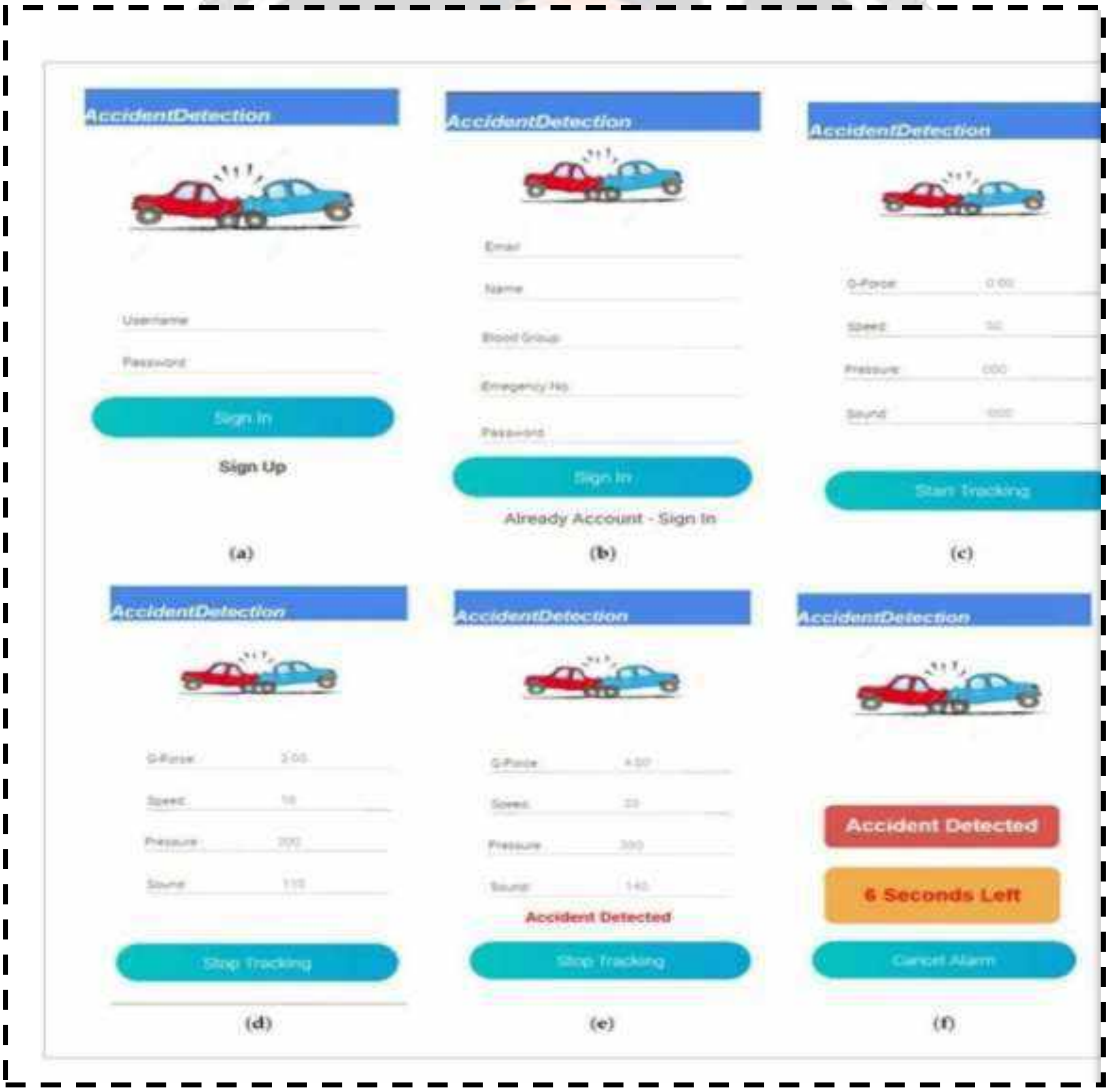


Fig 5: Android Application. (a) Sign In Screen; (b) Sign Up Screen; (c) Start Tracking; (d)No Accident; (e) Accident Detected; (f) Alarm.

a. Start and Stop Accident Detection Activity.
b. Tracking of Accidents.
c. Cancellation of Alarm.
d. Management of Account.

Notification Phase Implementation:

After an accident is identified, the cloud determines the nearest hospital and informs the hospital about the accident. This is performed using a web-based application. The application has been developed using ASP .NET MVC 4. This interface is used by the hospital to establish whether there is an emergency or not. Whenever an accident occurs, the website receives the information regarding the accident. The website shows the details of the accidentsuch as the location of the accident and driver and vehicle information. A Microsoft SQL database is used to store all the information regarding an accident. The website uses HTML, CSS and bootstrap for the development of the interfaces. The Google Maps API is used to show the position of the accident on a map. Figure below shows the working of web based application.

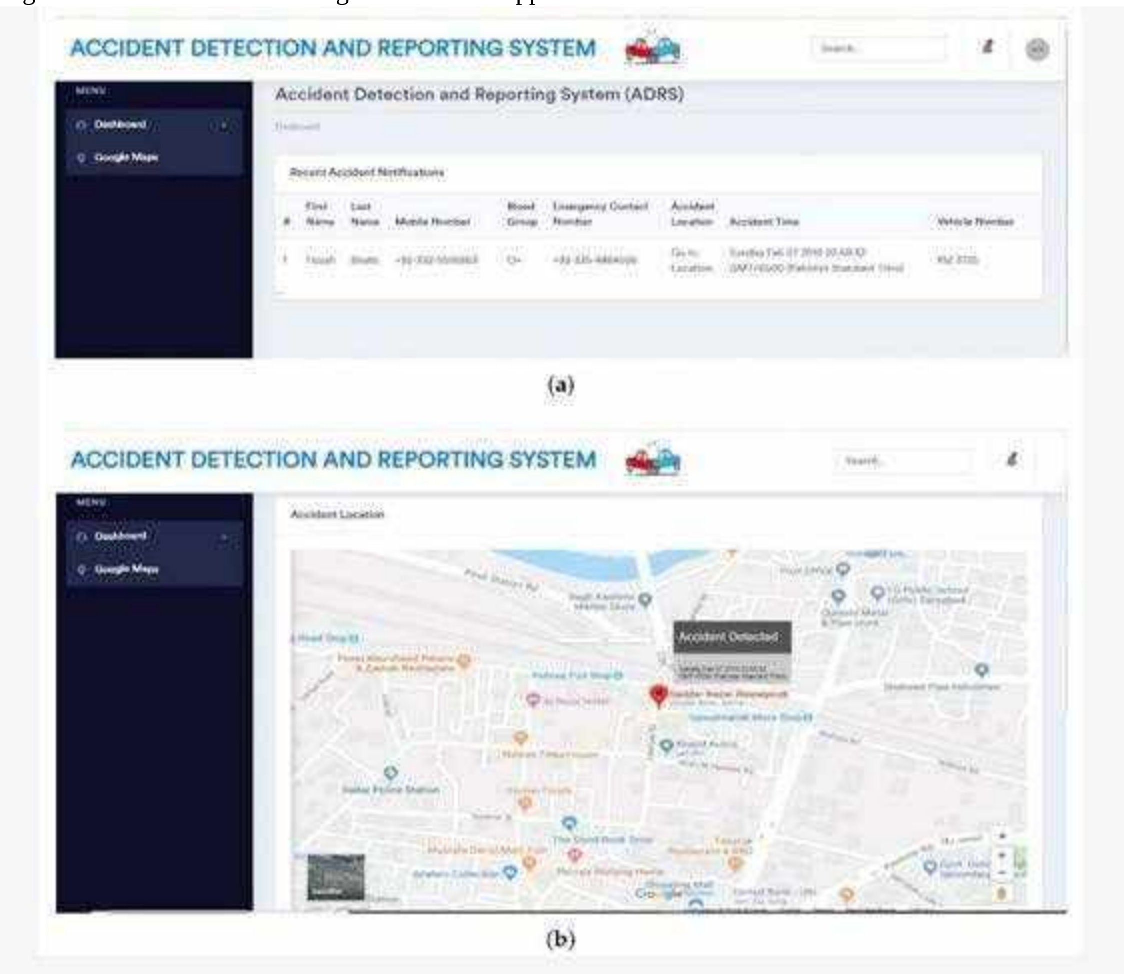


Fig 6 :(a) accident details; (b) location of the accident.

9. RESULTS

The overall result of this project is an application that provides help to people who require help but can’t ask for it. With the help of the application, their request for help is sent at the time of the accident with their location which helps emergency services provide support as early and effective as possible. All this is done with only the sensors available at low cost.

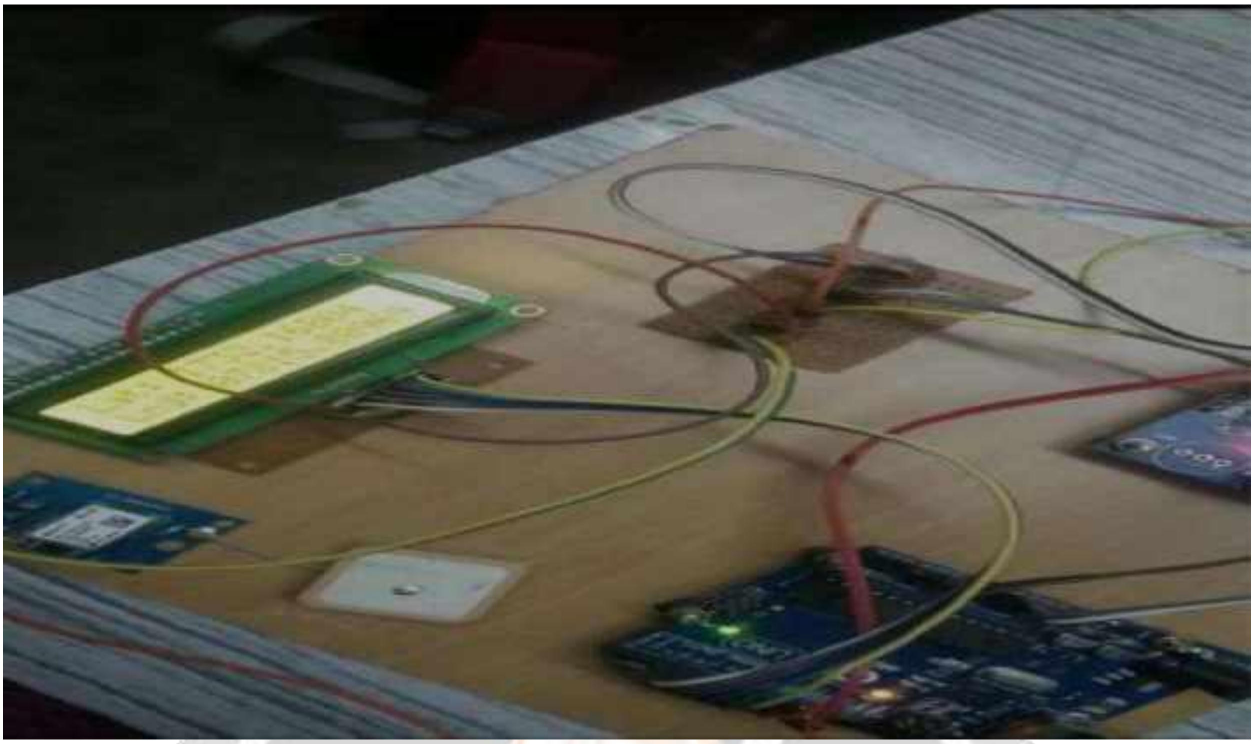


Fig 7.Interfacing controller with Lcd.

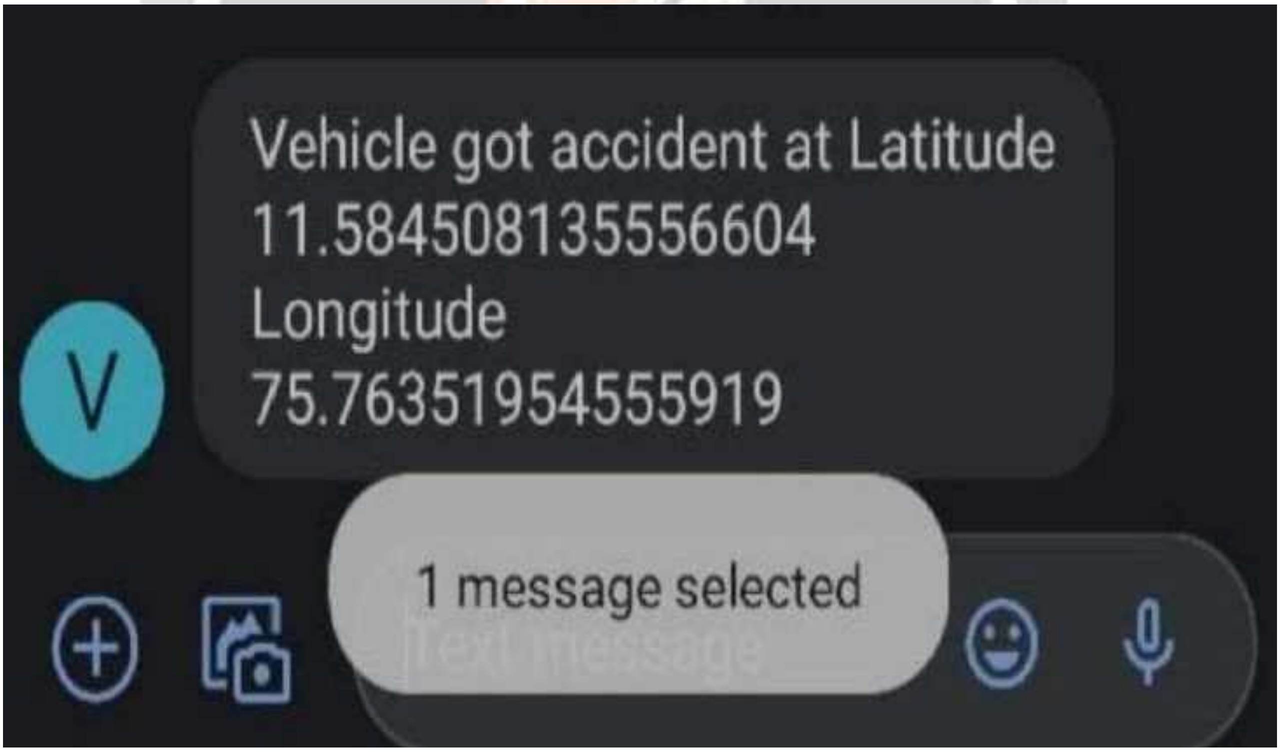


Fig 8.Notification message.

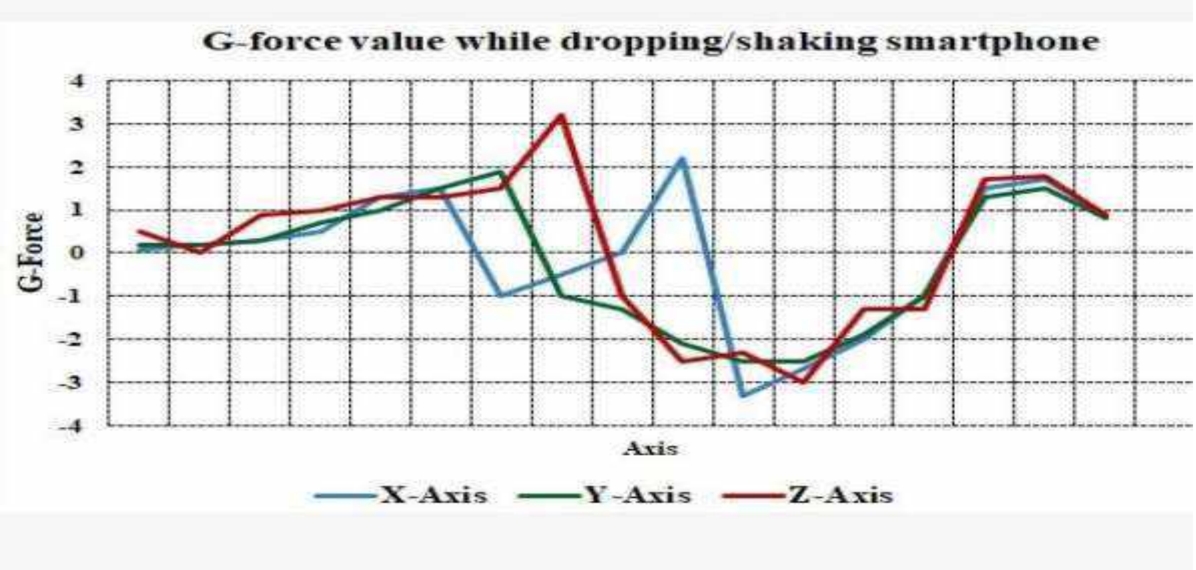


Fig 9: Experimental Graph

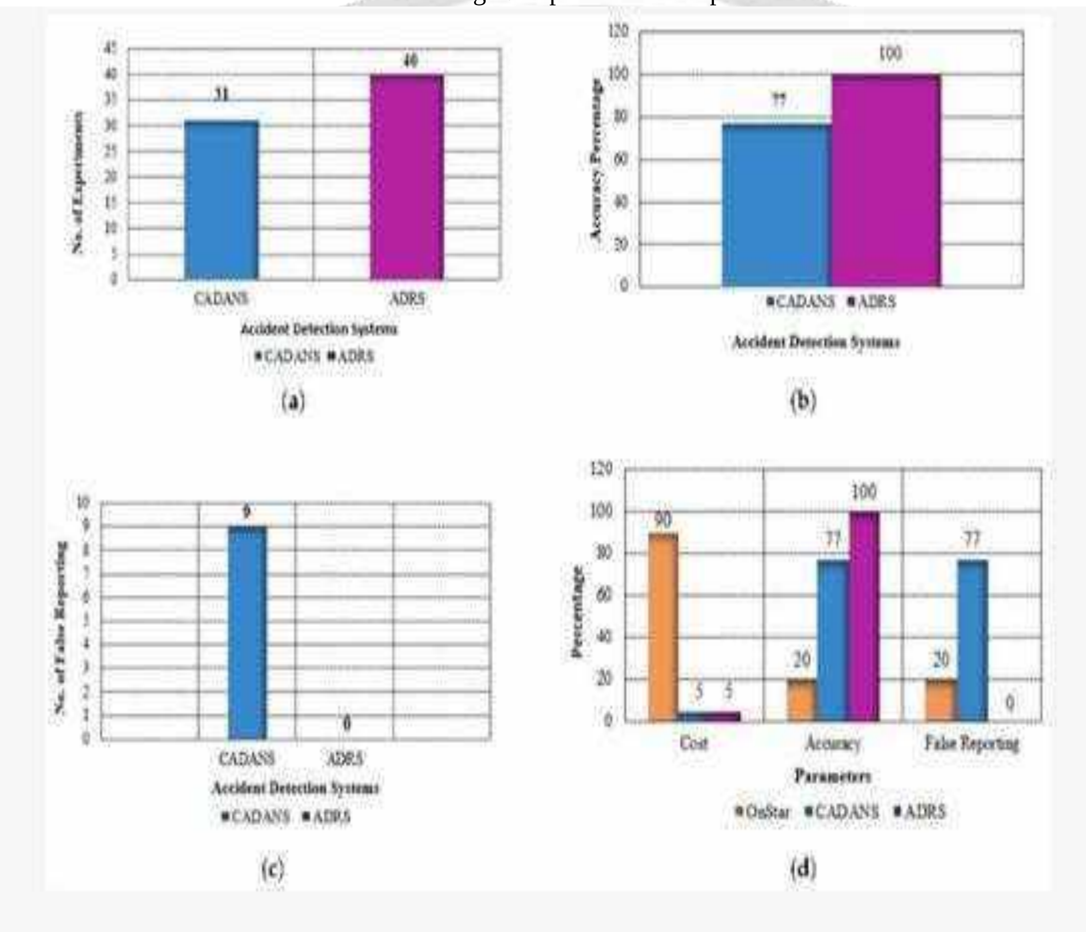


Fig 10: Experiment results. (a) comparison of accident detected; (b) accuracy percentage ofexperiments; (c) false reporting of experiments; (d) parameter based comparison.

10.FUTURE ENHANCEMENT

The proposed system deals with the detection of the accidents. But this can be extended by providing medication to the victims at the accident spot. By increasing the technology we canalso avoid accidents by providing alerts systems that can stop the vehicle to overcome the accidents.

11. CONCLUSION

The proposed programmed accident detection system can be a rescuer of life for the people who met with accidents. The proposed system is exceptionally easy to understand and even a non-specialized Person can use it without any problem. The system consists of equipment and programming segments. The equipment unit includes accident detection sensors that are constrained by an Arduino board and is fitted in the vehicle. Then again, the programming part is an Android application introduced in drivers Smartphones which is used to get the point by point map. In general, the benefits of this system are low cost, secure and simple to use. The system introduced in this work reduces the casualties due to accidents.

12. REFERENCES

[1] DR.C.K.Gomathy , V.Geetha , S.Madhumitha , S.Sangeetha , R.Vishnupriya Article: A Secure With Efficient Data Transaction In Cloud Service, Published by International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 5 Issue 4, March 2016, ISSN: 2278 – 1323.

[2] Dr.C.K.Gomathy,C K Hemalatha, Article: A Study On Employee Safety And HealthManagement International Research Journal Of Engineering And Technology (Irjet)- Volume: 08 Issue: 04 | Apr 2021

[3] Dr.C K Gomathy, Article: A Study on the Effect of Digital Literacy and information Management, IAETSD Journal For Advanced Research In Applied Sciences, Volume 7 Issue 3, P.No-51-57, ISSN NO: 2279-543X,Mar/2018

[4] Dr.C K Gomathy, Article: An Effective Innovation Technology In Enhancing Teaching And Learning Of Knowledge Using Ict Methods, International Journal Of Contemporary Research In Computer Science And Technology (Ijcrcst) *E*-Issn: 2395-5325 Volume3, Issue 4,P.No-10-13, April ’2017

[5] Dr.C K Gomathy, Article: Supply chain-Impact of importance and Technology in Software Release Management, International Journal of Scientific Research in Computer Science Engineering and Information Technology (IJSRCSEIT) Volume 3 | Issue 6 | ISSN : 2456-3307, P.No:1-4, July-2018.

[6] C K Gomathy and V Geetha. Article: A Real Time Analysis of Service based using Mobile Phone Controlled Vehicle using DTMF for Accident Prevention. International Journal of Computer Applications 138(2):11-13, March 2016. Published by Foundation of Computer Science (FCS), NY, USA,ISSN No: 0975-8887

[7] C K Gomathy and V Geetha. Article: Evaluation on Ethernet based Passive Optical Network Service Enhancement through Splitting of Architecture. International Journal of Computer Applications 138(2):14-17, March 2016. Published by Foundation of ComputerScience (FCS), NY, USA, ISSN No: 0975-8887

[8] C.K.Gomathy and Dr.S.Rajalakshmi.(2014), "A Software Design Pattern for Bank Service Oriented Architecture", International Journal of Advanced Research in Computer Engineering and Technology(IJARCET), Volume 3,Issue IV, April 2014,P.No:1302- 1306, ,ISSN:2278-1323.

[9] C. K. Gomathy and S. Rajalakshmi, "A software quality metric performance of professional management in service oriented architecture," Second International Conference on Current Trends in Engineering and Technology - ICCTET 2014, 2014, pp.41-47, doi: 10.1109/ICCTET.2014.6966260.

[10] Dr.C K Gomathy, V Geetha ,T N V Siddartha, M Sandeep , B Srinivasa Srujay Article: Web Service Composition In A Digitalized Health Care Environment For Effective Communications, Published by International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 5 Issue 4, April 2016, ISSN: 2278 – 1323.

[11] Dr.C K Gomathy, V Geetha , T.Jayanthi, M.Bhargavi, P.Sai Haritha Article: A Medical Information Security Using Cryptosystem For Wireless Sensor Networks, International Journal Of Contemporary Research In Computer Science And Technology (Ijcrcst) *E*-Issn: 2395-5325 Volume3, Issue 4, P.No-1-5,April ’2017

[12] V Geetha , Dr.C K Gomathy T.Jayanthi, R. Jayashree,, S. Indhumathi, E. Avinash,, Article: An Efficient Prediction Of Medical Diseases Using Pattern Mining In Data Exploration, International Journal Of Contemporary Research In Computer Science And Technology (Ijcrcst) *E*-Issn: 2395-5325 Volume3, Issue 4,P.No-18-21,April ’2017

[13].V Geetha , Dr.C K Gomathy T.Jayanthi, G.Vamsi , N.P.Ganesh, G.Raheshwara Rao, Article: An Effective Implementation Of Data Prefetching To Alleviate The Storage Access Latency, International Journal Of Contemporary Research In Computer Science And Technology (Ijcrcst) *E*-Issn: 2395-5325 Volume3, Issue 4,P.No-14-17.April ’2017

[14]."A STUDY ON THE RECENT ADVANCEMENTS IN ONLINE SURVEYING", International Journal of Emerging Technologies and Innovative Research (www.jetir.org),ISSN:2349-5162,Vol.5,Issue 11, page no.327-331, November-2018, Available :http://www.jetir.org/papers/JETIR1811850.pdf

VEHICLE TRACKING SYSTEM USING IOT

VM.SaravanaPerumal[1] ,Alisha S[2], B V Manasi[3], Meghana R[4], Manasi Yadav[5]

[1]Assistant professor, Dept of CSE, Rajaraswari College of Engineering, Karnataka, India
[2] Dept of CSE , RajaRajeswari College Of Engineering, Karnataka, India
[3] Dept of CSE , RajaRajeswari College Of Engineering, Karnataka, India
[4] Dept of CSE , RajaRajeswari College Of Engineering, Karnataka, India
[5] Dept of CSE ,RajaRajeswari College Of Engineering, Karnataka, India

ABSTRACT

Global System for Mobile Communication (GSM) and Global Positioning System (GPS) based vehicle location and tracking system provides effective, real time vehicle location. The GPS based vehicle tracking system is designed to find out the exact location of any vehicle and intimate the position to the concerned authority through SMS. The system includes a GPS modem that it retrieves the location of a vehicle in terms of its longitude and latitude. The system uses geographic position and time information from the GPS. This hardware is fitted on to the vehicle in such a manner that it was not visible to anyone. The system automatically sends a return reply to that particular mobile indicating the position of the vehicle in terms of latitude and longitude when a request by user is sent to the number at the modem. It also monitors the temperature of the engine. A program has been developed that it is used to locate the exact position of the vehicle and also to navigated track of the moving vehicle on Google map. The system allows to track the target anytime and anywhere in any weather conditions. This system is user friendly, easily installable, easily accessible and can be used for various other purpose.

Keyword :- *ESP32, WEB cam, MIT App inventor , and LCD*

---

1. INTRODUCTION

Internet of Things (IoT) describes networking of physical objects that contain electronics embedded in order to communicate and exchange the real time data among each other. In the upcoming years, IoT-based technology will offer advanced levels of services and practically change the way people lead their daily lives. Advancements in medicine, agriculture, smart cities, and smart homes are just a few of the examples where IoT is strongly established. IoT is network of interconnected computing devices which are embedded in everyday objects, enabling them to send and receive data[1]. Vehicle monitoring is believed to reduce the risk of accidents, improve safety and enhance overall comfort and performance for drivers. There has been enough reason to assume that more automated automobiles relieve the driver from many undesirable routines of driving task. It has also been known that many of the car accidents are due to human errors. Therefore, the conclusion has been that with a robust automated system the chance of car accidents can be reduced. Based on all these potential benefits of automation, research on automating some or all aspects of driving task has been going on for decades now[2].

These day's vehicle robbery cases are higher than any other time, it has gotten to be fundamental to give a vehicle a superb security with the main solid hostile to burglary gadget. Vehicle focal locking framework guarantees the best ensure to secure your vehicle from various types of burglary cases. It is a vehicle security gadget that offers fantastic insurance to your vehicle. However, this framework couldn't demonstrate to give complete security and openness to the vehicle in the event of burglary. So a more created framework makes utilization of an inserted framework focused around GSM innovation[3]. The outlined and created framework is introduced in the vehicle. Whether one is holder of single vehicle or in excess of 1000, Vehicle Tracking System

(VTS) is an answer for spot, track and secure your portable resources. It is intended for exact and ongoing following and reporting of your vehicle(s), regardless of where it is placed[4].

Combination of high-affectability GPS units in vehicle following frameworks has empowered these gadgets to work in different varieties of situations, for example, characteristic ravines, urban gulches and much under substantial foliage, the length of system scope is solid. Right now GPS vehicle following guarantees their wellbeing as voyaging. This vehicle following framework found in client's vehicles as a burglary counteractive action and salvage gadget[5]. Vehicle manager or Police take after the sign emitted by the following framework to place a victimized vehicle in parallel the stolen vehicle motor rate going to diminished and pushed to off. In the wake of exchanging on the motor, engine can't restart without consent of watchword. This framework introduced for the four wheelers, Vehicle following generally utilized as a part of naval force administrators for war fleet administration capacities, directing, send off, ready for and security. The applications incorporate observing driving execution of a guardian with a teenager driver. Vehicle following frameworks acknowledged in shopper vehicles as a burglary avoidance and recovery gadget[6].

However, there were limits in practical implementation of such systems due to rudimentary electronics and sensor technology. Thorough and futuristic research in this era, along with the rapid advances in electronics and sensor technology, contributed to a more vivid understanding of the difficulties and potentials of such systems[7].

In the design of safety vehicle driving system, it needs to consider and include the following four processes:

- Normal Scenario - To provide the driver with visual and driving assistances.
- Before accident - to prevent the occurrence of accident and to possibly provide the actions of collision avoidance and warning.
- During the accident - collection of accident data and information.
- After accident - to report the location of accidence and to provide emergency treatment.

This project addresses point 2 and point 4 of the vehicle automation design. Collision avoidance and collision warning systems (CWS) are the main focus of the project[8].

1.1 Existing System

GPS or Global Positioning Systems were designed by the United States Government and military, which the design was intended to be used as surveillance. Vehicle tracking entity's vital was to provide safety to the vehicles. Accident avoid system's aim is to rescue people in accidents. The Vehicle has only basic necessity like Stereo, AC, etc.

1.2 Problem Statement

There are many important & critical features missing in the existing system/device such as,

- Alcohol Detector.
- Vibration sensor used for accident detection.
- Temperature Sensor to check the engine temperature in case of over heating.

1.3 Proposed System

This project is done for the purpose of avoiding vehicle theft, accidents and detecting engine temperature. As soon as the system is on, the buzzer beeps. When the device is connected buzzer beeps. Theft detection is done by the Application which is used & can be tracked using GPS. If the user has consumed alcohol then, alcohol sensor detects & alerts. In this way accidents by user negligence can be avoided .If the temperature of the engine is getting high then the DS18b20(temperature sensor) detects and sends notification to Application and user can turn off the engine.

The Goal of the project is to design and implement automatic vehicle tracking system using GPS(global positioning system) & IoT (Internet Of Things) with the help of ESP32 microcontroller.

- Temperature sensor DS18B20 which is implemented here alerts & notifies if the temperature of engine reaches beyond safe zone.

- Alcohol Detector implemented here alerts in case the user has consumed alcohol thereby avoiding mishap due to user negligence.
- Vibration sensor used here Alerts in case of accidents.
- GPS module is installed to track & monitor the vehicle.

2. LITERATURE SURVEY

1. A Smart Anti-theft System for Vehicle Security Pritpal Singh, TanjotSethi, Bibhuti Bhusan Biswal, and Sujit Kumar Pattanayak

This proposed work is an attempt to design and develop a smart anti-theft system that uses GPS and GSM system to prevent theft and to determine the exact location of vehicle.

2. An Overview of an Advanced Vehicle Security System Tariq Alwada'n1, Adel Hamdan Mohammad1, Nidhal El-Omari1, Hamza Aldabbas

In the past few decades' wireless networks have become increasingly popular, due to the wide availability and rapid introduction of wireless transceivers into a variety of computing devices such as PDAs, laptop and desktop computers.

3. Anti-theft vehicle security system with preventive action K. A. Mamun ; Z. Ashraf

Nowadays rate of vehicle theft is very high all through the world and the situation are even worse in developing country. Therefore, protection of vehicles with an intelligent, reliable, effective and economical system is very important.

3. METHODOLOGY

3.1 Face Recognition

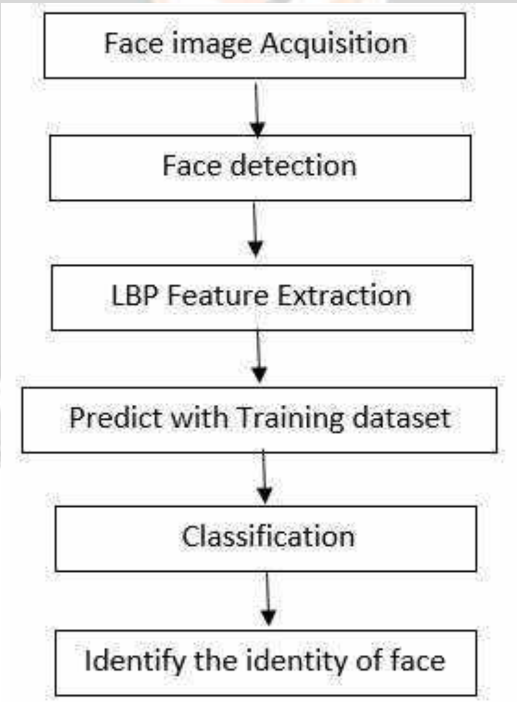


Fig 3.1 Flow Of Facial Recognition

The owner of the vehicle is detected by using a web camera so that the face recognition is implemented and if the unauthorized person is detected the buzzer sound is alerted and with help of the mems sensor vehicle position can be noted if the car is being towed otherwise.

3.2 Module Description

A) Relay

The main usage of the Relay was seen in the history for transmitting and receiving the information, that was called as Morse code where the input signals used to be either 1 or 0, these change in signals were mechanically noted in terms of ON and OFF of a light bulb or a beep sound, it means those pulses of 1s and 0s are converted as mechanical ON and OFF using electromagnets. Later this was improvised and used in various applications.

B) Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (*piezo* for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

C) Gps

The Global Positioning System (GPS) is a satellite based navigation system that provides location and time information. The system is freely accessible to anyone with a GPS receiver and unobstructed line of sight to at least four of GPS satellites. A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites.

D) Push Button

An electronic switch is an electronic component or device that can switch an electrical circuit, interrupting the current or diverting it from one conductor to another. Tactile Push Button Switch is widely used as a standard input "buttons" on electronic projects. These work best when you mount it on PCB but can also be used on a solderless breadboard for temporary connections in prototypes. The pins are normally open (disconnected) and when the button is pressed they are momentarily closed and complete the circuit

E) Ds18b20 (Temperature Sensor)

The DS18B20 is one type of temperature sensor and it supplies 9-bit to 12-bit readings of temperature. These values show the temperature of a particular device.

F) lcd

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix.

G) Vibration Sensor

Monitoring vibration levels over time allows prediction of problems before serious damage can occur. Critical to vibration monitoring and analysis are machine-mounted sensors. Three parameters representing motion detected by vibration monitors are displacement, velocity and acceleration.

H) Smoke Sensor

The MQ2 sensor is one of the most widely used in the MQ sensor series. It is a MOS (Metal Oxide Semiconductor) sensor. Metal oxide sensors are also known as Chemiresistors because sensing is based on the change in resistance of the sensing material when exposed to gasses. It can detect LPG, Smoke, Alcohol, Propane, Hydrogen, Methane and Carbon Monoxide concentrations ranging from 200 to 10000 ppm.

I) Google Firebased Cloud

Google Firebase is a Google-backed application development software that enables developers to develop iOS, Android and Web apps. Firebase provides tools for tracking analytics, reporting and fixing app crashes, creating marketing and product experiment.

J) Mit App Inventor

MIT App Inventor is a web application integrated development environment originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT).

K) ESP32 Microcontroller

Espressif Systems developed the ESP32 line of inexpensive system-on-chips (SoCs). It is an upgrade over the widely used ESP8266, which is popular in IoT projects. The ESP32 contains Wi-Fi and Bluetooth capabilities, making it a well-rounded chip for the creation of embedded systems and IoT projects in general. The ESP32 and Arduino IDE integrate remarkably well thanks to the installation of the ESP32-Arduino Core on the ESP32. After installing the ESP32-Arduino Core, you have access to a wide range of development kits built around the ESP32 and a tonne of sample sketches.

3.3 Pictorial Representation

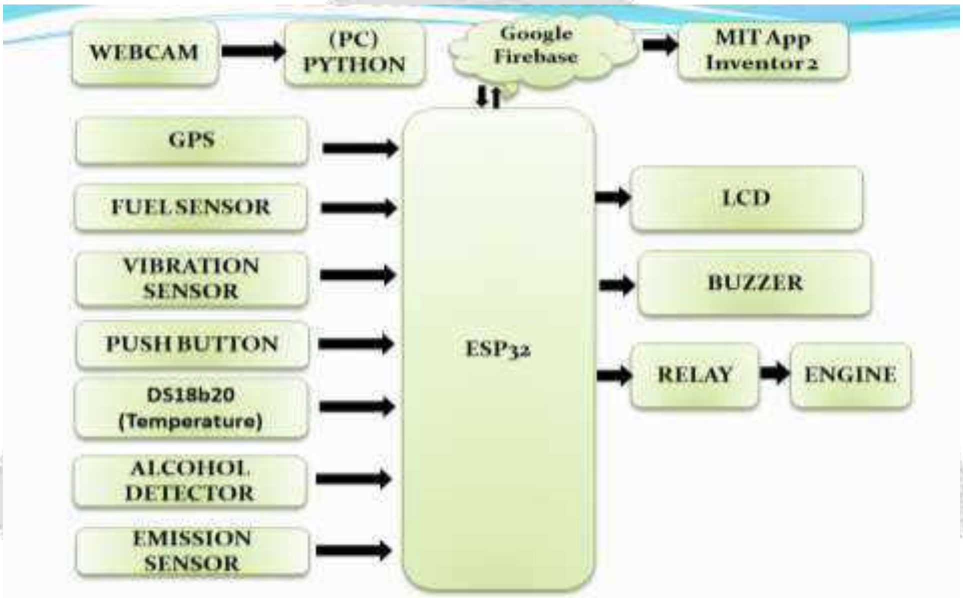


Fig -3.2: Architecture Of Model

3.4 Outcome Of the App

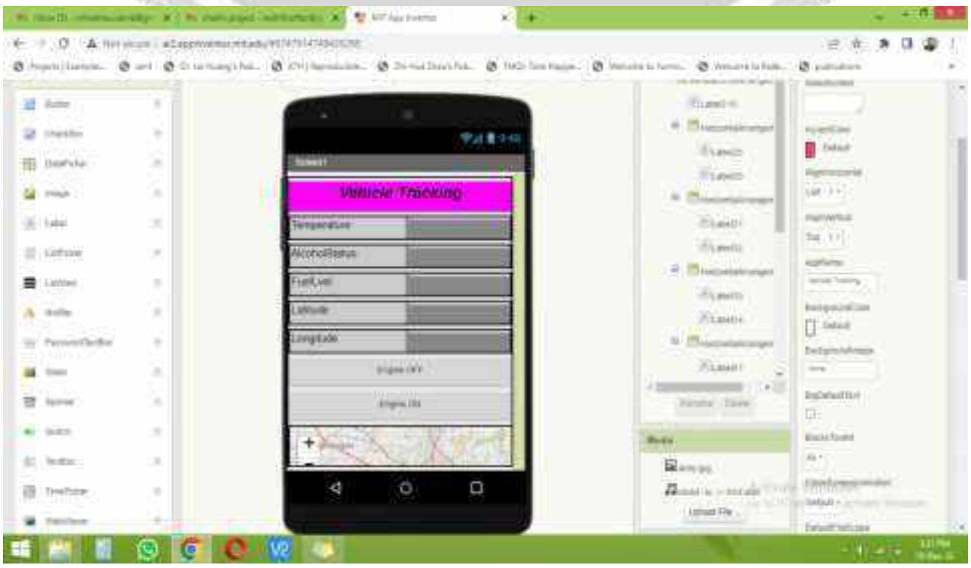
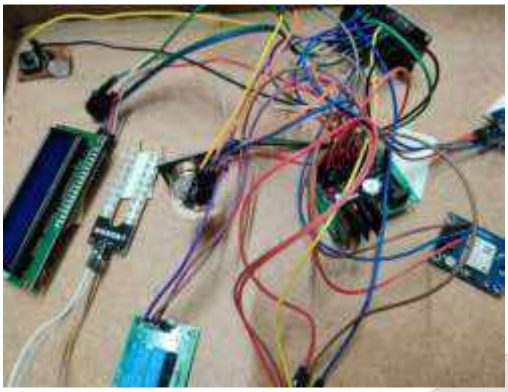
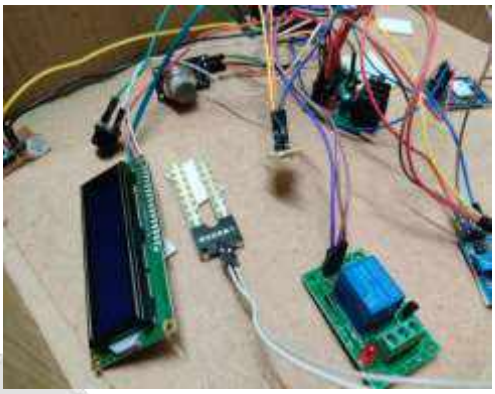
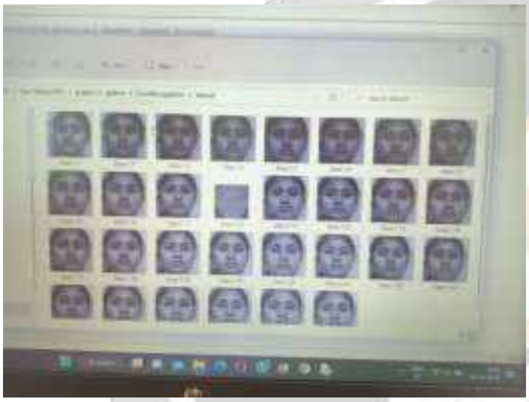


Fig-3.3: Mit Inventor App

4. RESULT







4. CONCLUSIONS

Human lives are most valuable. These prospective setups made better usage of tracking machinery by giving alert and secure travelling for the passengers using bad attentive mechanism path. This setup plays a crucial act in real time vehicle capturing of a motion by giving acquired data on the server side at the regular intervals of time to capture the motion regularly. Hence these are the possibilities to trace the motion as quickly as possible in a particular time. Children's alert appliance also takes the provided data through the sensors. In this assured direction, as per the children's concern, the prospective setup also provides alert message to the parent's mobile of accident place and knows about the children daily life activity.

5. REFERENCES

[1] IEEE transactions on intelligent transportation systems, vol. 4, No. 3, http://www.hozir.org/ , Retrieved September 16, 2016

[2] Shih-Nan Lu , Hsien-Wei Tseng , Yang-Han Lee1, Yih-GuangJan and Wei-Chen Lee on "Intelligent Safety Warning and Alert System for Car Driving", http://www2.tku.edu.tw/~tkjse/13-4/05-EE9713.pdf Retrieved August 30, 2016.

[3] Kaa open source to IoT platform, http://www.kaaproject.org/automotive, retrieved September 10, 2016.

[4] Lu Yeqiang, QiuFaju, Xin Jianghui, Shang Weiyan, "Dynamic obstacle avoidance for path planning and control on intelligent vehicle based on the risk of collision", seen transactions on system.

Women Surakshate: A Customizable Android and UI Watch App for Enhanced Personal Safety

Vijayanand S[1], Shyam Sundar G[2], Siddesha O B[3], Hemavathi R[4], Mohammed AthiqKamran[5]

[1] *Professor, CSE, Rajarajeswari College of Engineering, Karnataka,*
[2]*CSE, Rajarajeswari College of Engineering, Karnataka, India*
[3] *CSE, Rajarajeswari College of Engineering, Karnataka, India*
[4] *CSE, Rajarajeswari College of Engineering, Karnataka, India*
[5]*CSE, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

The developed Android application utilizes Jetpack Compose for the purpose/aim of ensuring women's safety. It is coupled with a WearOS watch application and provides features such as panic mode, emergency mode, location sharing, image sharing, and others that can be beneficial during dangerous situations. Firebase has been implemented as a backend for the application, and mobile functions have been utilized/implemented for its smooth functioning. The WatchOS documentation has been followed closely to ensure seamless functioning of the watch application. This application offers a practical solution for women's safety in a world where this has become a pressing issue. Panic mode enables the user to alert pre-selected contacts instantly during an emergency, while emergency mode uses location sharing and image sharing to provide quick assistance to the user. Real-time location sharing offered by the application can provide peace of mind to the user's family and friends. The Firebase backend provides scalability as per user requirements, while the WearOS watch application provides quick access to the application's features.

Keyword: - *Android Development, Jetpack Compose, Panic-Mode, Firebase.*

---

1. INTRODUCTION

Ensuring women's safety has become a pressing concern in modern times. In this regard, we have developed an Android application using Jetpack Compose, coupled with a WearOS watch application, to provide advanced safety features. The application provides features such as panic mode, emergency mode, location sharing, and image sharing, and others that can prove helpful during dangerous situations. We have integrated mobile functions and watch features by creating two interfaces, one for the mobile device and the other for the WearOS watch. Firebase has been implemented as the backend for the application, providing scalability as per user requirements. The application can be a significant contribution to the field of women's safety, offering advanced features with the use of modern technologies. The panic mode feature enables the user to instantly alert pre-selected contacts in case of an emergency, while emergency mode uses location sharing and image sharing to provide quick assistance. The application's real-time location sharing can provide peace of mind to the user's family and friends. The development process has closely followed the WearOS documentation to ensure seamless functioning of the watch application. In this paper-journal, the application's technical details, implementation, and advanced features, with the aim of contributing to the field/domain of women's safety.

2. EXISTING SYSTEM

Existing systems for women's safety lack advanced features and often do not provide a comprehensive solution to the issue. Some of the features that are missing in the current system are:
The following mechanisms/techniques are used in existing systems in women safety:

Currently, there is no universal Android application that can be used across different watches. This can make it difficult for users to find an app that suits their needs and can be used/implemented with their watch.
There are no dedicated watches available in the market that have been developed/designed specifically for women's safety. This can limit the number of options available to women who are in need for a watch that can offer advanced safety features. Many existing systems lack advanced safety features such as panic mode, emergency mode, real-

time location sharing, and image sharing, among others. This can limit the efficacy of the system/domain space during emergencies.

Some systems lack proper integration between the mobile device and the watch. This can result in a disjointed user experience and can limit the effectiveness/efficiency of the application.

Some existing systems lack scalability and cannot be easily customized as per the user's needs. This can be a significant drawback for users who require specific features that are not available in the existing system.

3. PROPOSED SYSTEM

The following approaches are being implemented to overcome, and improvise the present existing system:

The proposed system will have a universal Android application that can be used across different watches and phones. This system will provide users/women with a wider range of options and enable them to find an app that suits their needs. The proposed system will have dedicated safety features such as panic mode, emergency mode, real-time location sharing, and image sharing, among others. These features/applications will provide users with advanced safety options and help them during emergencies. The proposed system will include wearable devices with IoT integration. This will enable the system to track the user's movements and provide assistance during dangerous situations. The proposed system will be integrated with Firebase, which will provide scalability as per user requirements. This will ensure that the system can handle a large number of users and provide them with a smooth user experience. The proposed system will allow users to customize the application as per their needs. This will allow users to add specific features/options that they require and make the system more effective for them.

4. SYSTEM DESIGN

The front end of the application is developed using Jetpack Compose, it is a modern UI toolkit for building native Android applications. The UI framework provides a flexible and dynamic user-interface, it has been optimized for both mobile devices and wearable devices**.** The backend of the application is developed using Firebase, It is a cloud-based platform that provides a range of services such as authentication, real-time database, and storage, among others. Firebase has been used to store user data, authenticate users, and manage real-time data. The application is developed using various mobile functions such as GPS location, camera, and image sharing. These functions have been optimized/modified for the Android platform to ensure/confirm that the application works seamlessly on different devices. The application uses secure communication protocols such as HTTPS to ensure that all communication/Information-transfer between the user and the server is encrypted. Additionally, Firebase provides various security features such as user-authentication and secure data-storage, and real-time monitoring, which have been used to check the safety and security of user data. Firebase is used for user authentication, It ensures that only the authorized users can access/view the application. This ensures that the user's data is secure and prevents unauthorized access to the application. Firebase has been used for storing and managing user data. The real-time database feature of Firebase has been used to store user data in real-time, which ensures that the user's data is always up-to-date and can be accessed from any device. The application has been tested extensively to ensure/confirm that it works seamlessly on different devices. The integration between the watch and phone has been tested to ensure/confirm that the application works as expected on both devices.

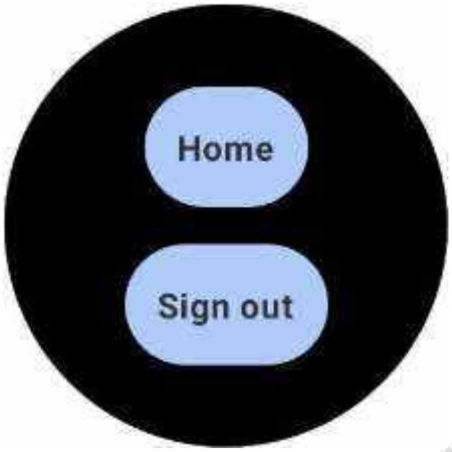


Figure 4.1: WearOs Watch UI **Figure 4.2**: **Panic Mode in Watch Application**

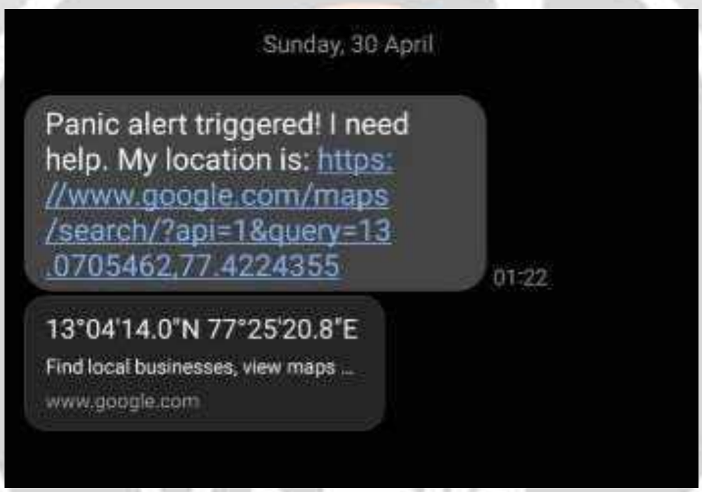


Figure 4.3 Panic Message Sent to Emergency Contacts

The data flow in the proposed project on an Android app for women's safety is designed/developed to ensure seamless communication between the user, the mobile device, and the backend server. The flow of data in the application can be thinned down into the following steps. The user inputs their data/information, such as emergency contacts and personal details, into the application. They can also activate features such as panic mode, emergency mode, and location sharing, which send a request to the server. The mobile device receives the user's input and communicates with the backend server through APIs. The mobile device sends the user's location, emergency contacts, and other relevant information to the server. The backend server receives the user's information, which is stored in a database using Firebase Real-time Database. The server processes the user's request and sends a response back to the mobile device. The wearable device receives the response from the server and displays the relevant information to the user. This includes alerts for panic mode, emergency mode, and location sharing, among others. The application uses HTTPS communication protocols to make sure that all data is encrypted and secure during transmission. Firebase Authentication is used to ensure that only authorized users can access the application.

5. RESULTS

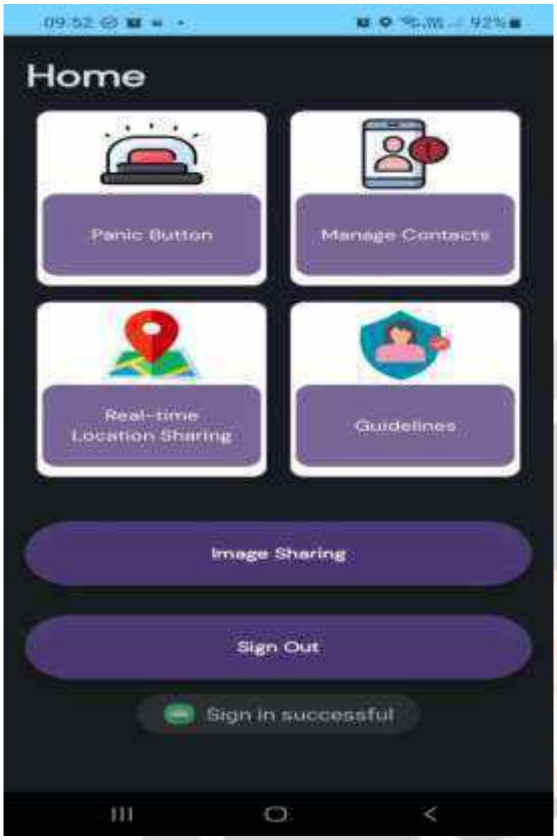


Figure 5.1: Mobile Application

Figure 5.2: Trigger Panic Mode

Android app for women's safety was developed with integrated features such as panic mode, emergency mode, location sharing, image sharing, and more. The app was designed to work on both mobile devices and wearable devices running WearOS, with a universal app that could be used on any device. The application was also designed to communicate/transfer data with a backend server using Firebase, allowing for real-time data updates and secure communication. The development team was able to successfully integrate the mobile functions and watch features, creating two interfaces that were tested for user-friendliness and functionality. The security of the app was also tested, ensuring that only authorized users could access the app. The user authentication process was implemented using Firebase Authentication, which was proven to be secure and reliable. The app was tested on different devices and platforms to ensure that it was compatible and functional. The testing included both manual testing and automated testing using unit tests and integration tests. The results of the testing showed the app was functional, user-friendly, and secure. The project successfully addressed the shortcomings of the existing systems, like as the lack of universal Android apps for watches and dedicated watches for women's safety. The integration of IoT technologies allowed for improved communication between the wearable device and the mobile device, improving the overall functionality of the app.

5. CONCLUSIONS

The proposed project successfully developed an Android app for women's safety with integrated features for panic mode, emergency mode, location sharing, image sharing, and more. The app was designed to work on both mobile devices and wearable devices running WearOS, with a universal app that could be used on any device. The integration of IoT technologies allowed for improved communication between the wearable device and the mobile device, improving the overall functionality/working of the app. The project addressed the shortcomings of the existing systems, like as the lack of universal Android apps for watches and dedicated watches for women's safety. The use of Firebase Real-time Database and Firebase Authentication ensured secure and reliable communication between the app and the backend server. The app was tested extensively to ensure that it was functional, user-friendly, and secure. The results of the project demonstrated the feasibility and practicality of using mobile and wearable technologies to enhance women's safety. The project has the potential to make a significant impact on women's safety and can be expanded to include additional features and functionalities in the future. The project has successfully developed an Android app for women's safety that addresses the shortcomings of existing systems and uses the latest technologies to provide a secure and reliable platform for women's safety. The project has contributed to the growing field of mobile and wearable technologies for safety and has the potential to make a significant impact on women's safety worldwide.

6. REFERENCES

[1] N. Agency, "165 cases of rape take place in 3 years in various stations and trains," *anandabazar.com*, 02-Mar-2020. [Online]. Available: https://www.anandabazar.com/national/165-cases-of-rape-take-place-in- 3-years-in-various stations-and-trains-1.1116864. [Accessed: 28-Mar-2020].

[2] S. O. Report, "DU students give 48hr ultimatum to arrest 'rapist'," *The Daily Star*, 06-Jan-2020. [Online]. Available https://www.thedailystar.net/city/dhaka-university-student-rape-protestsparks- on-campus-1850233. [Accessed: 27-Mar-2020].

[3] O. Correspondent, "SSC examinee raped after abduction in Mymensingh," *The Daily Star*, 04-Feb-2020. [Online]. Available: https://www.thedailystar.net/backpage/ssc-examinee-raped-inmymensingh- 1863088. [Accessed: 27-Mar-2020].

[4] S. O. Report, "Nurse gang-raped in Bhola," *The Daily Star*, 13-Feb-2020. [Online]. Available: https://www.thedailystar.net/country/nurse-gangraped- in-bangladesh-bhola-1867402. [Accessed: 27-Mar-2020].

[5] M. Shakil, "Four get death for Rupa rape, murder," *The Daily Star*, 13- Feb-2018. [Online]. Available: https://www.thedailystar.net/frontpage/four-get-death-rupa-rape-murder- 1533850. [Accessed: 27-Mar-2020].

[6] P. A. English Desk, "21 women 'raped' on public transport in 13 months: Report," *Prothomalo*, 16-Feb-2018. [Online]. Available: https://en.prothomalo.com/bangladesh/21-women-'raped'-on-publictransport- in-13. [Accessed: 27-Mar-2020].

A Method for Creating a Smart Classroom Based on IoT

[1]Manasa G V Kumar, [2]Samyuktha.S, [3]Sneha Aparna, [4]Suryakanth Mastappa Naik

[1] Asst. Professor, Department of CSE, Rajarajeswari College of Engineering, Karnataka, India
[2] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[3] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[4] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India

ABSTRACT

Students are more eager to adopt creative teaching techniques and demand innovative university campus life in this era of smart classroom technologies. IoT and cloud computing technologies can offer solutions for a smart and sustainable campus to enhance students' learning processes and boost the effectiveness of routine tasks carried out inside the institution. This project focuses on integrating the cloud into the educational process using the IoT paradigm. IOT in education enables students to study cutting-edge technologies that aid in the development of fresh concepts and rational solutions to societal challenges. The intelligence system, unified campus portal services, security, and maintenance system are all provided by IoT-based cloud computing technologies. The schools' increased digital connectivity improves both student learning and environmental sustainability.

Key Words: *Smart classroom, Camera-Based Detection, Automation.*

1. INTRODUCTION

Universities have recently begun to focus on the Internet of Things and cloud computing to create smart campuses. A Smart Campus connects many peripherals, infrastructure, and facilities to offer smart lighting, security, tracking, and effective use of resources like personnel, electricity, water, etc. According to the traditional classroom model, managing the classroom's daily operations and teaching must take up equal amounts of time. It gets tiresome to mentor and keep track of the student's academic activities. Obstacles must be overcome for faculty and institution administration to properly monitor student academic performance. Therefore, a new system is required to handle the workflow that greatly reduces the time of faculty not to stick with managerial tasks and to increase the time of teaching and interaction with students in order to achieve maximum utilization of the class hours. This project demonstrates a technique that uses cloud computing, IoT, and an application development platform to lessen secondary human labor. With this approach, teachers were able to concentrate more on what they do best—teaching—and less on running the classroom's daily operations.

2. RELATED WORK

Automation based on IoT has a significant influence on several industries today. Most of them use this method to track attendance and manage electric devices. Because there is more energy wasted in classrooms, those settings may be better suited to use this technique. Here, an energy-saving system was created utilizing IoT-based automation techniques, and multiple sensors, including LDR and LM35, were employed to identify the presence of human beings. When learning about various sensors, we discovered that they have several drawbacks, including a short lifespan, high cost, connection problems, and inconsistent results. We considered a few alternatives for getting around the limits of sensors and ultimately chose to utilize cameras to identify human presence. Numerous face detection-based attendance recording systems are available. In comparison, cameras will perform better compared to sensors because they are designed to detect human presence more precisely, while sensors must be customized to meet each user's needs and can be used for a variety of purposes, including disease prediction, weather forecasting, and healthcare infrastructures. We may also prevent energy loss by using this IoT-enabled technology.

We demonstrate how to monitor and regulate electrical equipment in this research utilizing an attendance tracking system and camera-based human identification algorithms.

3. METHODOLOGY

The electric equipment in a classroom, such fans and lights, is managed using camera-based discovery techniques. A camera is used to recognize people. The picture frame is divided into two separate sub frames. Each component of these sub frames, which represent various classroom settings, contains tables and chairs stacked vertically along with a fan and light. A camera is used to photograph the human presence, while Python and OpenCV are used to process the image. When a single frame piece detects human presence, the allocated fans and lights are automated; otherwise, they stay in the OFF state. A strategic distance can be maintained from energy waste in the classrooms—that typically happens when someone fails to turn off the electrical devices after using it—by adopting automation techniques.
Fig-1 shows a hypothetical classroom setting with person monitoring carried out by a single camera.

Fig- 1: Considered Classroom Environment

The proposed classroom setting is depicted in Fig. 2. The classroom was divided into two halves. As necessary, students are seated. Using the haar cascade classifier, that is an object identification method based on three feature extraction approaches and includes modules such as line features, edge features, and four rectangle features, we can detect the existence of objects. This classifier helps to identify characteristics in a picture or video, including pedestrian detection, board signs, and face landmarks. The highest level of face detection accuracy and a low percentage of false positives while detecting objects are two benefits of Haar cascades. Using a cascade classifier, observed faces in Fig. 2 are detected inside a box that is rectangular in shape.

Fig -2: Classroom environment two Frame Architecture

3. HARDWARE SETUP

The Arduino microcontroller, a 4-channel relay, a power switch, and a light are all included in the system design structure. The PC and Arduino are linked. For demonstration reasons, we are utilizing a PC camera. A camera in the room detects people. When the human presence is detected, the Arduino-controlled lights and fans in that room will switch on.

Like this, the lights will be turned off when someone leaves the room. A relay module is used to link the lamp to the Arduino. This relay channel regulates how the electrical apparatus operates. Additionally, since the voltage range for Arduino is 3 to 5 volts, we are using a relay to connect with a high voltage power source. High voltage devices cannot be connected to an Arduino directly.

Fig. 3 depicts the hardware configuration in which the Arduino ATMEGA328 is used to operate electrical equipment using a 4-channel relay. The switch will be the relay.

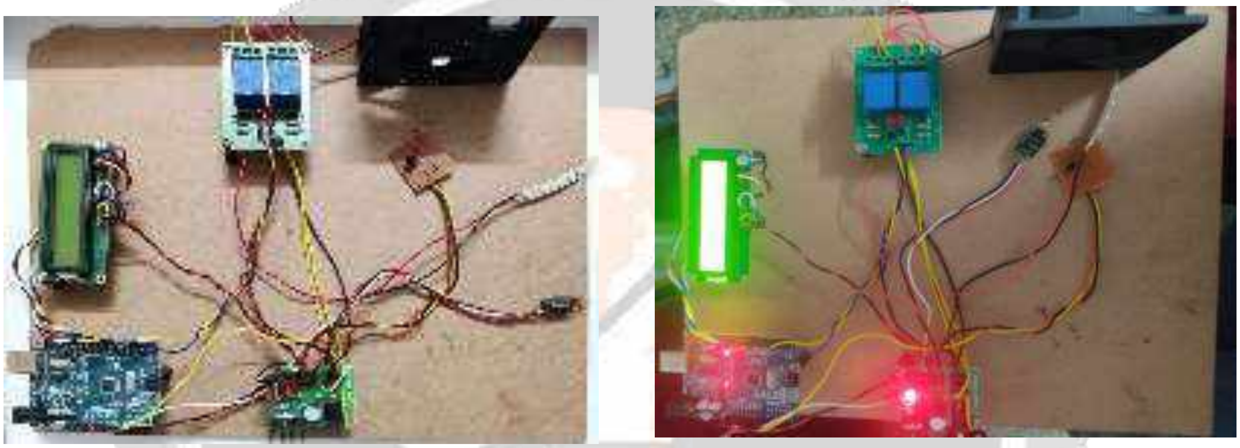


Fig- 3: Hardware setup (Active &Dormant states)

Components used for creating the project environment:

A. ARDUINO

Fig- 4: Arduino Board

The open-source Arduino hardware and software platform (Fig. 4) offers an easy way to control electrical equipment. The hardware is a compact PC system that may be developed to interface with various i/o devices. With a voltage supply ranging from 5V to 20V and several basic and sophisticated IO pins, this controller may be supplied by an external power source. The ATmega328 microcontroller used in it has several features, including a flash memory of 32KB, 2KB of SRAM, and 1KB of EEPROM.

B. RELAY

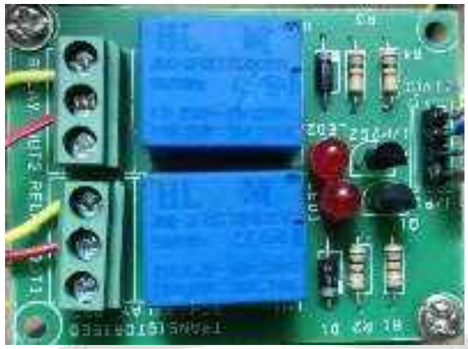


Fig- 5: Relay Board

An electrically powered device called a relay (Fig. 5) serves as a switch for regulating electrical devices. Relays are a common device for automation, power protection, and remote control, and offer benefits including stability, long-duration, and dependability. A relay's indicator light indicates whether the relay is on or off.

Maximum output voltages typically range between DC 30V/10A and AC 250V/10A. The board is approximately 75 mm long, 55 mm wide, and 19.3 mm tall in size and weight. A relay is expected to last for at least 100,000 operations. A mechanical device may last for a million, ten million, or even one hundred million operations.

4. RESULTS AND ANALYSIS

Utilizing a PC with a single camera, we are projecting an outcome. We utilized a laptop camera for demonstration reasons, which may be converted to a Closed-Circuit TV camera for enhanced security.

Fig-6: Website for attendance management

Fig-6 depicts the website designed for the evaluation of student and faculty attendance.

5. CONCLUSION

The IoT-based Cloud Integrated Smart Classroom for Smart and a Sustainable Campus will be a development in the educational environment that will lead to high efficiency and effectiveness of classroom teaching methods. The student body will be more motivated by this technique to submit their assignments on time. Instead of spending time controlling and observing the classroom's workflow, faculty and administration may devote more time to teaching and learning. In order to deliver an intelligent, economical, and ecologically sustainable campus, the suggested education system model.

The goal of the automated attendance system is to decrease the mistakes that frequently occur with the conventional (manual) attendance taking method. The goal is to automate and create a system that is beneficial to the institution or other organization. The modern, precise way of taking attendance in offices that can replace the traditional, manual ones. This approach is workable, trustworthy, and sufficiently safe. The system may be installed in the office without the use of specialized hardware. A camera and computer may be used to create it.

REFERENCES

[1] K. Atukorala, M. Tharugasini, I. Perera, D. Wijekoon, and C. Silva, “Smart-Eye - Integrated solution to home automation, security and monitoring through mobile phones,” NGMAST 2009 - 3rd Int. Conf. Next Gener. Mob. Appl. Serv. Technol., no. May 2016, pp. 64–69, 2009.

[2] P. S. Nagendra Reddy, P. A. Kumar Reddy, K. T. Kumar, G.N. Kodanda Ramaiah, and S. N. Kishor, “An IoT based home automation using android application,” 2016 Int. Conf. Signal Process. Community. Power Embed. Syst., pp. 285–290, 2016.

[3] G. Sfikas, “Creating a Smart Room using an IoT approach,” Research Gate, no. May 2016.

[4] H. Ando, N. Fuchigami, M. Sasaki, and A. Iwata, "A Prototype Software System for Multi-object Recognition and its FPGA Implementation," Third Hiroshima International Workshop on Nanoelectronics for Terra-Bit Information Processing, 2004, Proceedings.

[5] Asari K.V. and Gottumukkal R., "System Level Design of Real Time Face Recognition Architecture Based on Composite PCA," Proc. GLSVLSI 2003, 2003, pp. 157–160.

[6] Vijayan K. Asari, Hau T. Ngo, and RajkiranGottumukkal. The IEEE Computer Society Annual Symposium on VLSI: New Frontiers in VLSI Design (ISVLSI'05) Proceedings, "A Flexible and Efficient Hardware Architecture for Real-Time Face Recognition Based on Eigenface", isvlsi, pp. 280-281.

[7] "A Hardware/Software Co-design Approach for Face Recognition," Proc. 16th International Conference on Microelectronics, Tunis, Tunisia, December 2004. X. Li and S. Areibi.

POWER GENERATION THROUGH HUMAN LOCOMOTION USING PIEZOELECTRIC SENSORS

[1]Sumitha Manoj, [2]Prathyusha H Kumar ,[3]Sanjana H, [4]Sherlin Jagath J

[1]Assoc. Professor, Dept. of ECE, RajaRajeswari College of Engineering, Karnataka, India
[2,3,4] Student, Dept. Of ECE, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

The production of electric power from the footstep movement of the peoples and the pressure exerted during walking which is fritter away is the main theme of this paper. The mechanical power transformation into electrical power as the pressure exerted by the footstep and by using transducers is basically called as "Footstep power generation system". Power is produced by the power generating floor and it is basically the production of electrical energy from kinetic energy. The main aim is to overcome the power crisis throughout the world although it is not enough to fulfill over excessive demand of electrical energy, but it will be able to change and decrease reliance on old method of generating electricity. It can be installed on roadside footpath, parks and jogging tracks and many other public places, airport etc. and have great impact of this and will create great difference in the electrical power generation system. We can produce energy that can be stored in a rechargeable battery, so that we can use it for our later purposes, and it can be also placed in public places like streetlight, mobile charging etc.

Keyword: *- Piezo-electric Sensor, Mobile charging, Footstep.*

---

1. INTRODUCTION

The formation of electrical energy from the force exerted by footstep on the floor is illustrated in this research work. It will be surprising to know that the normal footstep movement on the floor can generate how much energy. As thousands of steps per day is taken by each person. Electrical energy is generated by the footstep taken by the peoples because of walking. It is a fact that large amount of energy is lost by each person during routine walk which is the main source for this system. A system is designed which generate power through non-conventional energy source technique such a walking on the gardens, grounds, and floors etc. This system is established in heavy populated areas. A compatible system has been designed to complete the procedure through which the load will run, home appliances will work on alternating current output voltage.

The energy that is produced from a person walking on floor is noise and pollution free. That type of energy is advantageous and even not need any type of fuel or power source to run. renewable energy in today's world while the demand of energy is increasing day by day is the current solution of this modern world. In this research work a system is designed which generate power through non-conventional energy source technique such a walking on the gardens, grounds, and floors etc. This system is established in heavy populated areas. Basic way of the "Footstep Power Generation" is based on the piezoelectric sensor to apply this system wooden plates up and down will be placed and adjusted on the piezoelectric sensor and moving spring.

The force is applied when the person is walking on that mat and the magnet is fixed on the upper portion of the wooden sheet because of force and moves into the cavity. However, the cavity is fixed on the bottom wooden sheet of the mat. A compatible system has been designed to complete the procedure through which the load will run, home appliances will work on alternating current output voltage. And the task is with the help of direct current to charge battery and then using inverter to convert direct current into alternating current for normal usage. At last, designing for the power generation of such types are very useful as compared to the demand of energy all over the world.

1.1 Existing Problem

- Increase in use of non-renewable energy which causes pollution.
- Increasing prices of the fuel resources
- Unable to meet demand because of increase in power usage.
- Electricity transmission losses
- Frequent power outages
- Electro mobility
- Grid modernization
- Threat of cyber attacks

1.2 Proposed Solution

Electrical power energy form by changing mechanical energy into electrical energy by the transform ring i.e., movement of footstep on the floor, piezo plate is placed there and that is the key feature of power produced through footsteps by piezo. The main working of this project depends on piezoelectric effect, which converts pressure into electrical energy. Here we have placed a piezoelectric tile which consists of piezoelectric sensors connected in series. Here, pressure is taken as input, and it is converted into electrical form and stored in a rechargeable battery. The PIC Microcontroller acts as heart of system, which transforms variable voltage into a constant voltage. To prevent current flow in opposite direction, a diode is placed. A RFID reader is placed to check whether the user is authorized and allows 15 minutes of charging time. A Liquid crystal Display is used to display how much voltage is stored in battery.

1.3 Objectives of Project

The main objectives of the project work are:

- To design and implement an ecologically safe way of generating dc voltage using anarray of piezo electric sensor.
- To boost the voltage generated from the piezo sensors using DC - DC boost-converter.
- To power a mobile for charging.

2. LITERATURE REVIEW

2.1 Introduction

Literature survey is very important to get a knowledge on desired topic. By using the information provided in the several literatures give credit to other researchers to prevent duplication. By surveying the several literatures, we can identify in constancies like gaps in research, conflicts in previous studies, open question left from other research. We referred some of the scholars to know some of the information about the project. The scholars which we have referred is listed below.

2.2 Base Papers

[1] Power Generation through footsteps using piezo-electric effect along with GPS Tracking, International Conference for Emerging Technology (INCET). Author: Rajendra Prasad, Avala Bhanuja, Bhavani. L, Bhoomika N in the year 2019. Energy utilization is the major key. Piezoelectric effect is utilized by piezoelectric sensor producing output energy in the form of AC voltage. To produce energy in a large extent, in this model implementation of the piezoelectric sensor network along the footpath is carried out which is given to the lane of streetlights along with it the smart shoe is implemented for a small production that consists of GPS tracking. In this proposed work model, GPS tracking has been added and streetlights switching technique comparing with existing model.

[2] Reverse electro wetting as a new approach to high-power energy harvesting. Author: Tom Krupenkin & J. Ashley Taylor in the year 2011.
Over the last decade electrical batteries have emerged as a critical bottleneck for portable electronics development. High-power mechanical energy harvesting can potentially provide a valuable alternative to the use of batteries, but, until now, a suitable mechanical-to-electrical energy conversion technology did not exist. Here we describe a novel mechanical-to-electrical energy conversion method based on the reverse electrowetting phenomenon. Electrical energy generation is achieved through the interaction of arrays of moving microscopic liquid droplets with novel nanometer-thick multilayer dielectric films. Advantages of this process include the production of high-power densities, up to 10 3 W m − 2; the ability to directly utilize a very broad range of mechanical forces and displacements; and the ability to directly output a broad range of currents and voltages, from several volts to tens of volts. These advantages make this method uniquely suited for high-power energy harvesting from a wide variety of environmental mechanical energy sources.

[3] Generation of Electricity by Using Footsteps as a Source of Energy. Author: P. R. Magdum, S. J. Chikhale in the year 2017.
Electricity is a basic part of nature, and it is one of the most widely used forms of energy across the globe. We get electricity, (which is a secondary energy source) from the conversion of other sources of energy, like coal, natural gas, oil, nuclear power, and other natural sources, which are called primary sources. Research show that the world has already had its enough shares of its energy resources. Fossil fuels pollute the environment. Nuclear energy requires careful handling of both raw as well as waste material. Research shows that large amount of power is generated from non-renewable energy resources compared to that of renewable energy resources. The extensive usages of available resources in recent years created a demand for the future generation. To overcome this problem, we need to utilize renewable energy sources for power generation and conservation. Therefore, the focus now is shifting more and more towards the renewable source of energy, which are essential and non-polluting. The goal of this paper is to show the detailed survey of how jumping platform can be now used as a source of power.

[4] Footstep Power Generation for Rural Energy Application to Run A.C. and D.C. Loads. Author: Kethavath Gopal, Adaikkalam Daniel Praneet in the year 2020.
Now days, the population of the country increased, and the requirement of the power is also increased. At the same time, the wastage of energy also increased in many ways. This paper presents the production of electric power from the footstep movement of the peoples and the pressure exerted during walking, which is fritter away, is the main theme. electrical power is achieved by transforming the mechanical power as the pressure exerted by the footstep and by using transducers is basically called as "Footstep power generation system". Power is produced by the power generating floor and it is basically the production of electrical energy from kinetic energy. In present days electricity demand is increasing and it is unable to overcome this global issue by using the traditional power generating sources. The main aim is to overcome the power crisis throughout the world although it is not enough to fulfill over excessive demand of electrical energy, but it will be able to change and decrease reliance on old method of generating electricity. To overcome this problem, the energy wastage is converted to usable form using the piezoelectric sensor. This sensor converts the pressure on it to a voltage. By using this energy saving method, footstep power generation system we are generating power.

3. SYSTEM DESIGN

The proposed system, aimed at storing the energy generated during daytime in batteries, and can be used during night. The proposed system is developed using a microcontroller. The output of piezoelectric sensor based micro generator will be a very low power ac voltage signal at random frequency. The power is stored in a battery that can be used to charge a mobile phone using RFID card. This system is powered by At-mega 328 microcontroller, it consists of Arduino IDE, RFID sensor, USB cable and LCD.

3.1 BLOCK DIAGRAM

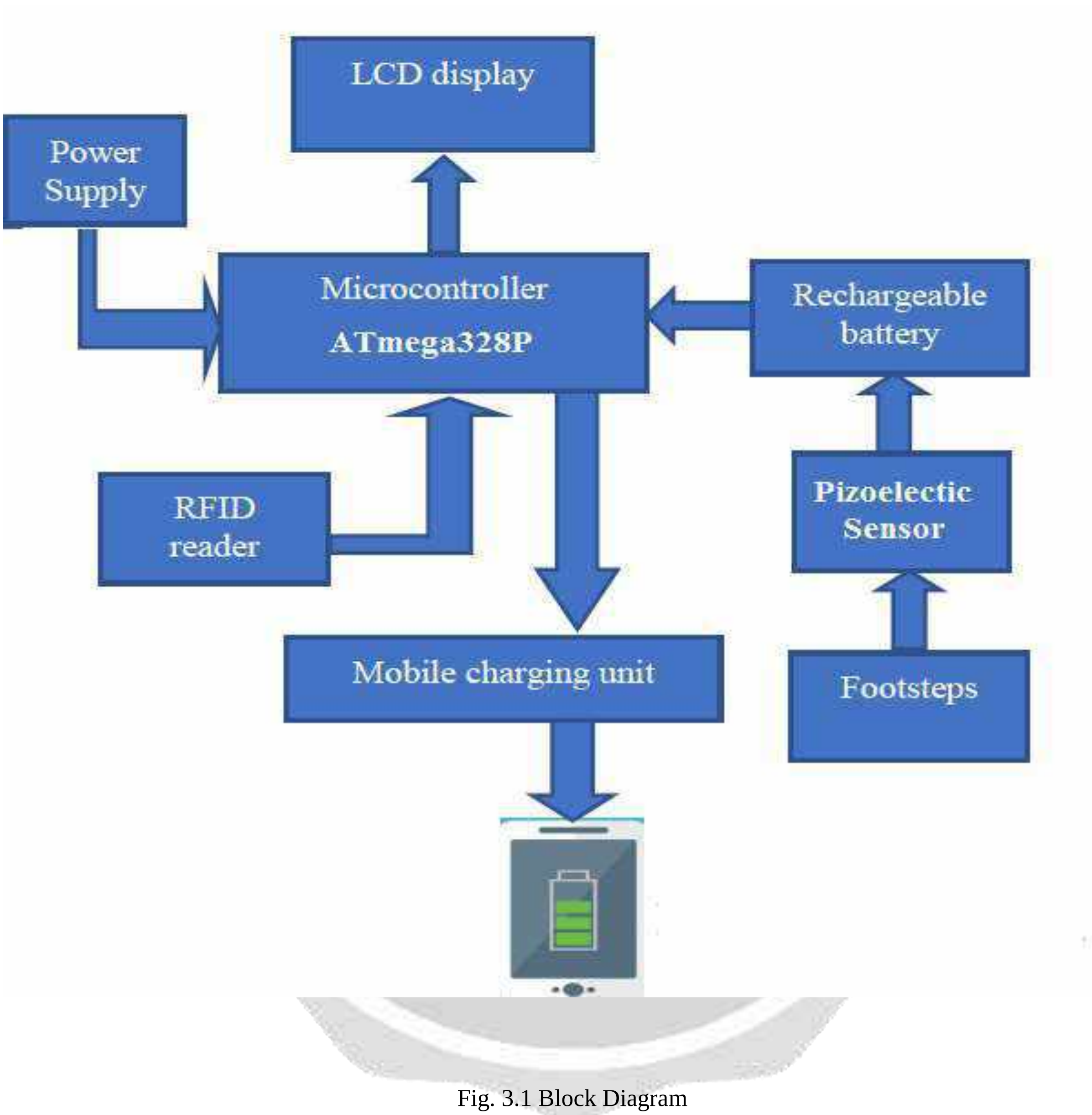


Fig. 3.1 Block Diagram

3.2 METHODOLOGY

These days the Internet of Things (IoT) is the most famous and trending wireless communication model due to its vast applications and reach to access. It involves a simple concept of controlling electronic or electro - mechanical devices using internet. Our smart staircase also has this smart and easy feature of internet of things. Node MCU being a controller that has inbuilt Wi-Fi capability is being used as its range is 15-200 meters and simple to program. Node MCU occupies less space and has the easily understandable architecture reducing efforts of programmer. Other digital pins used for motor driving using the motor driver L2398N.

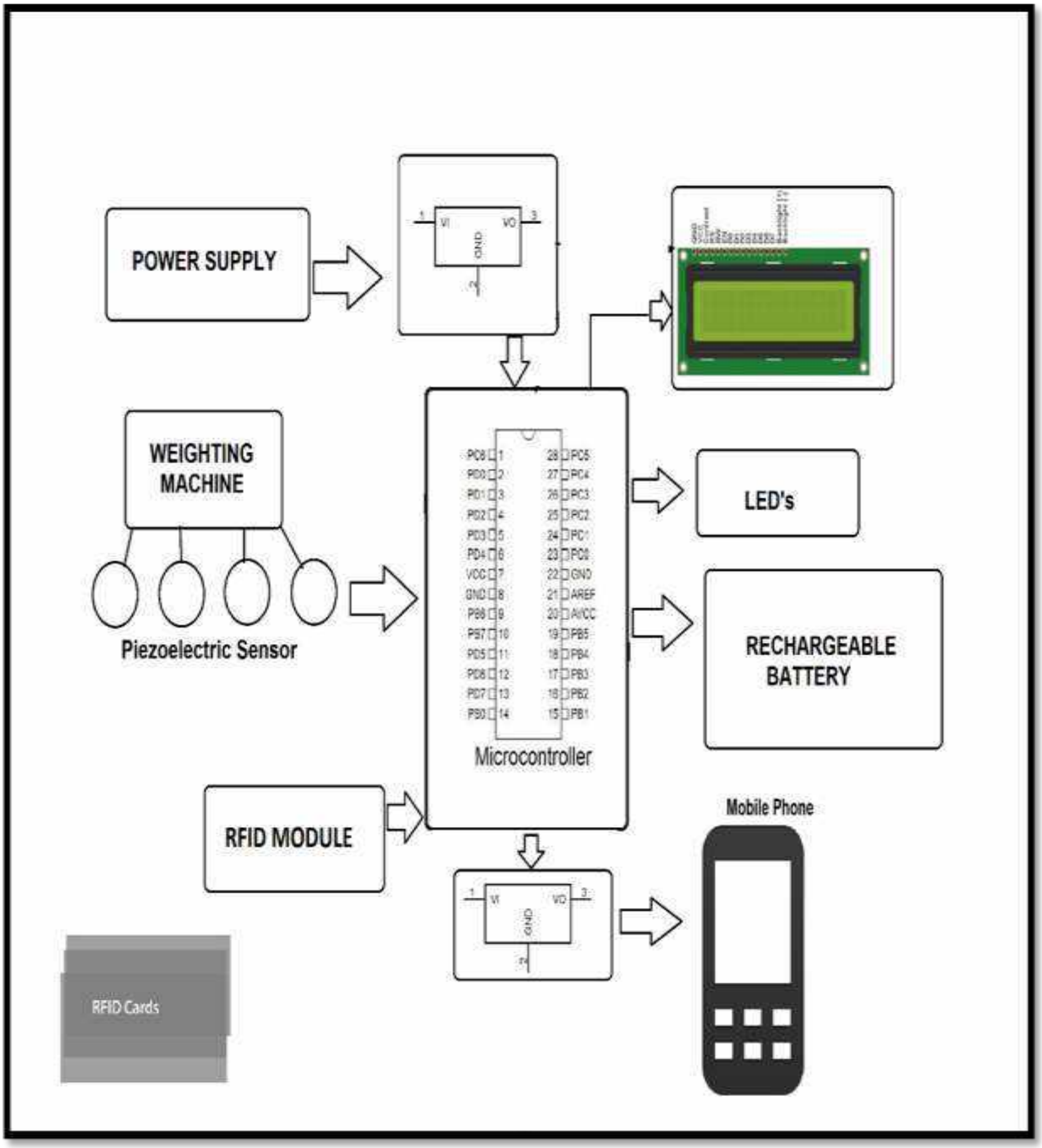


Fig. 3.2 Physical Setup

4. EXPERIMENTAL SETUP

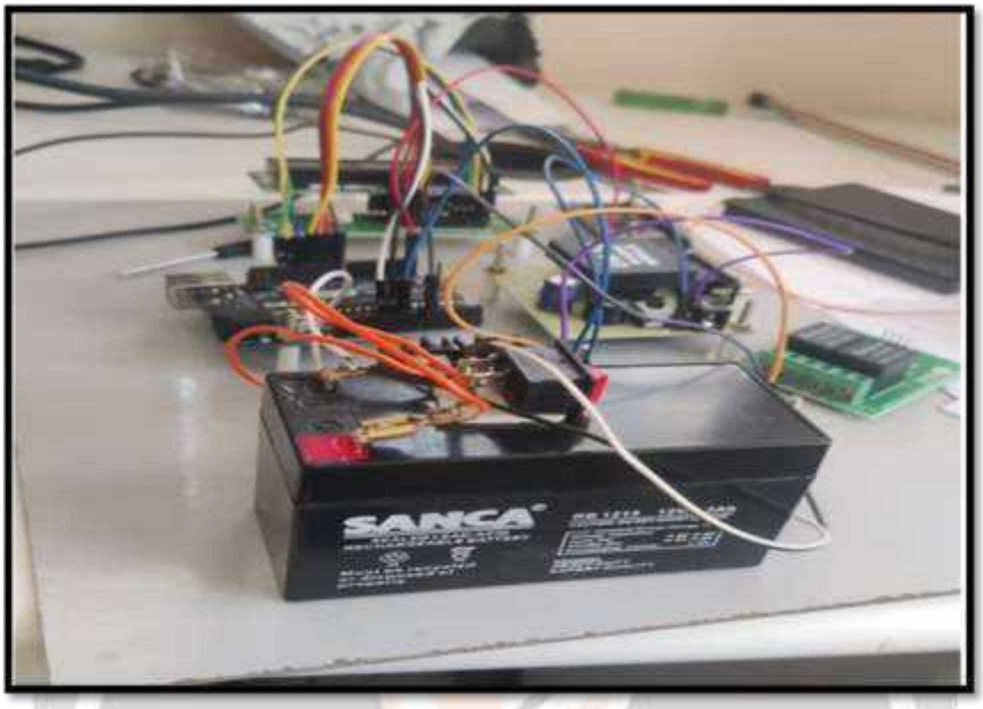


Fig 4. 1 Experimental Setup

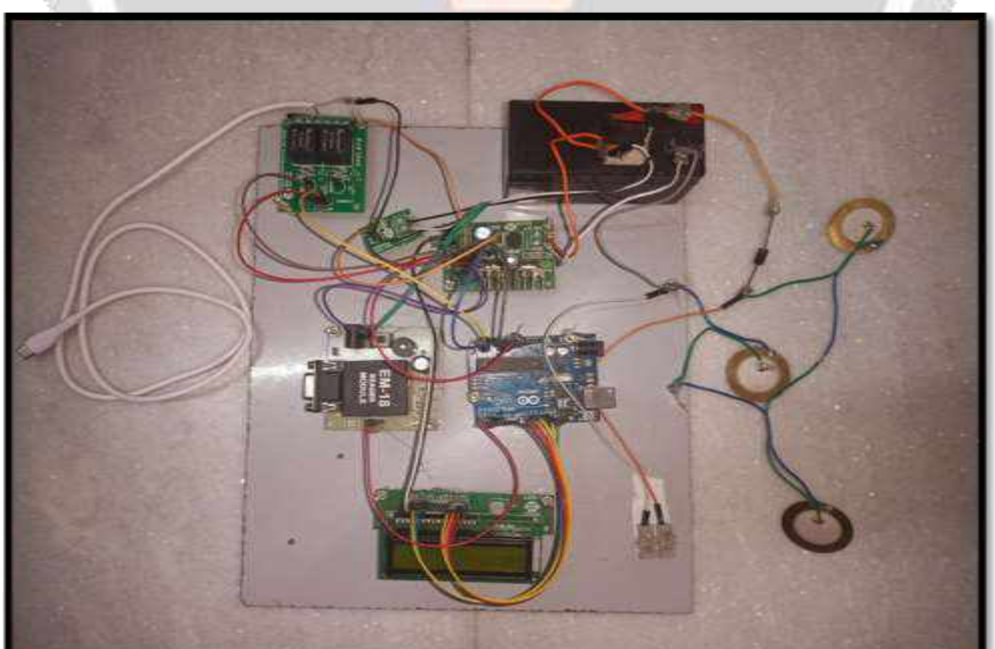


Fig 4.2 Final Circuit

4.3 Charging:

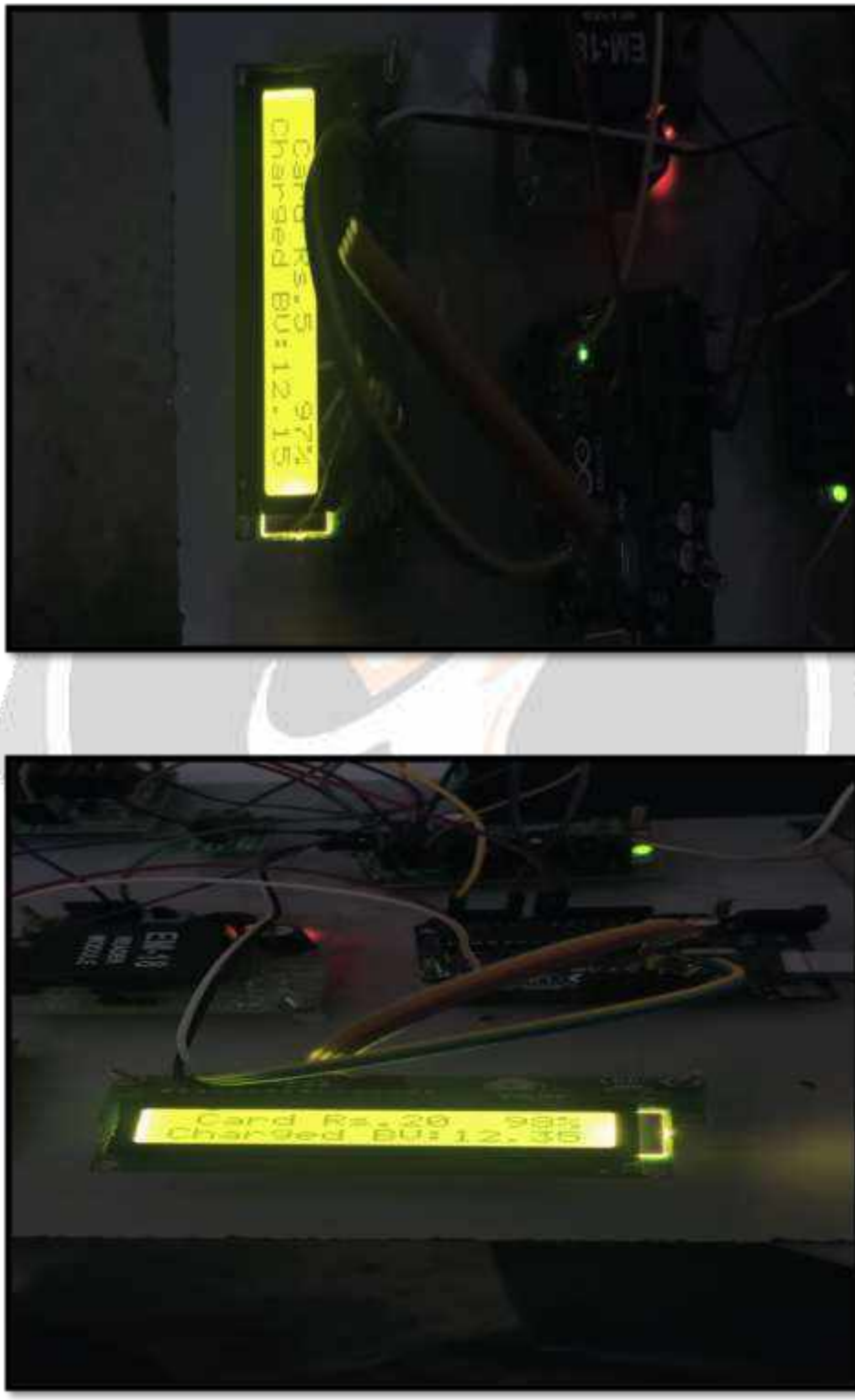


Fig 4.3 Battery Charging

5. IOT APP RESULTS:

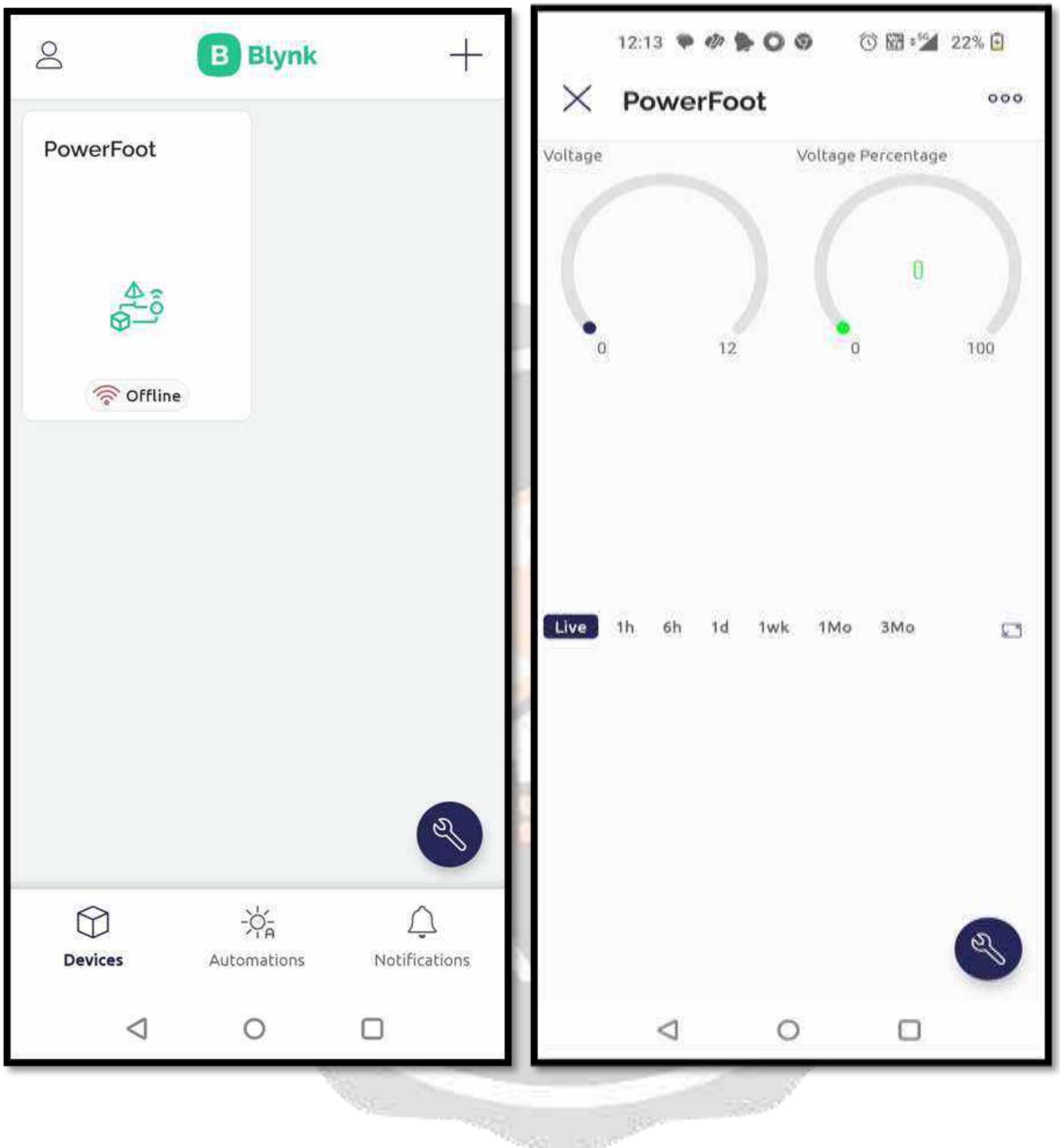


Fig 5. IOT App results

6. CONCLUSION

Footsteps are the main source of power generation. There is no need of energy from conventional source of energy and there is zero percent of pollution in this type of power generation. There is no need of any kind of power from mains and it is important to the areas, all tracks where footsteps are used to generate non-conventional energy such as electricity. The contribution of non-conventional energy to our primary energy is 11% that is a common fact. If this project is activated, it will not only add and overwhelm the energy deficit problems, but this will also form sound global environmental change.

7. REFERENCES

[1] R.Manasa Veena, B. Harika Reddy “Maximum Energy Harvesting from Electromagnetic Micro Generators by Footsteps Using Photo Sensor in International Conference on Computation of Power, Energy Information and Communication 2016.

[2] Taliyan.S.S "Electricity from footsteps" in IEEE Trans. On Power Generation, vo1.23. no.4, pp 2521-2530, April 2010.

[3] Jose Ananth Vino. V,AP,Bharath University "Power Generation Using Foot Step" in International Journal of Engineering Trends and Technology (UETT) -Volume I Issue2-May 20 II ISSN: 2231-5381

[4] Rama Krishna. K "Generation of electric power through footsteps" in International Journal of Multidisciplinary and Current Research Vol.2, ISSN: 2321-3124, Sep-2014

[5] Adhithan.A, Vignesh.K, Manikandan.M "Proposed Method of Footstep Power Generation Using Piezo Electric Sensor" International Advanced Research Journal in Science, Engineering and Technology Vol. 2, Issue 4, April 2015.

[6] Tanvi Dikshit, Dhawal Shrivastava, Abhijeet Gorey, Ashish Gupta, Parag Parandkar, Sumant Katiyal, “Energy Harvesting via Piezoelectricity”, BVICAM’s International Journal of Information Technology 2010.

[7] Y. C. Shu and I. C. Lien, "Analysis of power output for piezoelectric energy harvesting systems", Smart Materials and Structures 15 (2006), pp. 1499-1512.

[8] V.Dharmambal, Dr. Nisha KCR, Bhavana C, “Piezo Film based Renewable Energy System “, 2016 International Conference on Circuit, Power, and Computing Technologies [ICCPCT]

[9] Santhosh Mugali, “Footstep Power Generation Using Piezo-electric Transducers”, International Journal of Latest Technology in Engineering, Management and Applied Science, p. 2-5, Volume 7, May 2018.

[10] Iqbal Mahmud, “Electrical Power Generation Using Footsteps”, European Scientific Journal, 2018.

AUTONOMOUS CAR

Prof. Santosh Chavan[1] Sameer Kulkarni[2], Shreyank. H[3], Prajwal. BR[4], Prajwal.G[5]

1- Assistant Professor, Dept Of Electronics and Communication Engineering, Raja Rajeshwari College Of Engineering, Karnataka, India

[2,3,4,5] *Students, Dept. of Electronics and Communication Engineering, Raja Rajeswari College Of Engineering, Karnataka, India.*

ABSTRACT

Our project proposes to minimize that in an autonomous driving system, the field of view spans multiple cameras placed around a car driven through numerous driving scenarios Sensor data is received by the analyzing unit at a high velocity,also the camera provides over, millions of images for a small drive of about half a mile. A simple example of this is when pictures clicked on burst mode often have more throwaways than the ones which can be utilized. Efficient processing of a high volume of images is therefore a challenge which autonomous systems such as the driving system face. Given the multiple cameras present on autonomous cars, providing high resolution pictures through varying driving scenarios, the objective is to process and analyze this huge dataset efficiently. This project shall demonstrate the power of distributed computing in image processing algorithms and analysis of incredibly large datasets using a distributed approach. This paper gives a statistical proof of concept of how implementing a distributed parallel programming paradigm can improve autonomous systems such as the driving system which deal with high volumes of images.

Keywords: *Raspberry Pi, Automated Cars, Traffic Congestion, Increase safety.*

---

1. INTRODUCTION

An Autonomous vehicle has no human information and can detect encompassing with no human connections. An assortment of sensors are joined and are utilized to recognize the pathway, impediments, people on foot, and so forth from the encompassing. The advantage of having a driverless vehicle is having decreased expenses because of less wastage of fuel, expanded security, expanded versatility, expanded consumer loyalty, and so on. The target of a Autonomous vehicle is to make a completely practical mechanized vehicle that can decrease human exertion, lessen the mishap rate, give better traffic stream, explore to a given objective, keep away from ecological deterrents and follow street signs.These expansions in expressway limit now and then are one of the principle huge explanations behind sway in gridlock, especially in the metropolitan regions and more influenced in interstate clog in certain spots. For the specialists to deal with the traffic stream generally prompts expanding the gridlock, with the additional information and anticipating the driving conduct of individuals, we can consolidate these two subtleties for decreasing the gridlock the street with less requirement for traffic police on the streets and in any event, for the street signal.With the invention of self-driving cars manual driving problems are being resolved to a large extent. A simple example is that machines never goes to sleep. But developing self-driving cars increases the problem of large & complex calculations and feature extraction at high definition.

2. WORKING PRINCIPLE

The block diagram in Fig1 of the system consists of sensors unit, controller unit, server unit, and output devices. The sensor unit incorporates a number of sensors, including those for temperature, humidity, fire, gas, and infrared. A microcontroller with Bluetooth and Wi-Fi is called an ESP 32. The warehouse will have a number of nodes with ESP and sensor units positioned in various places. Sending this sensor unit data to ESP. In order to send SMS notifications to the authorities when there are deviations, we will integrate the GSM module with the ESP module. The data will be sent by the ESP to the server built using a Raspberry Pi and an SD card. Using the MQTT protocol, the raspberry pi module will send the data to the node-red dashboard. TheInternet of Things (IOT) uses the communications standard MQTT. It is intended to link faraway devices with a tiny code footprint and low network traffic by acting as a very lightweight publish/subscribe message transport. The node-red will take in the different sensor parameter data, process it, and show the parameter information. To prevent food waste from excessive storage, the system will also show the items' shipment time.

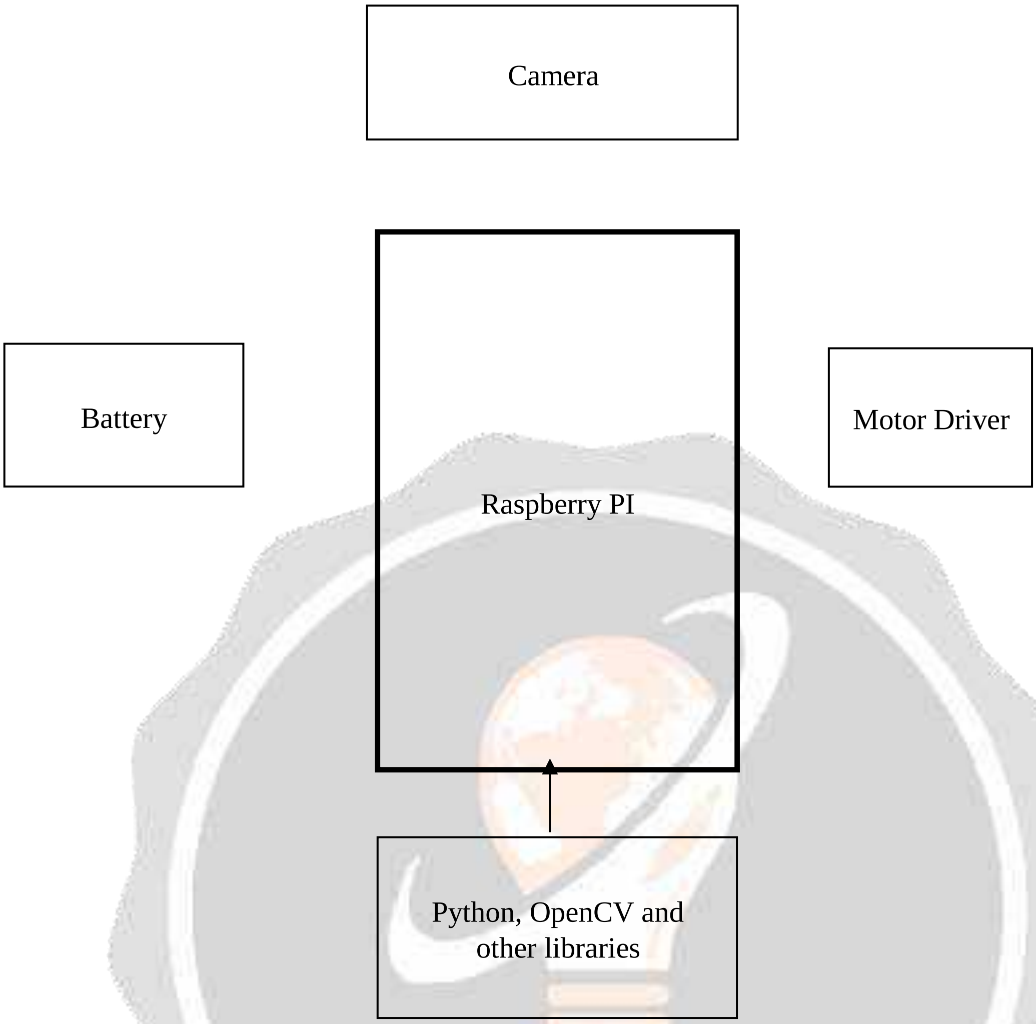


Fig 1: Block Diagram

3. RESULT & DISCUSSION

Fig 2 represents Self-driving cars works on image processing techniques on the basis of feature extraction. Every processing is done on each frame of the video. Machines does not take video as a stream of events it takes it as a stream of frames captured at each minimum instant of time. And all processing is done using those frames. For a camera every image is a 2d mesh of coloured pixels. It takes raw frame captured at each instant and converts it into threshold of black and white colour then it detects the edges. Edges are observed under Hough-lines method where collinear points are collected in to array of arrays and each array is then used as drawing points to draw straight lines. Orientations and length of line to be detected can be set in Hough-Lining. Then the angle of drawn lines is calculated and left or right decision is taken accordingly.

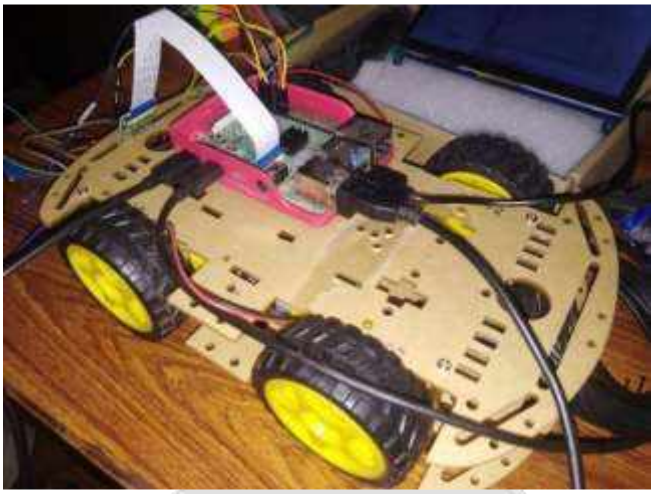


Fig 2: Proposed Prototype

It involves a simple concept of controlling the electronic or electromechanical devices. Raspberry Pi is a microcontroller board. In this section, we present methodology to design a autonomous car which can detect face, avoid obstacles, gives the location. We will be using OpenCV software development library for computer vision, which can process images and videos. OpenCV is a great tool for image processing. Face detection can be done through camera which is installed in autonomous car.

The yield of this stage is the plan report. Here we have the pi camera that transfers video live and sends it to the raspberry pi as displayed then at that point we have the raspberry pie that measures the information and sends the information to be prepared in a distant framework set somewhere. The information that is prepared then communicated to the Arduino that further sends the data for the displayed vehicle so it can work dependent on the condition.

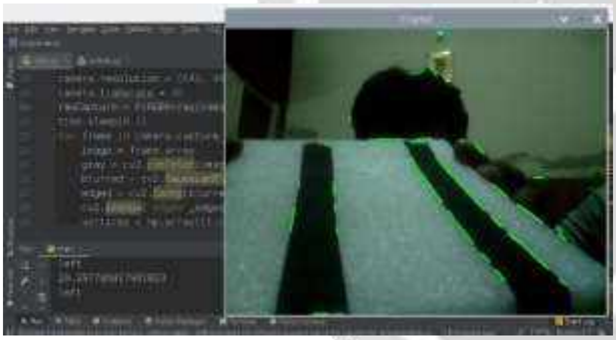


Fig 2.1: Straight Lanes

Fig 2.2 : Right rotated lanes

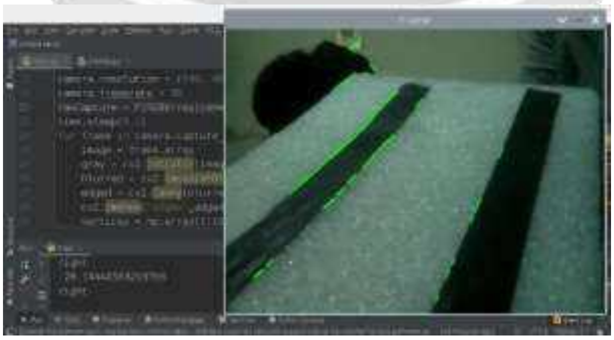


Fig2.3: Left rotated Lines

Fig 2.1, Fig2.2, Fig 2.3 represents tested results under different brightness levels and results are as follows. We have created three scenarios 1st tested in normal light as the figure 2.2 shows here is has very clear recognition of lanes then in flashing light as shown in figure 2.2 to check if it is distracting or not. It did this in a clear manner with somehow less recognition but no distraction was noticed then in dark as shown in figure 2.3 it has tiny recognition but still no distraction at all. The autonomous car detects the lanes and follows in the specific direction and the lanes are detected the pi camera installed on to the raspberry pi.

CONCLUSION

The model was effectively evolved utilizing Image Processing and Machine Learning. Notwithstanding the innate advantages, independent vehicle innovation should conquer numerous social obstructions. Similar as the issue looked by the principal auto, the impact of metal models can block the headway of innovation. Nonetheless, new enactment is setting out open doors for these vehicles to demonstrate their suitability. As more states legitimize driverless vehicles, the social impediment will give way, considering the biggest upheaval in close to home transportation. We resolved the issue of non-self-ruling vehicles with the proposed framework which decreases the human work of working the vehicle. Moreover, we additionally notice that the given framework execution is far superior to a normal client. Since the exhibition is better and consistently steady, we thusly infer that the proposed framework can tackle the essential human mistake that happens.

4. REFERENCES

[1] Tejas Gavankar, Aditi Joshi, Shantanu Sharma“autonomous car using image processing ” (ICUAS),2019 International Conference

[2] Mathe, K, Tamas, L. Busoniu, L. “Artifical Intelligence Integrated Blockchain For Training Autonomous Cars” 2020 IEEE International Conference.

[3] Rees, D. Talha, M. Florescu, I. “Survey of the image recognition based on deep learning network for autonomous car” Multisensor Fusion and Integration for Intelligent Systems (MFI), 2020 IEEE Conference.

[4] Hao Ling, “Study of development of autonomous vehicle using embedded control board” Antennas and Propagation & USNC/URSI National Radio Science Meeting, 2021 IEEE International Symposium.

[5] Manju Bisht, John Abbot, Ashraf Gaffar “ Social dilemma of autonomous cars a critical analysis” at 2021 International Conference on Information and Communication Technology Convergence(ICTC) [6] B. Kisačanin, "Deep Learning for Autonomous Vehicles," 2017 IEEE 47th International Symposium on MultipleValued Logic (ISMVL), Novi Sad, 2017, pp. 142-142, DOI: 10.1109/ISMVL.2017.49.

[7] M. V. Rajasekhar and A. K. Jaswal, "Autonomous vehicles: The future of automobiles," 2015 IEEE International Transportation Electrification Conference (ITEC), Chennai, 2015, pp. 1-6, DOI: 10.1109/ITECIndia.2015.7386874.

[8] K. Jain, "Working model of Self-driving car using Convolutional Neural Network, Raspberry Pi and Arduino," 2018 Second International Conference on Electronics, Communication, and Aerospace Technology (ICECA), Coimbatore, 2018, pp. 1630-1635, DOI: 10.1109/ICECA.2018.8474620.

[9] Daniel L. Rosenband. “Inside Waymo’s Self-Driving Car: My Favorite Transistors”, Symposium on VLSI Circuits Digest of Technical Paper 2017 Illia Vovsha, Ashwath Rajan, Asaf Salleb-Louissi, Anita Raja, Axinia Radeva, Hatim Diab, Ashish Tomar, Ronald Wapner, "Predicting Preterm Birth is Not Elusive: Machine Learning paves the way to individual Wellness, AAAI Symposium Series, 2014

[10] Qing Rao,Jelena Frtunikj. "Deep Learning for Self-Driving Cars: Chances and Challenges". Proceedings SEFAIS'18 Proceedings of the 1 st International workshop on software engineering for AI in Autonomous Systems Gbenga A.Kayode, Diederick E.Grobbee, Mary AmoakohColeman, Ibrahim Taiwo Adeleke, Evelyn Ansah, Joris A.H. De Groot, Kerstin Klipstein-Grobusch, "Predicting Stillbirth in a low resource setting", DOI:10.1186/s128884-016-1061-2, BMC Pregnancy, and Child Health., 2016

AN IOT AUTOMOBILE ROBO IMPLEMENTATION FOR DISASTER MANAGEMNET

Haritha K S[1], Dimple Y[2], Manasa B G[3],Varshitha D C[4]

[1] *Assistant Professor, Electronics and Communication Engineering, Rajarajeswari College of Engineering, Karnataka, India*

[2,3,4]*Student, Electronics and Communication Engineering, Rajarajeswari College of Engineering,Karnataka, India*

ABSTRACT

Most road accidents occur because of drowsiness due to careless driving of drivers. This system provides Eye Blink Monitoring (EBM) system that will alert the driver in drowsiness. Using an IR sensor the driver's eye is continuously monitored. The output of the system will have no effect on the normal eye blink rate. The IR sensor receives abnormal blinking rate and an alarm will ring to wake him/her up when the driver feel asleep. In this system we use alcohol sensor to detect the concentration of ethanol in air. If detected there will be no engine ignition. The speedometer and engine's computer receives the information from the engine speed sensor to tell the transmission to shift. Accident sensor need to detect a crash and convert it to usable signals within milliseconds.

KEYWORD:- *Disaster management, Internet of things, Networking, transportation saftey*

1. INTRODUCTION

"An IOT automobile robotic implementation for disaster management" is a project aimed at developing an autonomous vehicle that can be used for disaster management purposes. The vehicle is equipped with various sensors and communication modules that enable it to navigate through disaster-stricken areas and collect real-time data about the situation. The vehicle is also equipped with an internet of things (IOT) system that allows it to communicate with other devices and share data in real-time. The project aims to address the challenges faced by disaster management teams in accessing and collecting data from disaster-stricken areas. By providing a reliable and autonomous vehicle that can navigate through such areas, the project hopes to improve the speed and efficiency of disaster response operations.L298 is a popular motor driver integrated circuit that is used in many robotics and automation projects.L298 can be controlled using a variety of input signals, such as PWM signals, analog signals, and digital signals. This makes it easy to interface with microcontrollers and other digital control systems. A drowsiness sensor is a type of sensor that is designed to detect signs of drowsiness or fatigue in a person. Its main aim is to help prevent accidents or injuries caused by drowsy driving or operating heavy machinery while fatigued. Drowsiness sensors typically work by measuring various physiological parameters that are associated with drowsiness, such as changes in heart rate, respiration rate, or brain activity. Some drowsiness sensors use cameras to monitor facial expressions and eye movements to detect signs of fatigue, such as drooping eyelids or slow eye movements. Once a drowsiness sensor detects signs of fatigue, it can issue an alert to the driver or operator, such as a visual or audible alarm, to help them stay alert and avoid accidents. Some drowsiness sensors can also interface with other systems, such as vehicle control systems, to automatically adjust the speed or other parameters to help prevent accidents. Overall, the aim of a drowsiness sensor is to help improve safety by detecting signs of fatigue in drivers and operators and alerting them to take action to stay alert and avoid accidents.

The major goal is to prevent car accidents caused by reckless driving. Even when a driver is intoxicated, an alcohol sensor may detect the presence of alcohol in the air and prevent the engine from starting. One of the significant innovations that manufacturers anticipate will lower the frequency of accidents and fatalities on the road is the advent of a pre-collision/collision avoidance system. Using sensors, this system constantly assesses the location of the driver and any obstructions in the road to minimize the risk of an accident. Automotive accelerometers are employed in a number of safety systems in contemporary vehicles. For instance, in a collision, sudden deceleration activates the airbags.

There is no way to wake up inebriated people when they are over-intoxicated or drowsy. There are no current remedies for night drivers who become tired while driving overnight. It is not possible to reduce speed by cutting off the spark to the starter or sparkplug and awaking them. There is no available gravity sensor wheel grip solution. It is not possible for loved ones to give drivers advice when they are driving recklessly or after drinking too much. There is no available method for preventing accidents. It is not possible to use impact sensors to identify accidents. It is not possible to ship essential photos from an IOT smart phone utilizing GPRS for worldwide distribution. Employing tracking technology to find the accident site

This project's goal is to employ the Collision Avoidance System (CAS) to effectively prevent car collisions and to give users the highest level of protection possible while driving at night, while intoxicated, or recklessly. We are demonstrating a technology in this project called the "Eye Blink and Head Movement Monitoring System" that will assist drivers in recognizing tiredness. This system is based on the idea of continuously monitoring the driver's head movement and eye movements with an IR sensor. If he or she nods off, an alarm will sound to wake them up.

2. RELATED WORK

Jun zhao and Kuangrong Hoa [1] had proposed a system for monitoring Driver fatigue video images and steering grip force. Driver fatigue is one of the main reasons for road accidents. To address this issue, researchers have developed various techniques to monitor driver fatigue. Support Vector Machines (SVMs) are one such technique that has been widely used in recent years due to their high accuracy and robustness. In this literature survey, we will discuss some of the recent studies that have used SVMs for driver fatigue monitoring. In a driver fatigue detection system based on SVMs was proposed. The system uses a camera to capture the driver's facial features and extracts relevant features such as eye closure and head movement. The SVM classifier was then used to classify the driver's fatigue level. The results showed that the proposed system achieved a high accuracy rate of 91.7%. Developed a driver fatigue detection system based on SVMs and physiological signals. The system used a wearable device to capture the driver's physiological signals such as heart rate variability and electroencephalogram (EEG) signals. The SVM classifier was then used to classify the driver's fatigue level based on the extracted features. The results showed that the proposed system achieved a high accuracy rate of 95.7%.

An alcohol detection system was proposed [2] for ensuring Safety of Drivers. The paper describes the development of an alcohol detection system that uses a breathalyzer to measure the driver's blood alcohol content (BAC). If the BAC is above the legal limit, the engine is automatically locked, and a message is sent to the registered mobile phone number with the GPS location of the vehicle. This paper presents the development of a real-time alcohol detection and engine locking system for vehicles that uses an alcohol sensor and a microcontroller to detect alcohol levels in the driver's breath. The system also includes a GPS module for tracking the location of the vehicle and sending alerts to the registered mobile number.

The Automatic speed control in vehicles for [3] ensuring the vehicle safety for avoiding accident. The paper says about the automatic Speed Control System (ASCS) is a critical safety system that aims to reduce the number of accidents caused by over-speeding of vehicles. In this literature survey, we will discuss various research studies on the design of ASCS for 4-wheelers. Proposed an intelligent ASCS using a fuzzy logic controller that uses inputs from a camera and ultrasonic sensors. The system adjusts the vehicle's speed by controlling the throttle and brake pedals based on the distance from other vehicles, traffic lights, and road signs. The results showed that the proposed system effectively controls the speed of the vehicle, and the fuzzy logic controller provides smooth control compared to traditional PID controllers.

Asad ali and Mohamad Eid [4] This method propose the automated system for accident detection, which causes major accidents on highways, freeways and local roads that leads to huge social and economic impacts. Minor accidents may be resolved by the passengers themselves and do not require escorting to hospitals whereas major accidents where airbags are deployed require immediate attention of authorities. Automatic Smart Accident Detection (ASAD) is an auto-detection unit system that immediately notifies an Emergency Contact through a text message when an instant change in acceleration, rotation and an impact force in an end of the vehicle is detected by the system, detailing the location and time of the accident. The system involves the use of fuzzy logic as a decision support built into the smartphone application that analyzes the incoming data from the sensors and makes a decision based on a set of rules. The simulated results show a 98.67% accuracy of the system with failures resulting from the "gray regions" of the variable values.

3. PROPOSED METHODOLOGY

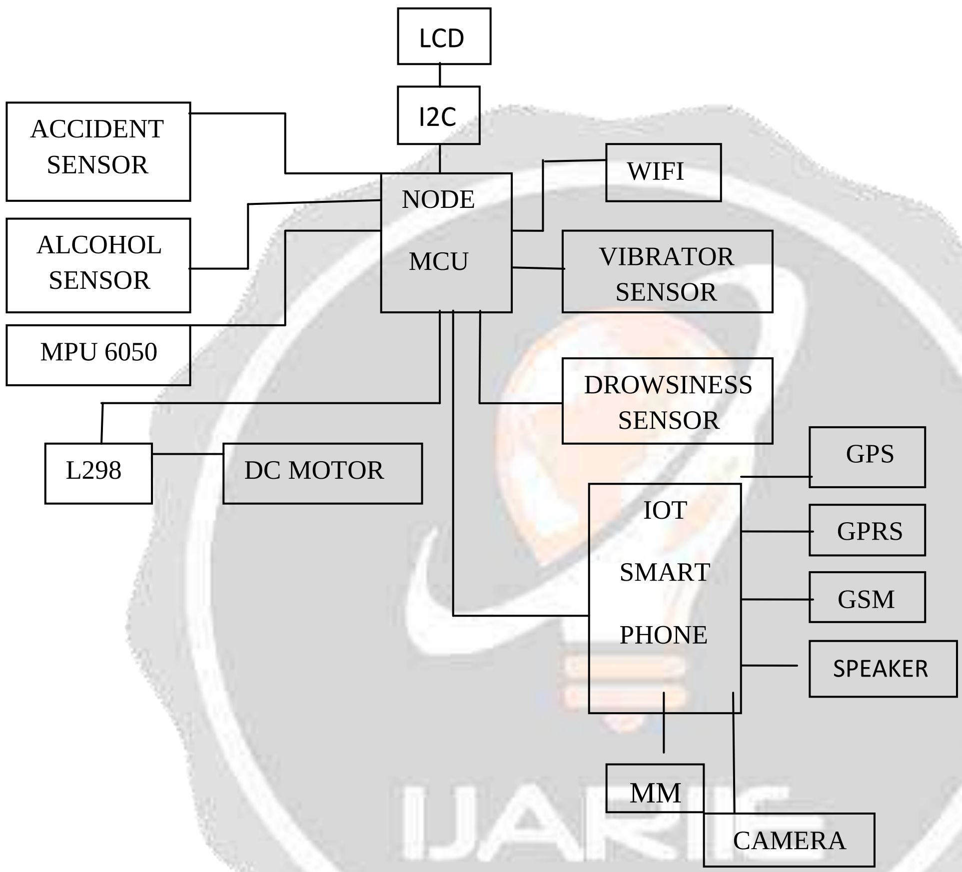


Fig 1 : Block diagram

To determine if the motorist is intoxicated or not, we use the MQ35 alcohol detection sensor. To determine if the person is intoxicated or not, the robot will employ MQ 35.The vehicle will automatically stop moving if the driver is intoxicated.To monitor the speed of the vehicle we use MPU6050 which is a three-axis accelerometer and three axis gyroscope Micro electro mechanical system (MEMS).It aids in the measurement of velocity, orientation,acceleration, displacement and other motion related features. When night time drivers feel sleepy, we have a remedy. Driver drowsiness detection systems can use cameras, eye tracking sensors and other hardware to monitor visual cues, where drowsiness can be detected through yawning frequency, eye-blinking frequency, eye-gaze movement, head movement and facial expressions. We employ a sleepiness detection sensor that can be attached to the windscreen or that looks like a pair of eyeglasses and continuously scans the eyelashes the L298 is a dual H-bride motor driver which allows speed and direction control of two DC motors at the same time. The module can drive DC motor that have voltages between 5and 35V,with a peak current upto 2A.

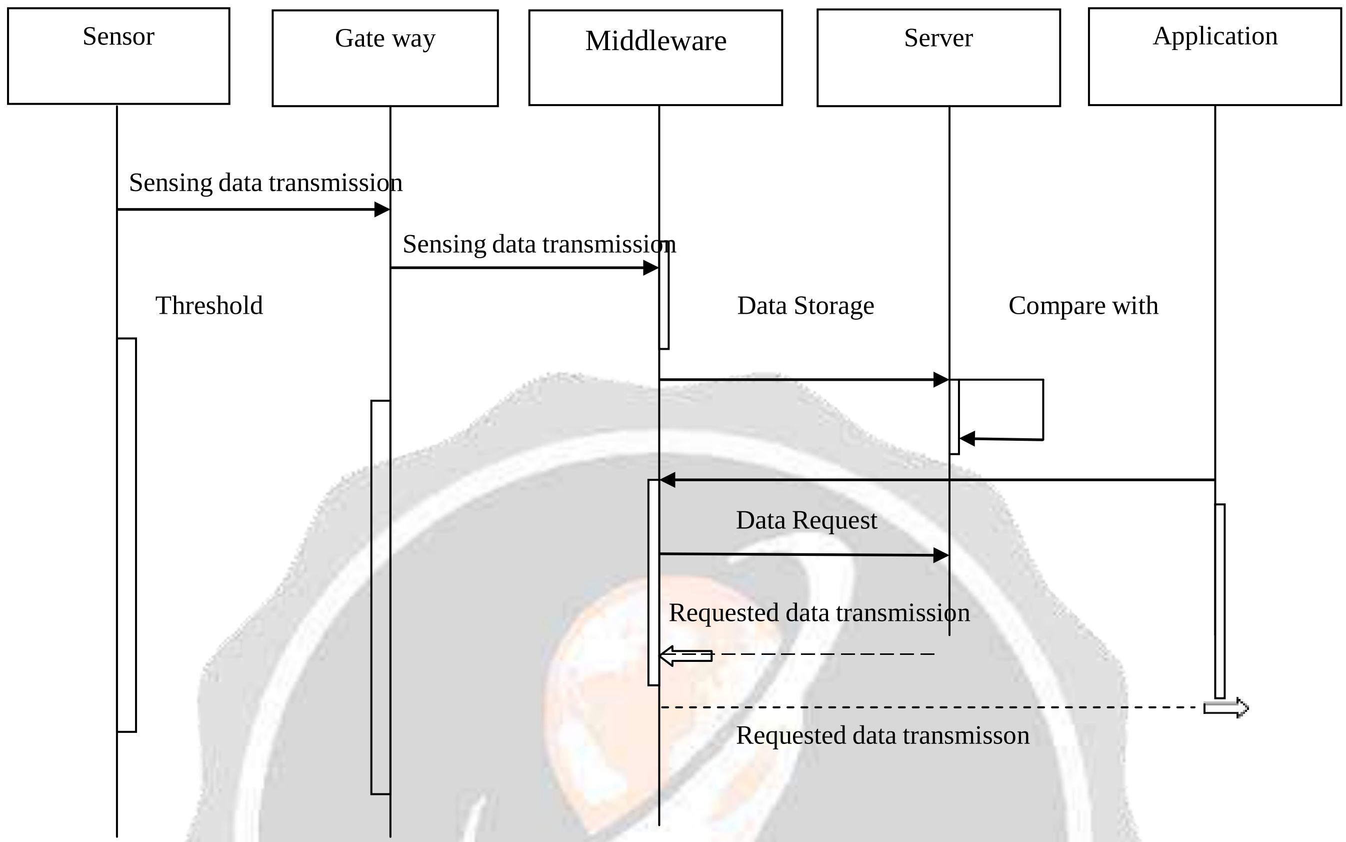


Fig 2: Timing diagram

Outlined a peer-assisted localization method based on Wi-Fi that would allow users to map the positions of their peers' devices after obtaining precise range estimates from them. The precision of the range error was roughly 2 m. The microprocessor prevents the dc motor to cutoff as engine locking when it receives a high alcohol signal from the alcohol sensor. It also shows an alcohol detection notice on the LCD screen.

For the system to start the engine, a push button is required. The blink sensor lights the eye region and eyelid with infrared light and monitors variations in the reflected light using a phototransistor and a separator circuit. Through the use of an IR sensor, this study measures and tracks eye blinking. The output from the IR receiver is low even if the closed eye suggests a high output from the IR receiver. Additionally, we use an accident sensor in our system to limit the speed of the car when the driver is driving carelessly.

Drivers drunk driving can bring a lot of harm. The paper studies a device that is placed in the car to detect whether the driver is drunk driving. The system consists of a core processor, an alcohol sensor, a display device, and an alarm device. The fitting curve of the alcohol sensor was determined through experiments, and the correspondence between the output voltage and the alcohol concentration was obtained.

The design can detect the state of the driver's alcohol concentration in real time in the car. When the system thinks that the driver's alcohol concentration exceeds a certain value, a voice alarm is issued, and the device can effectively prevent the driver from drunk driving. The alert message contains the geographical coordinates, time and angle in which the accident has occurred.

When an accident occurs, it is detected with help of a sensor which activates the device, the sensor gives its output to the microcontroller. The microcontroller sends the alert.

The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge.

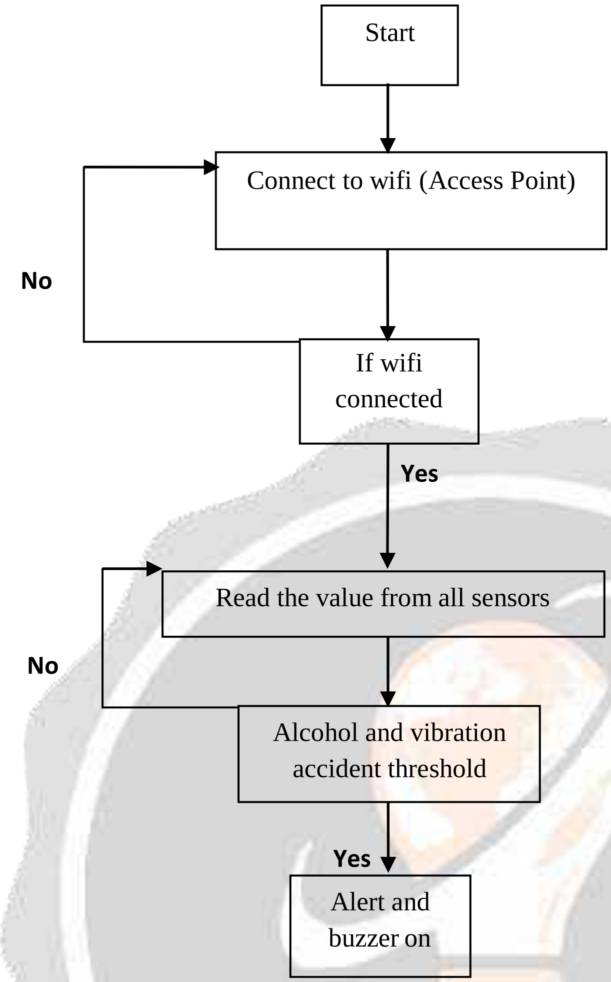


Fig 3: Flow chart diagram

The flow chart begins with the start of the system. Monitor driver behavior through sensors on the robot: The system uses various sensors installed on the automobile robot to monitor the driver's behavior, including alcohol sensor, accident sensor, drowsiness sensor, and vibration sensor. If alcohol sensor detects alcohol in driver's breath or blood, send alert to the driver through the robot's communication system: If the alcohol sensor detects alcohol in the driver's breath or blood, the system sends an alert to the driver through the robot's communication system. This alert warns the driver not to drive and to find an alternative transportation method. If accident sensor detects a potential collision, send alert to the driver through the robot's communication system: If the accident sensor detects a potential collision, the system sends an alert to the driver through the robot's communication system. This alert warns the driver of the impending danger and provides suggestions on how to avoid the collision. If drowsiness sensor detects signs of drowsiness or fatigue, send alert to the driver through the robot's communication system: If the drowsiness sensor detects signs of drowsiness or fatigue, the system sends an alert to the driver through the robot's communication system. This alert suggests that the driver take a break or rest before continuing to drive. If vibration sensor detects irregular or rough driving, send alert to the driver through the robot's communication system: If the vibration sensor detects irregular or rough driving, the system sends an alert to the driver through the robot's communication system. This alert suggests that the driver adjust their driving behavior to avoid accidents.Record all sensor data and driver responses for future analysis and reporting: The system records all sensor data and driver responses for future analysis and reporting. Provide regular reports to the driver and any relevant authorities on driving behavior and incidents: The system provides regular reports to the driver and any relevant authorities on driving behavior and incidents. Continuously update the robot's data and analysis algorithms to improve accuracy and effectiveness. The system continuously updates the robot's data and analysis algorithms to improve accuracy and effectiveness. The flow chart ends with the completion of the system.

4. RESULT AND DISCUSSION

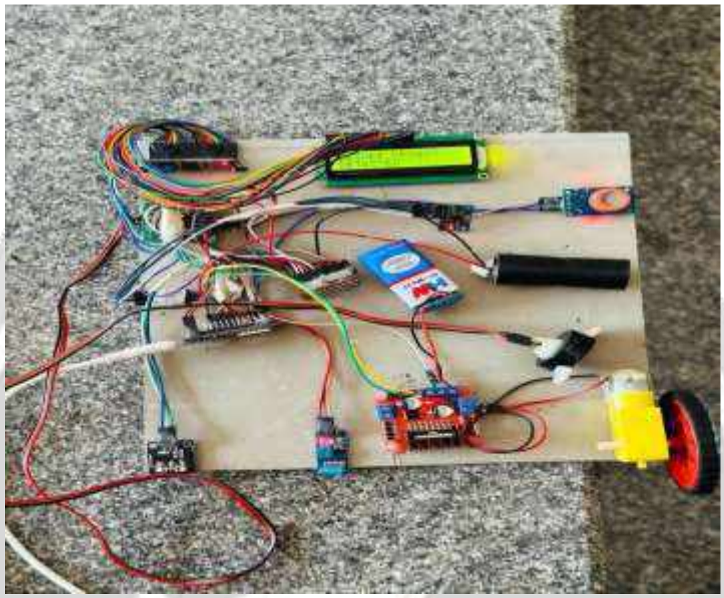


Fig 4: Accident prevention system

The alcohol sensor can detect the presence of alcohol in a driver's breath or blood and send an alert to the driver, potentially preventing drunk driving accidents. The accident sensor can detect a potential collision and send an alert to the driver, allowing them to take evasive action and avoid the collision. The drowsiness sensor can detect signs of drowsiness or fatigue and send an alert to the driver, encouraging them to take a break or rest before continuing to drive. The vibration sensor can detect irregular or rough driving and send an alert to the driver, encouraging them to adjust their driving behavior to avoid accidents. Overall, the combination of these sensors in an IoT automobile robot can improve driver safety and reduce the likelihood of accidents caused by human error or impairment. However, the effectiveness of such a system will depend on the quality and reliability of the sensors and the algorithms used to analyze the sensor data and provide alerts to the driver. Additional research and testing may be needed to fully evaluate the potential benefits and limitations of an IoT automobile robot for accident prevention. The results obtained by running the module are as follows: The owner's phone receives an audio warning message. The owner can retrieve the location of the driver by choosing the ―location‖ option. The owner can also get a list of driver's nearby police stations. With this, the photograph of the driver can be sent to owner's email address as specified in the clamped phone. The wheel/motor is stopped as soon as an accident occurs, the vibrator in the eye blink sensor frame vibrates and displays a message on the LCD. When the driver falls asleep, the vibrator vibrates and the LCD displays the message. Along with this, the vehicle speed is automatically reduced. When the accelerometer is tilted randomly, that acts as the steering, a message is displayed on the LCD the speed of the vehicle is reduced. With all of the above mentioned, the android applications send and receives details simultaneously.

5. CONCLUSION

In conclusion, an IoT automobile robot implementation for accident prevention using alcohol, accident, drowsiness, and vibration sensors has the potential to improve driver safety and prevent accidents caused by human error or impairment. The combination of these sensors can detect the presence of alcohol in a driver's breath or blood, potential collisions, signs of drowsiness or fatigue, and irregular or rough driving, and send alerts to the driver to encourage them to take corrective action. Alcohol detection to reduce drunk driving will there by satisfy the criteria of a safety system if the driver has consumed a pre defined amount of alcohol. Automatic vehicle speed control is designed to control the speed of the vehicle in specific zones to avoid the accidents in low speed areas. Vibration sensor monitoring is best for preventing action and maintenance. The vibration analysis tracks the real time performance of the machines. Driver drowsiness detection is a vehicle safety technology which helps prevent accidents caused by the driver getting drowsy. However, the effectiveness of such a system will depend on the quality and reliability of the sensors and the algorithms used to analyze the sensor data and provide alerts to the driver. Further research and testing are needed to fully evaluate the potential benefits and limitations of an IoT automobile robot for accident prevention.

6. REFERENCES

[1] Fatigue, Safety Net 2009, European Commission Road Safety, http://ec.europa.eu/transport/road_safety/specialist/knowledge/pdf/fatigue.pdf, (2009).
[2] N. L. Haworth, T. J. Triggs and E. M. Grey, "Driver Fatigue: Concepts, Measurement and Crash
[3] Countermeasures", Human Factors Group, Department of Psychology, Monash University, (1988) June.
[4] C. T. Lin, L. W. Ko, I. F. Chung, T. Y. Huang, Y. C. Chen, T. P. Jung and S. F. Liang, "Adaptive EEG-Based Alertness Estimation System by Using ICA-Based Fuzzy Neural Networks", IEEE Transactions on Circuits
[5] and Systems, vol. 53, no. 11, (2006).
[6] G. Yang, Y. Lin and P. Bhattacharya, "A Driver Fatigue Recognition Model Using Fusion of Multiple
[7] Features", Proceedings of IEEE International Conference on Systems, Man and Cybernetics (SMC), (2005)October, Hawaii, USA.
[8] Q. Ji and X. Yang, "Real-Time Eye, Gaze, and Face Pose Tracking for Monitoring Driver Vigilance",
[9] RealTime Imaging, vol. 8, (2002).
[10] T. Brandt, R. Stemmer, B. Mertsching and A. Rakotonirainy, "Affordable Visual Driver Monitoring Systemfor Fatigue and Monotony", Proceedings of IEEE International Conference on Systems, Man and
[11] Cybernetics, (2004) October, Hague, Netherlands.
[12] P. S. Rau, "Drowsy Driver Detection and Warning System for Commercial Vehicle Drivers: Field
[13] Operational Test Design, Data Analyses and Progress", National Highway Traffic Safety Administration ofUSA (NHTSA), (2005).
[14] T. Von Jan, T. Karnahl, K. Seifert, J. Hilgenstock and R. Zobel, "Don't Sleep and Drive–VW's Fatigue
[15] Detection Technology", Cen. for Automotive Safety Res., Adelaide University, Australia, (2005).
[16] S. Boverie, D. Daurenjou, D. Esteve, H. Poulard and J. Thomas, "Driver Vigilance Monitoring - New
[17] Developments", Proceedings of 15th IFAC World Congress on Automatic Control, (2002), Barcelona, Spain.
[18] M. Bayly, B. Fildes, M. Regan and K. Young, "Review of Crash Effectiveness of Intelligent Transport
[19] Systems", TRaffic Accident Causation in Europe (TRACE), (2007).
[20] H Cai and Y. Lin, "An Experiment to Non-Intrusively Collect Physiological Parameters Towards Driver State
[21] Detection", Proceedings of SAE 2007 World Congress, (2007) April, Detroit, Michigan, USA.

FAKE ACCOUNT DETECTION ON TWITTER USING MACHINE LEARNING

Shridev Udupa E S[1], Vinushreee K[2], Someshwar S[3], Shreyanka J T[4]

[1]*Student, Computer Science and Engineering, Rajarajeswari College of Engineering Karnataka, India*
[2]*Student, Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*
[3]*Student, Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*
[4]*Student, Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

Social media sites have become commonplace in today's world. Social networking sites are now used for a wide range of activities, including news, promotion, advertising, and communication. Some malevolent social media accounts spread misinformation and advance political agendas, among other things. One of the fundamental issues with social networks is this. Therefore, it is important to find malicious accounts. In this study, technologies based on machine learning were employed to find bogus accounts that might lead individuals astray. In order to achieve this, the created dataset underwent pre-processing, and bogus accounts were identified using machine learning methods. False accounts are found using the SVM (SUPPORT VECTOR MACHINE) method. These approaches' classification abilities are contrasted with those of the decision tree and logistic regression algorithm and the support vector machine.

Keyword: - *False, Machine learning, and Social media.*

---

1. Introduction

The phenomena of social networking has grown significantly during the past 20 years. During this upsurge, various forms of social networking have produced several online activities that have immediately piqued users' attention in significant numbers. On the other hand, they experience problems due to the growth in the number of fictitious accounts that have been made. False accounts are those that do not belong to actual people. Fake accounts may present spam, false web reviews, and fake news. The Twitter Rules are broken by fake accounts. They engage in illegal behaviour. Spammers are one of the biggest issues on social media since they may utilize their accounts to target various people. One of these objectives is spreading rumors that could have an impact on a certain business or possibly the entire society.

1.1 Problem Statement

Due to the lack of proper authenticated accounts on many online social network (OSN) platforms, it is simple to construct a set of false profiles and send bogus requests to several individuals inside the social graph. Users' propensity to accept friend invitations without confirming the legitimacy of the seeking profiles is being taken advantage of by the intrusions. According to Twitter, there are 170 million fake profiles out of 1.3 billion total profiles. We are creating a model that can run on the back end of the online social network (OSN) and detect the false and clone accounts that will be formed in the future in order to stop the formation of all these phony accounts.

1.2 Existing System

These words or a certain number of words are considered spam if they appear in a message. These guidelines have also been successfully applied to social media platforms. Although the main disadvantage is that creating new words is simple and ongoing, and shortened words are being used more frequently on platforms, such as lol, which stands for laugh out loud. various abbreviated words are being found on various platforms using pattern matching algorithms. When a tweet on a topic that is trending on social media is posted from any account, or when a brand-new account that is less than a day old starts promoting a topic that is trending, it is assumed to be false.

2. System Architecture

Data collection is where it all starts. It is gathered through the tweepy Twitter API. After the dataset has been preprocessed, new features are added using dataset features already present, and features are extracted using highly correlated heap. Divide the dataset into test and train segments. Then, using the supervised machine learning algorithms SVM, KNN, and Random forest algorithm, train the model using features that were extracted from the dataset. With a test dataset, test the model. The final model receives input from the user, and a result is returned. The classifier decides if the profile is legitimate or spam. Using test values, the user can analyse the trained model.

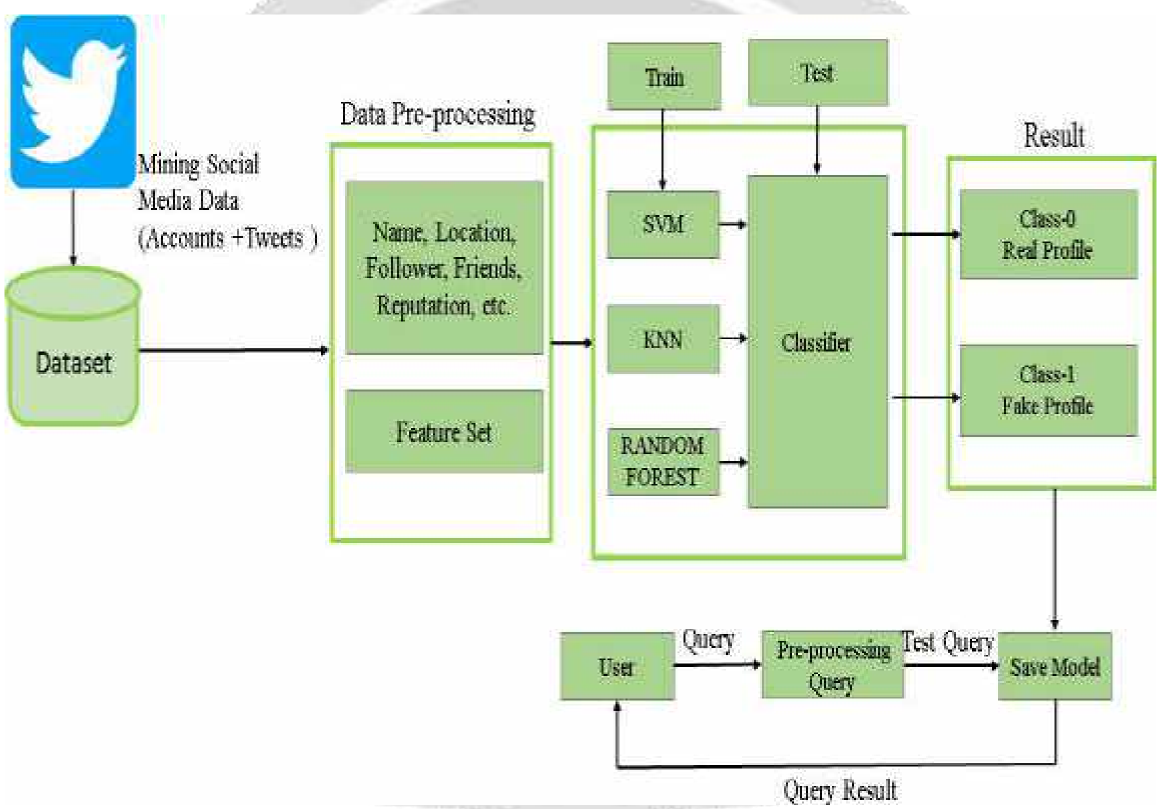


Fig -1: **Architecture Diagram**

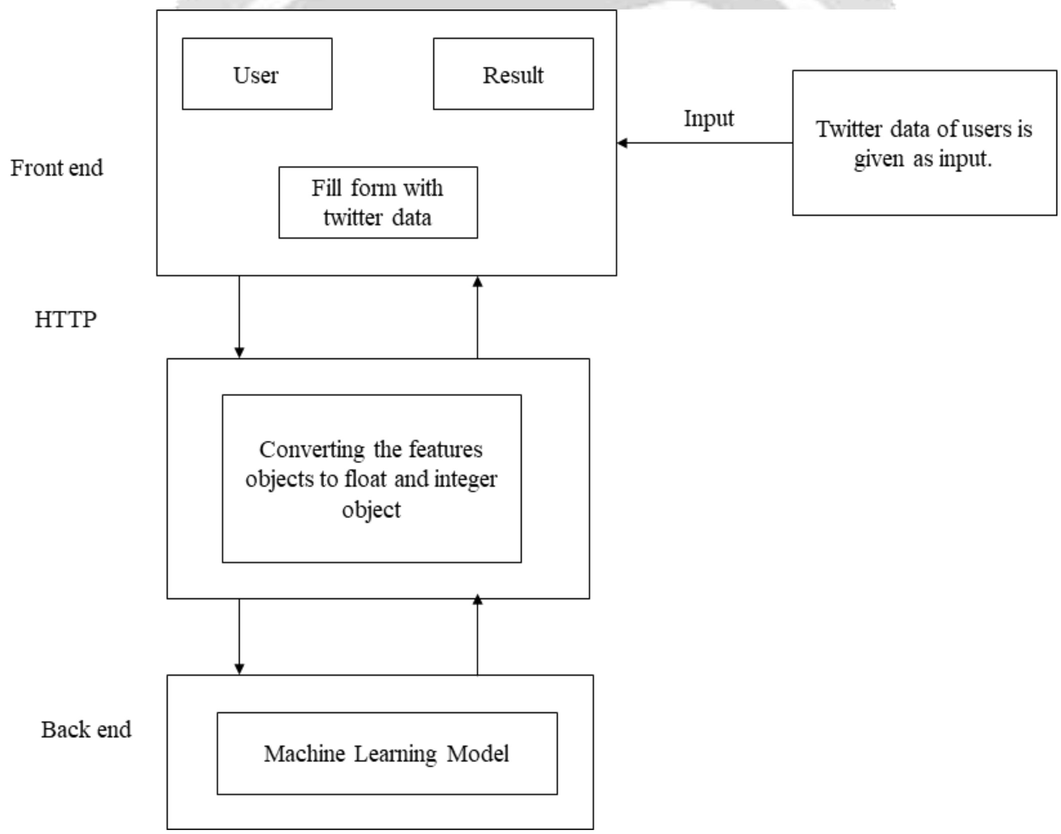
2.1 EVALUATION METRICS

The ratio of accurately predicted positive and negative events to all forecasts is known as accuracy. Accuracy alone, however, could not be sufficient because the dataset might not be balanced. Precision is the ratio of accurately predicted favourable outcomes (favourable events that were forecasted incorrectly included). A high precision suggests that the model is correctly recognizing fake accounts when it makes a valid forecast. Recall: The proportion of accurately foreseen positive outcomes to all positive situations is known as recall. A high recall means that the model has been successful in identifying the majority of the fraudulent accounts in the dataset. The F1 score, which is the harmonic mean of precision and specificity, provides a more balanced evaluation statistic than accuracy alone.

3. Implementation

The initial step is to gather information from Twitter. Twitter's API can be used to gather tweets, user profiles, and other pertinent data for the machine learning model's testing and training. Data needs to be cleansed and preprocessed after it is obtained. This entails eliminating duplicates, eliminating unimportant data, and converting the data into a format appropriate for machine learning algorithms. Extraction of features from the data is the following stage. The number of followers, the number of tweets, the substance of the tweets, the age of the account, the location, and other pertinent features may all be used to identify fraudulent accounts. After feature extraction, you must choose a machine learning algorithm that is appropriate for your project. Neural networks, decision trees, random forests, and logistic regression are a few of the widely used categorization techniques. After deciding on an appropriate algorithm, you must train the model using the features that were extracted. In this case, the model is trained using the training set after partitioning the data into training and testing sets. You must assess the model's performance on the testing set after training. Metrics like precision, recall, and F1 score can be used to assess the model's performance. The algorithm can be used to spot bogus Twitter accounts after it has been trained and evaluated. To automate the detection procedure, you can build a web application or include the model into an already-existing application.

3.1 Interface Design



4. CONCLUSIONS

Social networking security's main issue is that accounts are not sufficiently validated before information is shared. Here, status updates, discussions, and all other account information are offered, along with a recommended architecture that might be used to confirm an account's legitimacy before allowing it to continue using the site.

Since binary classification using the SVM is more effective than using any other classifier, in this project a framework that uses the Twitter API to collect data from Twitter is used. From each tweet, features are extracted that must be fed to the classifiers.

5. REFERENCES

[1] "Detecting Fake Followers in Twitter: A Machine Learning Approach," International Journal of Machine Learning and Computing, Vol. 7, No. 6, December 2017, by Ashraf Khalil, Hassan Hajjdiab, and Nabeel Al-Qirim

[2] "Detecting Fake Accounts on Social Media," conference paper by Sarah Khaled, Hoda M. O. Mokhtar, and Neamat El-Tazi, published in December 2018.
"Fake Accounts Detection on Twitter Using Blacklist," Myo Myo Swe and Nyein Nyein Myo, IEEE, June 2018

[4] Rohit Raturi, "Machine Learning Implementation for Identifying Fake Accounts in Social Network.," International Journal of Pure and Applied Mathematics, Volume 118, No. 20, 2018, 4785-4797.

[5]."Automatically Identifying Fake News in Popular Twitter Threads," by Cody Buntain and Jennifer Golbeck, arXiv:1705.01613v2 [cs.SI] 30 May 2018

[6] "Fake Account Detection Using Machine Learning and Data Science," International Journal of Innovative Technology and Exploring Engineering, ISSN: 2278-3075, Volume-9 Issue-1, November 2019. S. P. Maniraj, Harie Krishnan G, Surya T, and Pranav R.

[7] "Twitter Spam Detection by Using Machine Learning Frameworks" International Journal of Innovative Research in Science, Engineering and Technology Vol. 8, Issue 5, May 2019 by Miss. Richa Ramesh Sharma, Prof. Yogesh S. Patil, and Prof. Dinesh D. Patil

[8] "Credibility Detection in Twitter Using Word N-gram Analysis and Supervised Machine Learning Techniques," in INASS October 26, 2019, by Noha Y. Hassan, Wael H. Gomaa, Ghada A. Khoriba, and Mohammed H. Haggag. 2019-12-03; updated

[9] "Spammer Detection and Fake User Identification on Social Networks," by Faiza Masood, GhanaAmmad, and Ahmad Almogren, Digital Object Identifier 10.1109/ACCESS.2019.2918196

SELF-WOUND ANALYSIS USING MACHINE LEARNING AND IMAGE PROCESSING

R.Rajkumar[1], Keerthan Gowda H K[2], Amogha L A[3], Dhanush K R[4]

[1] *Asst.prof, Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[2] *Student, Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[3] *Student, Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[4] *Student, Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

Strong surgical wound care is crucial, and this cannot be understated. Surgical wounds that are not properly cared for might lead to serious consequences. It therefore rises. The need to expand a user-friendly self-care tool that may help both patients and medical professionals to guarantee the Nation is free of surgical wounds without the need of specialized medical equipment. A surgical wound assessment device for self-care is suggested on this publication. The suggested device is made to enable patients to take images of their own surgical wounds using a mobile device and then contribute these pictures for analysis. The suggested technique, which combines image-processing and gadget-learning algorithms, has four tiers. First, images are divided into super pixels, with each super pixel containing the pixels with a similar distribution of shades. Second, the region of skin associated to these super pixels that correlate to the pores and skin is identified. From this comes Super pixels. Based on the assertion of the textural difference between skin and wounds, surgical wounds may be removed from this area in around 1/3 of cases. In the end, the country and surgical wound symptoms and signs may be evaluated. Effects from full-scale experiments are run. More than 90% of the national evaluation findings are accurate using the suggested approach, and more than 91% of the symptom evaluation results agree with the actual study.

Case studies are also provided to demonstrate the advantages and disadvantages of this equipment. These outcomes show how this gadget ought to function.

Keywords— Artificial intelligence (AI), classification, health care service system

1. INTRODUCTION

Powerful surgical wound care is crucial and cannot be undervalued. Poorly managed surgical wounds can result in symptoms of infection, the healing of chronic wounds, or even the possibility of existence. To ensure First class surgical wound care, patients are required to live in a health institution under supervision, which is a significant burden. For clinical professionals to properly use constrained clinical resources, One of the most promising ways is patient self-care. Medical personnel can periodically check the state of surgical wounds, and patients are educated by scientific specialists to increase engagement in the care process. This approach not only easily relieves the workload of scientists, but it also guarantees outstanding surgical wound care efficacy. An easy linguistic contact between patients and medical professionals is essential to achieving successful self-care. This way, patients may readily inform medical personnel about the status of their surgical wounds and request their assistance as needed. Patients would thus need a convenient tool that could help them assess the severity of their surgical wounds since they lack the expertise of skilled medical professionals. a result of the quick advancement of mobile technology.

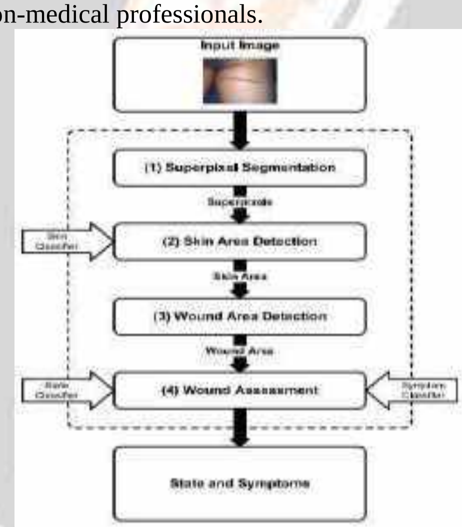
Smartphones, tablets, and other cellular devices might be a fantastic option for creating these self-care tools. In recent years, those intelligent devices equipped with cameras have become essential gadgets for all individuals. As a result, these gadgets allow patients to take pictures of their wounds so that they may be utilized to assess the surgical wound. In order to:

1) automatically identify the location of surgical wounds from the pictures;
2) determine whether the country of surgical wounds is typical or not; and
3) identify the symptoms if there are any abnormalities on wounds, this paper aims to build a wound evaluation device that uses snapshots from nonprofessional cameras (for example, on mobile devices) as input.

The pictures' quality could not be compared: In the self-care scenario, photographs of surgical wounds are frequently shot by amateur photographers (such as patients themselves and members of their own families) using amateur cameras (such as those found in smartphones and tablets). Contrary to fashionable cameras used for science, pictures made with such equipment frequently have unique qualities (such as colour tone, shade temperature, and so on). It's crucial to use cutting-edge techniques to handle these pixels.

Surgical wounds can also differ; they are made when a doctor makes an incision or cut with a scalpel and are often treated with stitches. Several different types of medical conditions call for surgery. The type of procedure used and the location on the body determine the size and form of a surgical wound. Finding surgical wounds in photographs becomes challenging as a result of this.

(c) Early diagnosis of signs and symptoms is crucial: To stop the surgical wound from getting worse, it's essential to identify any abnormalities in the earliest stages. On the other hand, it would be too late because the peculiarity of the situation could be obvious to even non-medical professionals.



2 Related Works

This section discusses a few related paintings to the proposed Gadget. because the proposed gadget has a tendency to assess signs and symptoms on surgical wounds by using images taken with the aid of nonprofessional cameras, both picture processing-related works and medical related works are then mentioned.

2.1 Superpixel

Superpixel method a connected organization of pixels which might be similar to every different in colour fee or different features, it's far popularized by way of ren and malik [4] the term within the 2003. As soon as a picture may be segmented into many superpixels, the computations will be extra efficient than previous because handiest few hundred groups of pixels want to be processed. Therefore, superpixel is commonly getting used to object segmentation.

2.2 Skin Detection

Skin reputation might be used for human–computer Interaction and content reading. Zou and Kamata proposed an algorithm for face detection in color images with complicated backgrounds. It used pores and skin color detection to enhance the accuracy of detections. The usage of skin color to understand pores and skin could be the very beneficial method. Kim et al. [10] used pixel-clever color groupings.

2.3 Image Feature Extraction

The "aspect" of a photo is the most understandable element. Canny demonstrated the renowned reliable edge detection method with an astounding responsiveness to noisy images. It has been widely employed in the processing of medical images. Despite being a fantastic feature, the edge cannot effectively provide the location of the surgical stitching factor.In our test, it was determined that the feature factors had the ability to detect the wound's place higher. In order to find the proximity, feature factor extraction will update edge detection.

2.4. Self-Care Technology

The usage of cell technology enhances people's capacity to reveal their physiological state. There is a chance to develop new technology to help patients do self-care at home. A model-driven approach was put up by Mezghani et al. to create a monitoring system to control patients' health development based mostly on wearable technology that is believed to be used for "blood sugar. “developed a system based only on mobile sensing that can recognize manic and depressed symptoms as well as detect state changes in bipolar patients. Algorithms were created by Succor et al. to analyses blood pressure and pulse oximetry alarms that were received from a home environment satisfactorily.

2.5 Skin Diseases Detection

Recent research efforts have focused on employing machine learning techniques, notably deep learning approaches, to identify skin diseases. Skin lesions were categorized by Estevan et al. using deep convolutional neural networks. Masood and Ali Al-Jumpily proposed a framework for comparing skin cancer diagnostic models and assessing the outcomes solely in light of these models. The color pixel type approach of skin segmentation was studied by Phung et al. utilizing color representation, color quantization, and a class set of rules. Alasdair et al. provided a number of image segmentation techniques for finding acne lesions and device mastering techniques for identifying various acne lesions from one another. Contrary to popular belief, the deep neural.

2.6 WOUND DETECTION

Modern methods used to solve these issues include: assessing wounds by estimating wound areas using digital image planimetry software. In order to evaluate variations in wound temperature, Wendelken et al. employed infrared pictures. A transportable 3-dimensional (3-d) device for measuring wounds was created by Dini et al.

In order to determine the depth, volume, and optimal floor placement of wounds, Lubeley et al. performed 3-d floor scans of the wounds. Hani et al. evaluated the depths of wounds using imaging techniques with the intensity of subject statistics.

3. METHODOLOGY

3.1 System Architecture

The device shown in this work was proposed to address the problem with symptom evaluation. The device consists of two parts. The category element captures a snapshot of a person with surgical wounds when they arrive and reports any surgical wound symptoms that may be present. This component safeguards the following four stages: super pixel segmentation, skin area detection, wound area detection, and wound assessment. On this section, three classifiers are applied, two in the phase of skin vicinity detection and one in the segment of wound evaluation. Those classifiers ought to educate themselves on unique educational information in the education component appropriately.

3.2 Super pixel Segmentation

This stage involves dividing a photo into a lot of super pixels to serve as the basic building blocks for subsequent stages. A super pixel is a group of pixels that are all shown in the same hue and brightness and may be thought of as an important perceptual atomic point. In other words, by grouping pixels that are part of the same object, superpixel algorithms can segment the image. Super pixels are beneficial at later levels when additional accurate classifiers are being built, thanks to improved image segmentation. Remember that the suggested equipment is intended for use in surgical wound self-care. Usually, the images are taken by unique individuals using unique equipment. As a result, picture normalization is desired to standardize photo dimensions and the range of pixel intensity values. In terms of size, all pictures.

3.3 Skin Area Detection

This section aims to identify the area of the skin that has surgical wounds. Given that surgical wounds are on the skin's surface, a portion of the skin should be removed for additional wound assessment. Given an image's superpixels, two tasks need to be completed: In order to develop the skin vicinity, which refers to the greatest variety of neighbouring pores and skin superpixels, one must first extract super pixels that are pores and skin (abbreviated as skin superpixels). The main task will be modeled as a type problem, necessitating the creation of a classifier. The second obstacle might be overcome by finding a most elliptical region.

4. CONCLUSIONS

In order to mechanically assess wounds following operations, this study offers a surgical evaluation machine for selfcare. The suggested method consists of four steps.1) Super pixel segmentation: This technique organizes pixels with similar color distributions using super pixel extraction.2) Location identification of pores and skin: the pores and skinclassifier is designed to find skin superpixels and locate surgical incisions using the ellipse-fitting method. 3) wound site detection: the nook detection approach is used to precisely capture superpixels, which are surgical wounds, based on the observation that the texture of surgical wounds is different from that of normal skin; 4) Wound assessment: Classifiers are created to recognize not only the state but also the symptoms of superpixels with wounds.

Our method may achieve 90% (accuracy) in nation evaluation and 91% (accuracy) in symptom assessment compared to the analysis performed by medical specialists. Case studies demonstrate that the suggested approach may identify and rate a few symptoms on surgical wounds. These results show that Pleasant's evaluation, which was conducted using the suggested approach, was extremely near to that of a scientific expert. This suggests that this tool can aid medical personnel in diagnosing patients more quickly and effectively while also raising their awareness of those who require more care.

.5. REFERENCES

[1].G. M. Salomé, l. Blanes, and l. M. Ferreira, "the effect of skin grafting on the fine of lifestyles and shallowness of patients with VenousLeg ulcers," global J. Surg., vol. 38, no. 1, pp. 233–240, jan. 2014.

[2]. N. R. Veronovici, G. C. Lasiuk, G. R. Rempel, and C. M. Norris, "discharge schooling to promote self-control following cardiovascular surgical treatment: an integrative overview," eur. J. Cardiovasc. Nurs., vol. 13, No. 1, pp. 22– 31, 2014.

[3]. Pores and skin segmentation statistics set. Accessed: apr. 2017. [Online]. Available: https://archive.Ics.Uci.Edu/ml/datasets/pores and skin+segmentation

REAL TIME DRIVER DROWSINESS DETECTION

Neha Singhal[1], Sinchana M N[2], Vijayalaxmi Joshi [3], Naveen kumar D K[4], Balaji M [5]

[1] *Associate Professor, Information Science and Engineering, RRCE, KARNATAKA, INDIA*
[2] *Assistant Professor, Information Science and Engineering, RRCE, KARNATAKA, INDIA*
[3] *Assistant Professor, Information Science and Engineering, RRCE, KARNATAKA, INDIA*
4 Student, Information Science and Engineering, RRCE, KARNATAKA, INDIA
5 Student, Information Science and Engineering, RRCE, KARNATAKA, INDIA

ABSTRACT

Due to the rise in accidents brought on by drowsy driving, real-time driver drowsiness detection is a crucial area of study. The goal of this study is to use computer vision and machine learning techniques to create an effective and efficient system for real-time driver drowsiness detection. To detect drowsiness, the proposed system uses a camera to capture the driver's face and analyze different facial features like eye closure duration, blink rate, and head movements. To increase the accuracy of drowsiness detection, the system also considers other elements like the time of day, driving habits, and road conditions. The study's findings demonstrate that the suggested system can accurately identify drowsy driving in real-time, which may help to prevent accidents.

Keyword : ***AI , IoT, Supervised Learning***

1.INTRODUCTION

A system that uses computer vision and machine learning algorithms to identify driver drowsiness in real time is known as real-time driver drowsiness detection. Typically, the system uses facial cues like eye and head movements to assess whether the driver is awake or asleep. The system typically uses a mounted camera inside the vehicle to take pictures of the driver's face. The images are then subjected to machine learning algorithms that look for signs of sleepiness like drooping heads, heavy eyelids, and slow eye movements. The machine learning algorithms improve their drowsiness detection precision by learning from prior data. The high rate of accidents brought on by drowsy driving has led to an increase in the popularity of real-time driver drowsiness detection systems. identifying when a Road accidents are widely attributed to driver inattention. To avoid accidents, it is imperative to create a system that can identify driver drowsiness in real-time. For the development of such systems, machine learning, an area of artificial intelligence, has been extensively used. Sensors like cameras, accelerometers, and microphones are used in real- time driver drowsiness detection using machine learning to gather information on the driver's behavior and physiological parameters. The machine learning algorithm then processes the collected data to look for drowsiness indicators like yawning, drooping eyelids, and changes in head position. A dataset of labeled samples, including information gathered from drivers who e xhibit drowsiness and those who do not, can be used to train the machine learning algorithm. The A cutting-edge use of artificial intelligence that can assist in preventing accidents caused by drivers who are sleepy or fatigued behind the wheel is real-time driver drowsiness detection.The procedure entails using a camera and computer vision techniques to identify drowsiness indicators, such as closed eyes, head nodding, or yawning, and then classifying these indicators using machine learning algorithms. A dataset of labeled samples, including information gathered from drivers who e xhibit drowsiness and those who do not, can be used to train the machine learning algorithm. The algorithm gains the ability to spot drowsiness-related patterns in the data.

2. LITERATURE REVIEW

The number of fatalities from accidents[1] can be reduced by using cutting-edge technological applications that stop traffic accidents. This study presents an improved algorithm for more precisely and minimally falsely detecting driver drowsiness. Early drowsiness detection in drivers would help them maintain their alertness while operating a vehicle. To identify drowsiness, we have created a system based on image processing. A camera used to monitor the driver sends real-time data to be processed. [2] One of the main factors contributing to traffic accidents is driver inattention, which can result in serious physical injuries, fatalities, property damage, and monetary losses. Therefore, it is imperative to implement a reliable system for detecting driver drowsiness so that the driver can be warned before anything untoward occurs. [3]. This essay exa mines design We make an effort to quickly summarize the methods that have previously been used by researchers to detect drowsiness based on vision, along with their drawbacks. Many of the systems developed to detect driver drowsiness appear to rely on eyelid closure because it is the most accurate indicator of drowsiness . However, the following visual traits can also be used to detect drowsy driving: longer blink intervals, yawning, drooping posture, slow eyelid movement, frequent nodding, fixed gaze.

3. METHODOLOGY

In order to detect and track the driver's face, extract pertinent features, and use machine learning algorithms to determine whether or not the driver is drowsy, real- time driver drowsiness detection methodology combines computer vision and machine learning techniques. The objective is to offer a dependable and efficient system that can stop accidents brought on by fatigued driving.

VISUAL DETECTION

The detection of eyes with poor contrast is generally very difficult. After a face has been successfully detected, the eye must be found for additional processing. The decision parameter for determining the driver's state is in our method eye. Even though it doesn't seem complicated, eye detection is actually a very hectic process. In this instance, feature detection is used to carry out the specified region's eye detection. For this process, the Eigen approach is typically used. It is a lengthy process. When eye detection is performed, the outcome is compared to the reference or threshold value to determine the driver's condition.

WORKING STEPS

- Camera ON
- Monitor drowsiness
- If driver Drowsy
- Step1: Alarm on (Buzzer)
- Step2: Send Email

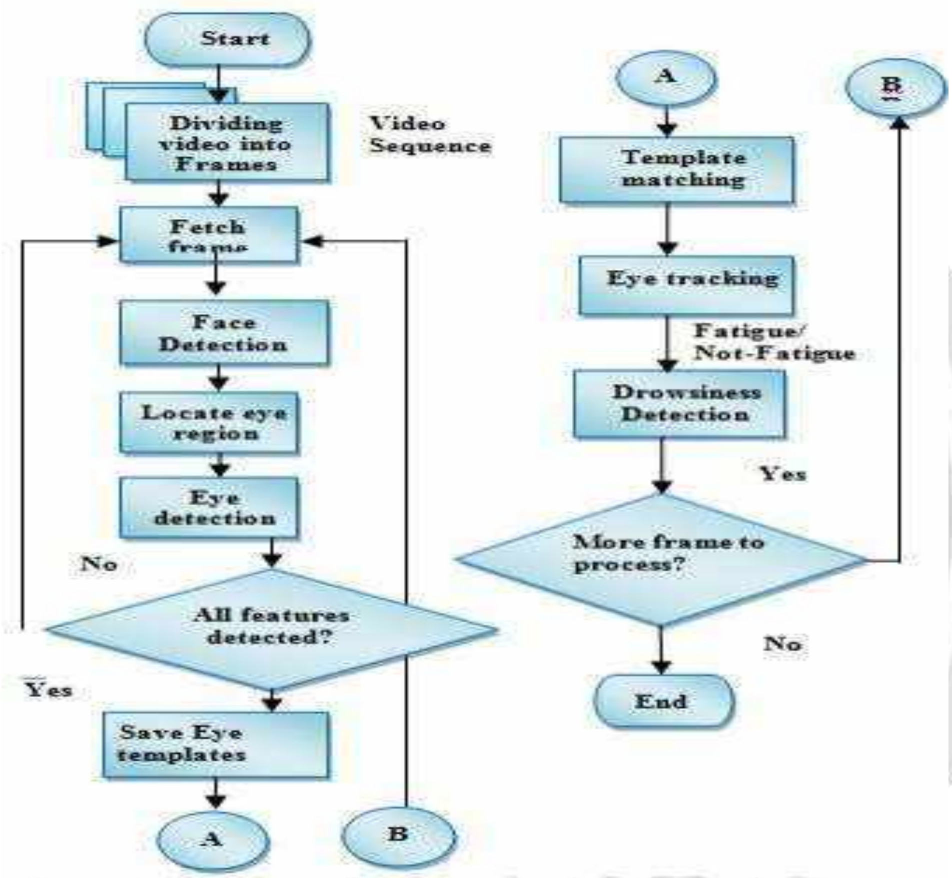


Image Capture

We can take a picture of the driver using a web camera that has been installed inside the car. Even though the camera records a video clip, the developed algorithm must be applied to every edge of the video stream. The application of the suggested mechanism to a single frame is the only goal of this paper.

Dividing Frames:

We are dealing with a real-time scenario where video is being recorded and processed. However, an algorithm can only be processed or applied to an image. Consequently, the recorded video needs to be split up into frames for analysis.

Face detection:

The suggested systemwill begin by taking individual video frames. Live video processing is supported in great detail by OpenCV. For each frame, the systemwill find the face in the image.

4. RESULTS

The results are described below given figures.

Figure :1

Figure 2

Figure :3

5. CONCLUSIONS

The following procedures were used to implement drowsiness detection on a PC: Successful video capture during operation, as well as drowsiness and yawning detection. Each frame of the video that was captured was broken down and exa mined. Successful face detection is followed by successful eye detection. The loop of taking pictures and analyzing the state of the driver is repeated as long as eye closure for successive frames is detected; otherwise, it is categorized as drowsy condition. In this implementation, a message is displayed if the eye is not detected or is not surrounded by a circle while the user is sleepy.

6. FUTURE SCOPE

Our model is intended to identify drowsy eye states and to provide an alert signal or warning, which could be audio or delivered in another way. However, if the driver is slow to react to the warning signal, an accident may happen. This is because the driver's response to being warned may not be sufficient to prevent the accident. Therefore, to prevent this, a motor-driven system can be designed, installed, and timed to the warning signal so that the vehicle will automatically slow down after receiving the signal. Additionally, by using our own smartphone instead of the slower Raspberry Pi, we can avoid using it for video processing.

7. REFFERENCES

[1]. Safie S. I Rus mawarni Ramli, M. Amirul Azri, M. Aliff, Zulhaimi Mohammad, "Raspberry Pi Based Driver Drowsiness Detection System Using Convolutional Neural Network (CNN)", *2022 IEEE 18th International Colloquiumon Signal Processing & Applications (CSPA)*, pp.30- 34, 2022.

[2]. Wafa Abdul Ga fur Geevarghese Titus, Darsana P, "Real-Time Drowsiness DetectionUsing Fusion of Facial Features", 2022 International Conference on Computing, Communication, Security and Intelligent Systems (IC3SIS), pp.1-5, 2022

[3]. Siti Nuradin Syahira Sheikh Anwar Azrina Abd Aziz, Syed Hasan Adil, "Development of Real-Time Eye Tracking Algorithm", 2021 4thInternational Conference on Computing & Information Sciences (ICCIS), pp.1-6, 2021.

[4]. K. P. Kumar, S. R. Thamanam and M. N. Kumar, "Identification of Driver Drowsiness Using Image Processing", European Journal of Molecular & Clinical Medicine, vol. 7, no. 4, pp. 1264-1268, 2020.

[5]. P. Bharadwaj, A. CN, T. S. Patel and K. Avoidance System in Vehicles", 2019

[6]. A. Sayeed and S. A. Sad, "Driver drowsiness detection using face monitoring and pressure measurement", Research & Reviews: A Journal of Embedded System & Applications, vol. 5, no. 3, pp. 118, 2018.

[7]. N. L Fitriyani C .K. Yang, and M Syafrudin. "Real-time eye state detection systemusing harr cascade classifier and circular Hough transform", IEEE 5th Glob. Conf. Consum Electron. GCCE, pp.5–7, 2016

[8]. W. Zhao, R. Chellappa, P.J. Phillips, and A. Rosenfeld, "Face Recognition: A Literature Survey," ACM ComputingSurveys, vol. 35, pp. 399-459, 2003.M. H. Yang, D. J. Kriegman, and N. Ahuja,"Detecting faces in images

DISTRACTION AND DROWSINESS DETECTION OF VEHICLE DRIVER USINGOPEN CV

Prof. Udhyami M B[1], Abrin Nisha J[2], Anusha S G[3], Yashas S M[4]

[1] Assistant Professor, Electrical and Electronics Engineering, Rajarajeswari college of Engineering,Karnataka, India
[2] UG Student, Electrical and Electronics Engineering, Rajarajeswari college of Engineering, Karnataka,India
[3] UG Student, Electrical and Electronics Engineering, Rajarajeswari college of Engineering, Karnataka, India
[4] UG Student, Electrical and Electronics Engineering, Rajarajeswari college of Engineering, Karnataka, India

ABSTRACT

Drivers are meant to concentrate on driving, but they pay more attention to their surroundings, and driving abilities and underestimate the impact of distraction activities on driving performance. In this paperwork, the driver's head posture is examined to know whether the driver is concentrating on his frontal view. This system works by analyzing the eye movement of the driver and alerting the driver by activating the buzzer when he/she is drowsy. The Convolutional neural network model is best suitable to detect driver distraction more reliably than the training model. The application was implementedusing Open CV in a PC environment with a single camera view. In case, if the driver does not wake up the vehicle automatically slows down and moves toward its left, and stops.

Keyword: - *Arduino, Vibrating motor, Open CV MEM.*

1. INTRODUCTION

According to the Government's Road Safety Strategy, Tomorrow's Roads: Safer for Everyone, one of the key aspects of driver behaviour that must be addressed if the target of reducing the number of people killed and seriously injured in traffic accidents by 40% by 2010 is to be realised. Drowsiness occurs during periods when a person should ordinarily be awake due to sleep deficiency or disruption. Even one night of inadequate sleep can result in significant short-term fatigue, and repeated sleep disturbances can result in chronic drowsiness. The only way to successfully deal with exhaustion is to sleep. When you get less than four hours of sleep per night, your performance drops. Sleep deprivation has cumulative effects that usually Losing one or two hours per night could lead to persistent sleepiness over time. Eye blink rates, which often represent a person's level of attention, were monitored using a webcam.

These were meticulously collated and in real time retrieved to estimate the driver's level of fatigue. The technology can track the driver's eyes to detect short naps of three to four seconds. The mechanism of this method runs at 8–15 frames persecond. On a PC with a single camera view, Open CV was used to construct the application. Through the identification of driver fatigue, this technique was designed to reduce traffic accidents. The suggested setup includes the PC With Open CV. Most often, facial recognition is employed to safeguard drowsy drivers. Since driving is no longer necessary due to the growing population, there have been an alarming number of accidents resulting in severe loss of life and property. This initiative's goal is to locate accidents and report their locations.

2. METHODOLOGY

2.1 COMPONENTS USED:

ARDUINO UNO: Arduino is an open-source project that created microcontroller-based kits interactive objects that can sense and control physical devices. Arduino is a prototype platform based on an easy-to-use hardware and software. It consists of a circuit board, which can be programmed (referredto as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board. Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

BUZZER: A peizo electric buzzer is an electro mechanical signaling device, that are used in emergency or normal alarms, automobiles, household appliances such as a microwave oven, timers and game shows. Piezoelectric buzzer is just a flat piece of piezoelectric material with two electrodes. This type of buzzer requires some oscillators to drive it—if a DC voltage is applied,then a beep sound occurs. They are used in places where you need something that emits an audible tone, but don't care about high-fidelity sound reproduction. They are cheap and can bevery loud without using very much power.

DC MOTOR: A DC motor consists of a current carrying armature which is connected to the supply end through commutator segments and brushes. The armature is placed in between north and southpoles of a permanent or an electromagnet. When the direct current is supplied to the armature, a mechanical force acts on it due to the electromagnetic effect of the magnet and motor starts rotating. In practical DC motor, the permanent magnet is replaced by a field winding which produces the required flux called main flux and all the armature conductors, mounted on the periphery of the armature drum. It gets subjected to the mechanical force. Due to this overall armature experiences a twisting force called torque and armature of the motor starts rotating. A DC motor is a rotary electrical machine that converts electrical energy into mechanical energy. Here the electrical energy supplied to DC motor is direct current (DC).

MOTOR DRIVER: L293D is a Motor Driver IC which allows the DC motor to rotate in both clockwise and anti-clockwise direction. L293D is a 16-pin IC which can control a set of two DC motorssimultaneously. This IC works on the concept of the H-bridge circuit. When a positive voltageis applied across the motor driver the motor starts rotating in one of the directions and by reversing the voltage the motor starts rotating in the opposite direction.

ALCOHOL SENSOR: An alcohol sensor detects the attentiveness of alcohol gas in the air and an analog voltage is anoutput reading. The sensor can activate at temperatures ranging from -10 to 50° C with a powersupply is less than 150 Ma to 5V. The sensing range is from 0.04 mg/L to 4 mg/L, which is suitable for breathalyzers. The passive alcohol sensor (PAS) is a device developed to assist police in identifying drinking drivers. The PAS draws in mixed expired and environmental air from in front of the subject's face and passes it into a fuel cell sensor that can detect very smallamounts of alcohol.

ULTRASONIC SENSOR: An object can be detected with an infrared system consisting of an infrared transmitter and a receiver. More in detail an IR transmitter, also known as IR LED, sends an infrared signal witha certain frequency compatible with an IR receiver which has the task to detect it. example, in proximity sensors to detect a near object, in contrast sensors to find a path or in counting sensors to count objects.

OPEN CV: OpenCV (Open-Source Computer Vision) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez (which was later acquired by Intel). The library is cross-platform and free for use under the open-source BSD license. OpenCV supports the deep learning frameworks TensorFlow, Torch/PyTorch and Caffe on Linux and FreeBSD. On Windows it can use MinGW or MSVC with the default install and can also use Microsoft Console Debugger when compiled from source code. Clang is also supported.

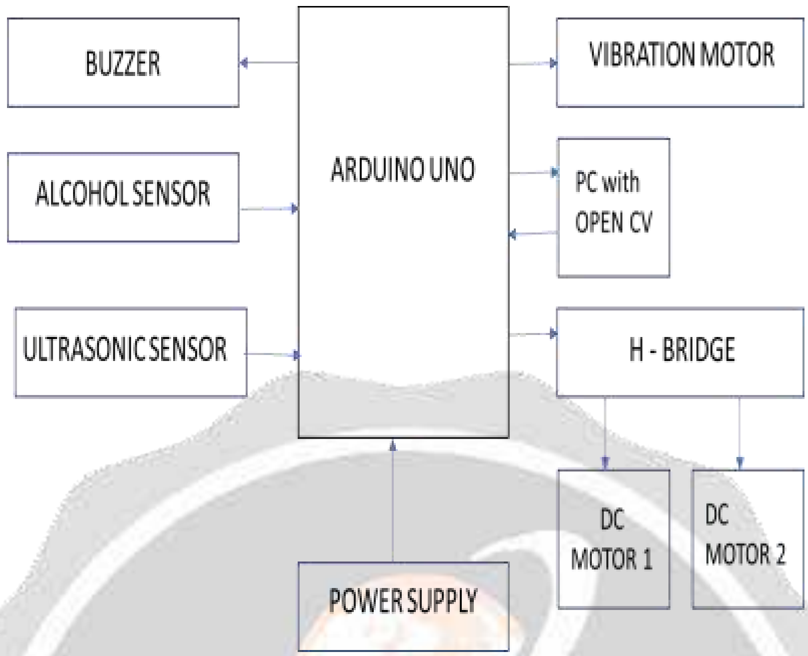


Fig -1: Block diagram

2.2 Proposed Working System

This drone is deployed when there is critical transportation for an ambulance. The motors used are DC Brushless Motor (A2212) of 14000KV and propeller with pair of clock wise (CW) and counter clock wise (CCW) structure. This receiver commands will control the flight through Electronic Speed Controller (ESC) which controls the speed of 4 BLDC motors. The flight controller used in the UAV is APM 2.8 Flight Controller. Telemetry collects the data and transmitted to receiving equipment for monitoring, display and recording with GPS (NEO M8N) way point navigation. The flights of drones are automated by fixing waypoints in mission planner software so that we can check the status of the drone and can also change the user location between flight of the drone using telemetry communication. The latitude and longitude location are sent to the admin thereby planning mission by fixing the location. The power supply consists of Solar panel which generates therequired voltage and it can be stored in the battery and supplied to all the components.

3. EXPERIMENTAL SETUP

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6can be used as PWM outputs), 6 analog inputs. a method for detecting driver drowsiness/sleepiness is developed on Arduino microcontroller board. The readings taken from different sensors used in this project it has an MQ-3 alcohol gas sensor todetect alcohol, if consumed by the driver and relay circuit to stop him from performing the drive if alcoholconsumed. The alarm will be activated when the driver has consumed alcoholor driver head nods frequently when driver eyes get closed. The controller in turn automatically turns on the left indicator and park to its left side and alsohelps in locking of ignition. Video Recording: Using this module we will connect operation to webcam using OPENCV erected- in function called Video Capture. Frame Extraction: Using this module we will snare frames fromwebcam and also prizeeach picture frame by frame and convert image into 2- dimensional array. Face Detection & Facial Landmark Detection: Using SVM algorithm we will descry faces from images and also extract facial expression from the frames. Detection: Using this module we will descry eyes and mouth from the face. Calculate: Using this module we will calculate distance with Euclidean Distance formula to check whether given face distance closer to eyeblinks or yawning, if eyes blink for 20 frames continuously and mouth open as yawning also it'll advise motorist.

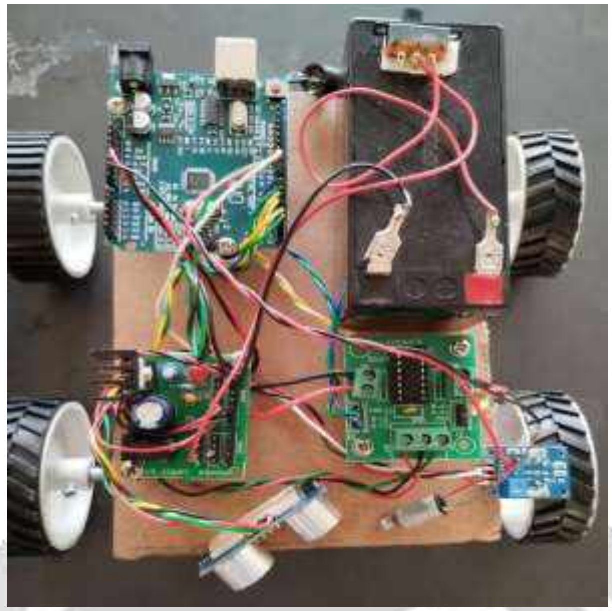


Fig -2: Experimental setup

4. FUTURE SCOPE

A driver alertness detection system was proposed based on fatigue detection in real-time. Theproposed method easily detects the eye blink and the drowsiness. Information about the eyes position was obtained through image processing algorithms. Image processing offers a non- invasive approach to detect drowsiness without any annoyance and interference. An algorithmfor performing face recognition was used. It was found that with this algorithm, a good measurement of theblink rate was obtained. The proposed algorithm was able to detect the eyes at medium and high illumination and independent of gender and age, but for optimal detection the camera had to be positioned as front as possible. In order to prevent the effects ofpoor detection due to insufficient light, night vision camera was implemented so that better results, unaffected by lack of brightness, will be obtained. Safe driving will be ensured by indicating the driver using a buzzer indicator.

5. CONCLUSIONS

A driver alertness detection system was proposed based on fatigue detection in real-time. The proposed method easily detects the eye blink and the drowsiness. Information about the eyes position was obtained through image processing algorithms. Image processing offers a noninvasive approach to detect drowsiness without any annoyance and interference. An algorithm for performing face recognition was used. It was found that with this algorithm, a good measurement of the blink rate was obtained. The proposed algorithm was able to detect the eyes at medium and high illumination and independent of gender and age, but for optimal detection the camera had to be positioned as front as possible. In order to prevent the effects of poor detection due to insufficient light, night vision camera was implemented so that better results, unaffected by lack of brightness, will be obtained. Safe driving will be ensured by indicating the driver using a buzzer indicator. And also, if the driver continues to sleep the vehicle automatically go left and stop and also it has alcohol detection which detects the alcohol presence and stop the vehicle.

6. REFERENCES

[1]. G. Sikander and S. Anwar, “Driver fatigue detection systems: A review,” IEEE Transactions on IntelligentTransportation Systems, vol. 20, no. 6, pp. 2339–2352, 2019.

[2]. M. S. Reddy, B. Narasimha, E. Suresh, and K. S. Rao, “Analysis of eog signals using wavelet transform for detecting eye blinks,” in 2010 International Conference on Wireless Communications Signal Processing (WCSP), 2010.

[3]. “Analysis of eog signals using wavelet transform for detecting eye blinks,” in 2010 International Conference onWireless Communications & Signal Processing (WCSP). IEEE, 2010.

[4]. M. Takao, T. Ishiguro, T. Kubota, and M. Iijima, "3d-spatial learning and eye blink," in 2019 IEEE 1st Global Conference on Life Sciences and Technologies (LifeTech), 2019.

[5]. A. Kuwahara, R. Hirakawa, H. Kawano, K. Nakashi, and Y. Nakatoh, "Eye fatigue prediction system using blink detection based on eye image," in 2021 IEEE International Conference on Consumer Electronics (ICCE), 2021.

[6]. C.-W. You, N. D. Lane, F. Chen, R. Wang, Z. Chen, T. J. Bao, M. Montes-de Oca, Y. Cheng, M. Lin, L. Torresani, and A. T. Campbell, "Carsafe app: Alerting drowsy and distracteddrivers using dual cameras on smartphones," in Proceeding of the 11th Annual International Conference on Mobile Systems, Applications, and Services, ser. MobiSys '13. New York, NY,USA.

[7]. J. Liu, D. Li, L. Wang, and J. Xiong, "Blinklistener:" listen" to your eye blink using your smartphone," Proc.ACM Interact. Mob. Wearable Ubiquitous Technol., vol. 5, no. 2, jun 2021.

[8]. C. Xu, Y. Zheng, and Z. Wang, "Efficient eye states detection in realtime for drowsy driving monitoring system," in 2008 International Conference on Information and Automation,2008.

[9]. P. P. Caffier, U. Erdmann, and P. Ullsperger, "The spontaneous eyeblink as sleepinessindicator in patients with obstructive sleep apnoea syndrome-a pilot study." Sleep Medicine,2

[10]. T. Zheng, Z. Chen, C. Cai, J. Luo, and X. Zhang, "V2ifi: in-vehicle vital sign monitoringvia compact rf sensing,"Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, 2020.

[11]. P. Ren, X. Ma, W. Lai, M. Zhang, S. Liu, Y. Wang, M. Li, D. Ma, Y. Dong, Y. He, and X. Xu, "Comparison of the use of blink rate and blink rate variability for mental state recognition," IEEE Transactions on Neural Systems and Rehabilitation Engineering, vol. 27.

[12]. A. Bulling, D. Roggen, and G. Troster, "It's in your eyes: ¨ Towards context-awarenessand mobile hci usingwearable eog goggles," ser. UbiComp '08. New York.

[13]. H. Manabe and T. Yagi, "Eog-based eye gesture input with audio staging," ser. ETRA'14. New York, NY, USA:Association for Computing Machinery, 2014.

[14]. D. Suman, M. Malini, and S. Anchuri, "Eog based vigilance monitoring system," in 2015Annual IEEE India Conference(INDICON), 2015.

[15]. R. Anchan, A. Pillay, A. Kale, A. Bhadricha, and S. P. Ram, "Optimal bipolar lead placement in electrooculography (eog): A comparative study with an emphasis on prolonged blinks," in 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT), 2020.

[16]. S. Ishimaru, K. Kunze, K. Kise, J. Weppner, A. Dengel, P. Lukowicz, and A. Bulling, "Inthe blink of an eye: Combining head motion and eye blink frequency for activity recognition with google glass," in Proceedings of the 5thAugmented Human International Conference.

[17]. M. Dhuliawala, J. Lee, J. Shimizu, A. Bulling, K. Kunze, T. Starner, and W. Woo, "Smooth eye movement interaction using eog glasses," in Proceedings of the 18th ACM International Conference on Multimodal Interaction.

[18]. D. Kumar and A. Sharma, "Electrooculogram-based virtual reality game control using blink detection and gaze calibration," in 2016 International Conference on Advances in Computing, Communications and Informatics (ICACCI).

[19]. Ms. Sarika B. Kale, Gajanan P. Dhok, "Embedded system for intelligent ambulance and traffic control management International Journal of Computer and Electronics research",Volume 2, Issue 2, April 2013.

[20]. Fengyuan Jia Hongyan Wang, "A New Type of Automatic Alarming Device to Rescue Accident Injured inTime",September 2014.

[21]. Sri Krishna Chaitanya Varma, Poornesh, Tarun Varma, Harsha, "Automatic Vehicle Accident Detection and Messaging system using GPS and GSM Modems", International Journal of Scientific & Engineering

Research, Volume 4, Issue 8, August-2013.

[22]. Tanaya Achalkar, Shrinath Panmand, Saurabh Naik, Dilip Patil, Rachna Sonkumwar *"AnEfficient Approach forAccident detection System" International* Journal of Engineering Trendsand Technology 67.4 (2019).

[23]. M.Rajendra Prasad, P.Aswani ,"An automated traffic accident detection and alarm device", International Journalof Technological Exploration and Learning (IJTEL) Volume 1 Issue 1, August 2012.

[24]. H. Jiang, J. Hu, D. Liu, J. Xiong, and M. Cai, "Driversonar: Fine-grained dangerous driving detection usingactive sonar," *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*, vol. 5, no. 3, sep 2021.

SMART BANDAGE USING RFID TAG

Kamal Raj T[1], Sanskar Drolia[2], Shibin C Reji[3], Shriti Arvind Singh[4], Yashi Bilthariya[5]

[1] Asso.Professor, Department of CSE, Rajarajeswari College of Engineering, Karnataka, India
[2] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[3] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[4] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India
[5] Student, Computer Science, and Engineering, Rajarajeswari College of Engineering, Karnataka, India

ABSTRACT

The population of several nations, including China and India, is ageing. The ageing population need domestic health care systems that can monitor seniors' health over time. In this research, a brand-new wearable platform called the smart-clothes platform is proposed for long-term health monitoring. Five different types of sensors for health monitoring are incorporated into smart clothes using newly developed electronic textiles. The platform has. Based on the smart-clothe, a platform for computing that uses an embedded gateway, a smartphone, and back-end cloud servers to gather and analyse long-term sensor data. A wide range of applications for health services based on cellphones and cloud services are made possible by the platform.

Keyword - *Smart Bandage, IoT, Health-Care, Remote Monitoring*

---

1. INTRODUCTION

In this study, the smart-clothe platform, a revolutionary wearable device and computer platform for long-term health monitoring, is proposed. The smart bandage is a bandage equipped with multiple sensors for monitoring health conditions, using newly developed electronic textile technology. The smart clothing's inbuilt gateway sends sensor signals to a smartphone for signal processing. On the smartphone, numerous applications can be created for tracking health data, making diagnoses, and handling emergency situations. Furthermore, for long-term sensor data collection, the smartphone links the t-shirts to the back-end cloud service platform. Long-term sensor data mining can be used for cutting-edge medical research and diagnostics. The application scenario and platform prototype for the smart-bandage are presented in this study. Smart bandages, often known as "modern dressings," are used to treat patients more comfortably and conveniently while also shortening the length of their hospital stays. This medical tool generates the ideal environment for complicated and dynamic wounds to heal more quickly and securely. The Internet of Things (IoT) is transforming how we live, increasing our productivity and simplifying our daily activities. Businesses may benefit from the Internet of Things, which may boost productivity and collect more customer data.

1.1 Problem Statement

A vital physiological mechanism that helps injured tissues heal is wound healing. The blood can clot and the bleeding can be controlled with the aid of a pressure bandage. A pressure bandage must not be too tightly wrapped. Handling stiff bandage material is difficult. Most inexperienced people use too little pressure when applying inelastic bandages.

1.2 Existing System

The major purpose of today's wound dressings is to protect and seal the injured site. Medical professionals frequently depend on physical examinations of the wound to treat chronic wounds since they are difficult to diagnose and cure. This approach necessitates time-consuming and expensive hospital visits on a regular basis.

2. System Architecture

An open hardware development board called an Arduino may be used to create and construct objects that communicate with the outside world. A microcontroller board called Arduino Uno is based on the ATmega328P. A temperature sensor is being used by the system to keep track of the patient's temperature. The pressure sensor detects any pressure applied to the wound and transmits data to the Arduino microcontroller. For patient identification, RFID cards are given out. The data on RFID cards is read using an RFID reader. The SPO2 sensor measures heart rate and oxygen saturation. All of the sensory data is stored using ThingSpeak IOT.

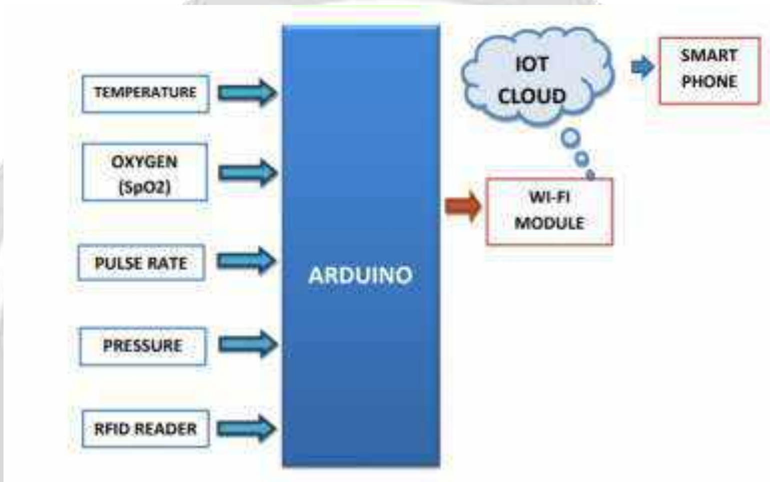


Figure -1: Design & Architecture Model

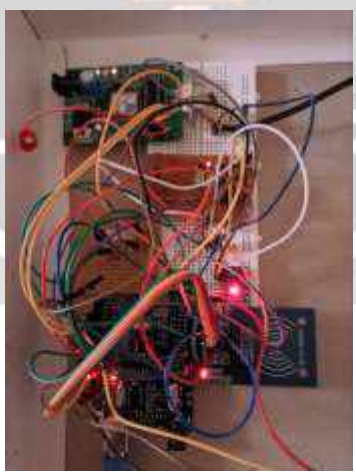


Figure -2: System Components

2.1 Hardware Specification

HARWARE REQUIREMENTS:

- Arduino Uno.
- Pressure Sensor.

- SPO2 Sensor.
- Temperature Sensor.
- ESP8266 Wi-Fi Module
- RFID Reader.

SOFTWARE REQUIREMENTS:

- Arduino IDE.
- Embedded C Programming.
- ThingSpeak IOT.

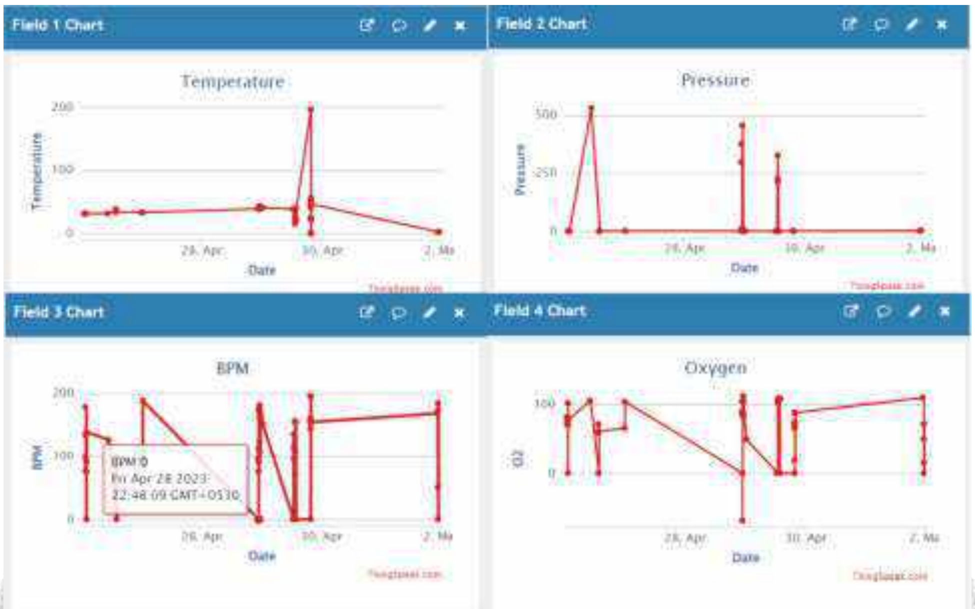


Table -3: Graph

3. Implementation

There are various procedures that must be taken in order to develop an IoT system that monitors vital indicators. First, a microcontroller like the Arduino Uno must be chosen. The next step is to choose and integrate the necessary sensors with the microcontroller. Sensors like temperature, heart rate, and blood oxygen level sensors may be utilized for vital sign monitoring. An RFID reader may be utilized to verify users.

The microcontroller must be programmed using the Arduino IDE, which employs the Embedded C programming language, after the sensors have been integrated. It should be planned for the programme to gather data from the sensors and store it in a cloud platform like ThingSpeak, which will allow access to the data from any location with an internet connection.

When vital signs drop below pre-determined threshold levels, a notification alert system should be put in place to notify the user or a healthcare practitioner. This will increase the system's usefulness. Using the ThingSpeak web app, vitals can be monitored in real time.

Testing and deployment should be done after the system has been designed and integrated with the cloud platform to make sure it is operating as planned. These procedures may be used to build an efficient IoT system for monitoring vital signs.

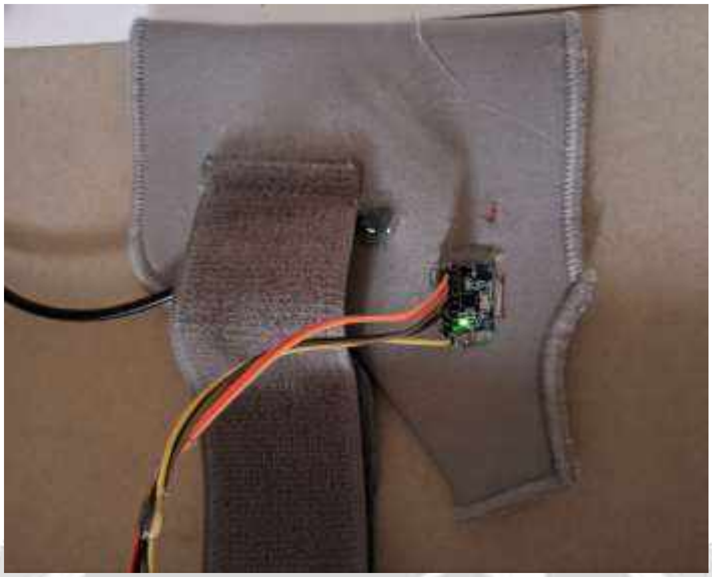


Figure -4: Prototype Bandage

3.1 Module Description

Module 1: Microcontroller
Arduino is a free and open-source hardware development platform that may be used to create interactive objects. A microcontroller board called Arduino Uno is based on the ATmega328P. This Arduino microcontroller has integrated sensors for all of its sensors.

Module 2 : RFID Tag
The bandage must be uniquely identified, and that is the job of the RFID Tag module. It is intended to be integrated with the Smart Bandage in order to monitor bandage usage and follow the development of the wound.

Module 3: SPO2 | Motion Sensor
The SPO2 and Motion Detection module is in charge of determining whether or not the patient is moving by measuring the patient's pulse rate, oxygen saturation level in the blood, and pulse rate. It is made to be integrated with the Smart Bandage in order to track the patient's respiratory condition and notify the user when the bandage needs to be readjusted as a result of movement.

Module 4: Temperature | Pressure Sensor
Real-time data on the skin's temperature and pressure are provided by the Temperature and Pressure module, which may be used to look for inflammation and infection as well as to stop unwelcome pressure.

Module 5: Alert Notification System
If certain parameters exceed a predetermined threshold, the Alert Notification System module is in charge of notifying the user. It's made to be included into the Smart Bandage to offer a potential health concern early warning system.

Module 6: Integration with Cloud
The data gathered by the other modules is sent to the cloud for storage and analysis by the Integration with Cloud with ThingSpeak module. It is intended to be incorporated with the Smart Bandage to allow for remote patient monitoring and condition analysis. Both a Wi-Fi module that connects to the internet and a ThingSpeak API that communicates data to the cloud are included in this module.

4. CONCLUSIONS

In conclusion, the suggested smart bandage is a potentially viable answer to the demands for health monitoring in an ageing society. The platform supports multiple health-service applications on smartphones by fusing strain and temperature sensors with an Arduino microcontroller, connecting to energy-efficient gateways, and using cloud computing. The smart-clothes platform also enables the long-term logging of health data without interfering with normal living. The advancement of this technology may help in the early detection and monitoring of health issues as well as enhance the quality of life for ageing populations.

5. REFERENCES

[1]. P. Mostafalu, W. Lenk, M. R. Dokmeci, B. Ziaie, A. Khademhosseini, and S. R. Sonkusale, “Wireless flexible smart bandage for continuous monitoring of wound oxygenation,” Oct. 2015.

[2]. B. K. Ashley, M. S. Brown, Y. Park, S. Kuan, and A. Koh, “Skininspired, open mesh electrochemical sensors for lactate and oxygen monitoring,” Biosens. Bioelectron., May 2019.

[3]. E. S. Hosseini, L. Manjakkal, D. Shakthivel, and R. Dahiya, “Glycine–chitosan-based flexible biodegradable piezoelectric pressure sensor,” 2020.

[4]. W.-J. Deng, L.-F. Wang, L. Dong, and Q.-A. Huang, “LC wireless sensitive pressure sensors with microstructured PDMS dielectric layers for wound monitoring”, June. 2018.

[5]. W. Gao, H. Ota, D. Kiriya, K. Takei, and A. Javey, “Flexible electronics toward wearable sensing,” , 2019.

[6]. S. Nasiri and M. R. Khosravani, “Progress and challenges in fabrication of wearable sensors for health monitoring,”, Sep. 2020.

[7]. M. S. Brown, B. Ashley, and A. Koh, “Wearable technology for chronic wound monitoring: Current dressings, advancements, and future prospects,” Apr. 2018.

[8]. D. P. Cuthbertson and W. J. Tilstone, “Effect of environmental temperature on the closure of full thickness skin wounds in the rat,” , 1967.

FAST AND LIGHTWEIGHT HUMAN POSE ESTIMATION

Hemavathi J[1], Nayana BC[2], Priyanka HK[3], Nagashree S[4], Preeti B Shetty[5]

[1]*Assistant Professor, Computer Science and Engineering Department, RajaRajeswari College Of Engineering, Karnataka, India*
[2] *Student, Computer Science and Engineering Department, RajaRajeswari College Of Engineering, Karnataka, India*
[3] *Student, Computer Science and Engineering Department, RajaRajeswari College Of Engineering, Karnataka, India*
[4] *Student, Computer Science and Engineering Department, RajaRajeswari College Of Engineering, Karnataka, India*
[5] *Student, Computer Science and Engineering Department, RajaRajeswari College Of Engineering, Karnataka, India*

ABSTRACT

Although achieving significant improvement on pose estimation, the major drawback is that most top-performing methods tend to adopt complex architecture and spend large computational cost to achieve higher performance. Due to the edge device's limited resources, its top-performing methods are hardto maintain fast inference speed in practice. To address this issue, we proposed the fast and lightweight human pose estimation method to maintain high performance and bear the less computational cost. Especially,the proposed method consists of two parts, i.e., the fast and lightweight pose network (FLPN) for pose estimation and a novel lightweight bottleneck block for reducing computational cost, which can integrate the simple network and lightweight bottleneck into an efficient method for accurate pose estimation. In terms of lightweight bottleneck block, we introduce the structural similarity measurement (SSIM) to refine the appropriate ratio of intrinsic feature maps and reduce the model size. Furthermore, an attention mechanismis also adopted in our lightweight bottleneck block for modeling the contextual information. We demonstratethe performance of the proposed method with extensive experiments on the two standard benchmark datasets by comparing our method with state-of-the-art methods. On the COCO keypoint detection dataset, our proposed method attains a similar accuracy with these state-of-the-art methods, but the computational costof these top-performing methods is more than 7 times that of ours.

Keyword : *Human pose estimation, structural similarity, cheap operation, lightweight block.*

1. INTRODUCTION

Pose estimation is a computer vision technique that predicts and tracks the location of a person or object. The goal of estimating human pose based on input images can be simplified to precisely localize human anatomical keypoint like elbow wrists knees etc. Human pose estimation aims at predicting the poses of human body parts and joints in images or videos. Human pose estimation which is a fundamental task in computer vision is extensively adopted for action recognition, pose tracking, and human-computer interaction. This is typically done by identifying, locating, and tracking a number of key points on a given object or person. For objects, this could be corners or other significant features. And for humans, these key points represent major joints like an elbow or knee. We contend that applying a lightweight model for real time human pose estimation is one of the major unaddressed issues. However, the lightweight human pose estimation networks with small model size, light computation consuming, and high accuracy are suitable to directly deploy on resource-limited devices such as mobile phones and smart laptops.

2. APPROACH

Human pose estimation localizes body key points to accurately recognizing the postures of individuals given an image. This step is a crucial prerequisite to multiple tasks of computer vision which include human action recognition, human tracking, human-computer interaction, gaming, sign languages, and video surveillance. Therefore, we present this survey article to fill the knowledge gap of 2D human pose estimation. The approaches used in human pose estimation are described before listing some applications and also flaws facing in pose estimation. Following that, a center of attention is given on briefly discussing researches with a significant effect on human pose estimation and examine the novelty, motivation, architecture, the procedures of each model together with its practical application and drawbacks, datasets implemented, as well as the evaluation metrics used to evaluate the model.

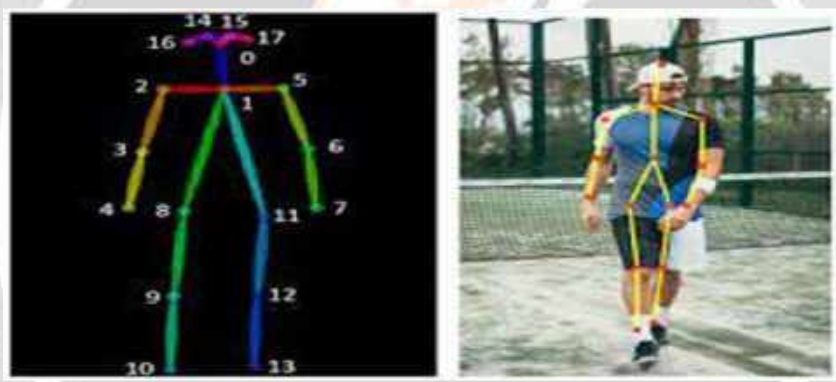


Fig -1: Recognizing Keypoints

3. IMPLEMENTATION

With pose estimation, we're able to track an object or person(or multiple people) in real world space at an incredibly granular level. This powerful capability opens up a wide range of possible applications. Human pose estimation is one of the key problems in computer vision that has been studied for well over 15 years. The reason for its importance is the abundance of applications that can benefit from such a technology. For example, human pose estimation allows for higher level reasoning in the context of human computer interaction and activity recognition. It is also one of the basic building blocks for marker-less motion capture (MoCap) technology. MoCap technology is useful for applications ranging from character animation to clinical analysis of gait pathologies. Pose estimation also differs from other common computer vision tasks in some important ways. A task like object detection also locates objects within an image. This localization, though, is typically coarse-grained, consisting of a bounding box encompassing the object. Pose estimation goes further, predicting the precise location of keypoints associated with the object. We can clearly envision the power of pose estimation by considering its application in automatically tracking human movement. From virtual sports coaches and AI-powered personal trainers to tracking movements on factory floors to ensure worker safety, pose estimation has the potential to create a new wave of automated tools designed to measure the precision of human movement.

3.1 MODEL DESCRIPTION

The same set of parameters and settings as SimpleBase- line were adopted to guarantee a fair comparison between our method. Our network and the above mentioned two net- works were all initialized by pre-training on the most conceptually simple method uses a regressor to output final predictions of each key point location. The resulting model accepts an image as input and outputs X, Y, and potentially Z coordinates for each key point you're trying to predict. A slightly more complicated approach uses an encoder- decoder architecture. Instead of estimating key point coordinates directly, the encoder is fed into a decoder, which creates heatmaps representing the key point is found in a given region of an image. In these cases, additional post-processing is required to assign each area to a specific object instance. The architecture of the FLPN network is similar to Simple Baseline. Our method contains a stem, a backbone network and several up-sampling layers. Differently, we introduce the method of SSIM to evaluate the similarity among feature maps, redesign the bottleneck block (green blocks in the figure) and choose a novel lightweight fashion for up-sampling.

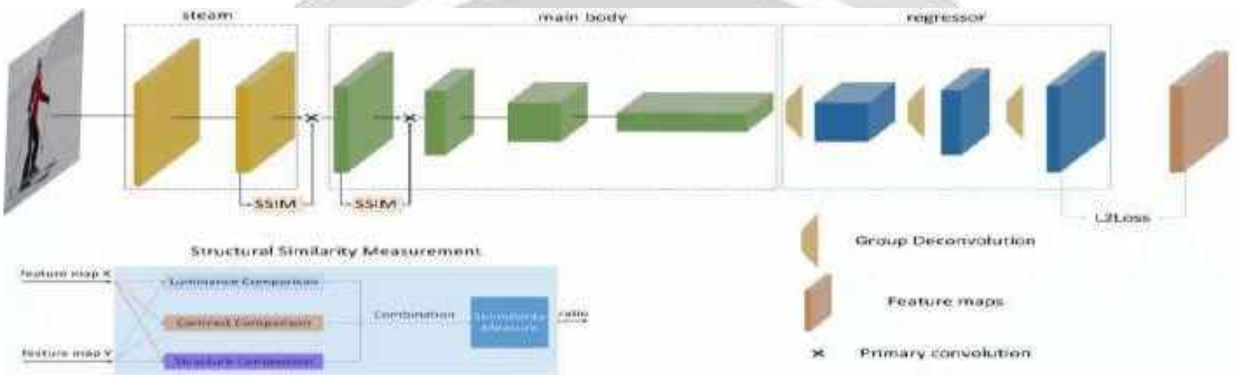


Fig -2: Illustrating the architecture of the FLPN network. Similar to SimpleBaseline, our method contains a stem, a backbone network and several up-sampling layers. Differently, we introduce the method of SSIM to evaluatethe similarity among feature maps, redesign the bottleneck block (green blocks in the above figure.), and choose a novel lightweight fashion for up-sampling.

At the same time, we also append the GC block which is effectively able to model the global context by capturing long-range dependencies with the less computational cost increase. To achieve extremely efficient architecture and high performance, we proposed the FLPN network with a simple architecture. we propose a novel lightweight human pose estimation method by redesigning a simple network (FLPN) with several groups of lightweight bottleneck (Smart bottleneck) blocks. The smart bottleneck is mainly composed of two stacked smart modules and a global context(GC) block.Then, the smart module is introduced to utilize cheap operations to generate more feature maps from these intrinsic feature maps.The structural similarity (SSIM) measurement method is adopted in the smart module and determines the appropriate proportion of intrinsic feature maps in the total feature maps. Pose estimation refers to computer vision techniques that detect human figures in images and videos, so that one could determine, for example, where someone's elbow shows up in an image. It is important to be aware of the fact that pose estimation merely estimates where key body joints are and does not recognize who is in an image or video. The pose estimation models takes a processed camera image as the input and outputs information about key points.The key points detected are indexed by a part ID, with a confidence score between 0.0 and 1.0. Its important to remember the distinction between 2D pose estimation and 3D pose estimation. The two tasks carry different data requirements, produce different outputs 2D pixel values vs a 3D spatial arrangement, and are generally used to solve different problems.

We provides reference implementation of two TensorFlow Lite pose estimation models:

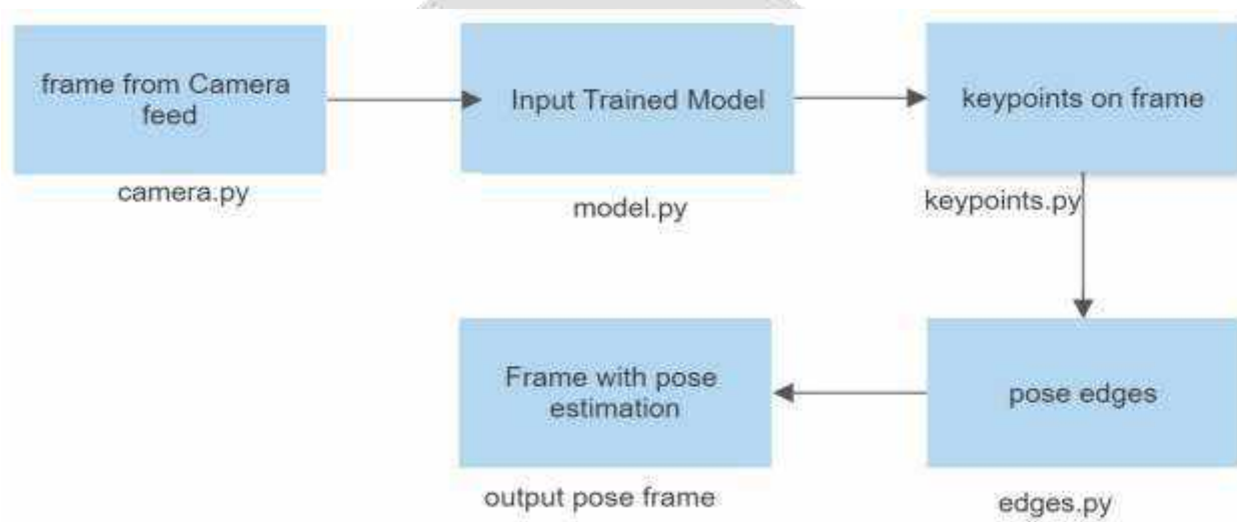
- MoveNet: the state-of-the-art pose estimation model available in two flavors: Lighting and Thunder.

- PoseNet: the previous generation pose estimation model released in 2017.

There are two overarching approaches: a bottom-up approach, and a top-down approach :

- With a bottom-up approach, the model detects every instance of a particular key point (e.g. all left hands) in a given image and then attempts to assemble groups of key points into skeletons for distinct objects.
- A top-down approach is the inverse – the network first uses an object detector to draw a box around each instance of an object, and then estimates the key points within each cropped region.

3.2 MODULE DESCRIPTION



- MAIN: Main used to integrate and invoke all other models, and classes.
- MODEL: This contains a trained, lightweight, fast Tensorflow lite mode on the COCO dataset.
- CAMERA: This module has a generic driver class to capture frames from external cameras or webcams.
- KEYPOINTS: These modules have definitions for each prediction and tensors of coordinate pairs of all key points predicated on the model.
- EDEGES: Using this modulus we convert key points into edges by connecting them and estimation of the pose is done by drawing it on the frame.

4. CONCLUSIONS

This paper presents a fast and lightweight method consists ofFLPN network for more accurate pose estimation, a Smart bottleneck block for reducing the computational cost, and themethod of SSIM to refine the appropriate ratio of intrinsic feature maps for reducing the module block size and main- taining the high accuracy. Extensive experiments on these above mentioned datasets demonstrate that our method has achieved similar accuracy with these top-performing methods and our computational cost is extremely lower than theirs. Considering the inference time and computational cost, our method is more suitable to employ edge devices. Finally,we hope our method could take some inspired ideas on real-time and lightweight pose estimation field.

5. REFERENCES

[1] Toshev and C. Szegedy, "DeepPose: Human pose estimation via deep neural networks", *Proc. IEEE Conf. Comput. Vis. Pattern Recognit. (CVPR)*, pp. 1653-1660, Jun. 2014.

[2] Bulat and G. Tzimiropoulos, "Binarized convolutional landmark localizers for human pose estimation and face alignment with limited resources", *Proc. IEEE Int. Conf. Comput. Vis. (ICCV)*, pp. 3706-3714, Oct. 2017.

[3] K. He, X. Zhang, S. Ren and J. Sun, "Deep residual learning for image recognition", *Proc. IEEE Conf. Comput. Vis. Pattern Recognit. (CVPR)*, pp. 770-778, Jun. 2016.

[4] G. Cheron, I. Laptev and C. Schmid, "P-CNN: Pose-based CNN features for action recognition", *Proc. IEEE Int. Conf. Comput. Vis. (ICCV)*, pp. 3218-3226, Dec. 2015.

IOT IN INDIAN AGRICULTURE USING WIRELESS SENSORS AND NETWORK

D Kirubha[1], Deekshitha U M[2], Gunasree N A[3], Harshetha Murthy[4], Harshitha V[5]

[1] *Associate Professor, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[2] *Student, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[3] *Student, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[4] *Student, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*
[5] *Student, Department of Computer Science and Engineering, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

Recently, farmers have shown a lot of interest in smart agriculture approaches. One of the main employment in India and a substantial contributor to the GDP of the nation is the agriculture sector. By enabling farmers to more effectively monitor and manage their crops and fields, the use of Internet of Things (IOT) technology in Indian agriculture has the potential to completely transform the sector. The installation of wireless sensors and network infrastructure that enable real-time data collecting and analysis will help achieve this. We go over the advantages of IOT technology for farmers, including higher agricultural yields, less resource use, and better decision-making skills. This includes effective resource management practises like reducing the amount of water needed for irrigation and the usage of harmful pesticides. Overall, the adoption of IOT in Indian agriculture has the potential to significantly raise farmers' profitability, sustainability, and productivity.

Keyword : - *Smart agriculture, Internet of Things(IOT), Relay.*

1. INTRODUCTION

The backbone of our economy is agriculture. India's agriculture generates almost 70% of the national income[1].In this study, we demonstrate how to deploy "smart agriculture," which uses wireless sensors and the Internet of Things.Smart agriculture is a cutting-edge strategy that makes use of the most recent technologies to enhance the productivity, efficiency, and sustainability of farming practises [2],[3]. By delivering real-time data on soil moisture, temperature, humidity, and other factors, IoT and wireless sensors have completely changed how we approach agriculture. Farmers can monitor and manage their crops and livestock remotely thanks to IoT-enabled sensors that wirelessly collect and transfer data.

Smart agriculture uses technology like the Internet of Things (IoT), sensors, drones, artificial intelligence (AI), and machine learning to increase farming's productivity, sustainability, and profitability[4],[5],[6]. Farmers may foresee weather patterns and natural disasters, obtain insights into crop growth and health, and make well-informed decisions about irrigation, fertilisation, and pest management by gathering and analysing data. Reduced waste, increased productivity, better crop quality, and reduced environmental impact are just a few advantages of smart agriculture. Farmers may cut expenses and increase yields by utilising resources like water, fertiliser, and energy as efficiently as possible. Furthermore, smart agriculture can lessen the effects of climate change on agriculture by adjusting to changing weather patterns and cutting greenhouse gas emissions [11].In general, smart agriculture is a game-changer for the farming business, giving farmers the tools they need to make educated decisions, improve their yields, while simultaneously lowering their environmental effect.

3. EXISTING SYSTEM

Electrified welded mesh fences (often 30 cm in the ground), chemicals or organic compounds, and gas cannons are currently used as solutions to this issue.Farmer's employment of Hellikites, Ballons, Shot/Gas Guns, String & Stone, etc. are further traditional techniques. These remedies are frequently brutal and inefficient. Additionally, they cost a lot to install and maintain, and some of the techniques pollute the environment in ways that affect both people and animals. The chemical agents used to stop these animal attacks, on the other hand, have an application cost per hectare and their efficacy is reliant on the weather, as rain may have a diluting effect. The crop production can be greatly increased with technology support at many phases of agricultural processes.

4. PROPOSED SYSTEM

Our daily lives are heavily reliant on technology. The need for Internet of Things(IoT) has increased significantly across many industries, which has attracted substantial research interest from both the academic community and the business community. The crop production may be greatly increased with technology support at many phases of agricultural processes. Comparing sensor networks tomore traditional, intrusive monitoring techniques, they show a significant improvement. In order to stop animals from entering the agricultural field, this article describes the creation of an Internet of Things application for cropsecurity. To guard against possible harm to agriculture from wild animal assaultsand meteorological conditions, a repelling and monitoring system is offered. If an animal is found; the farm is secured against animal invasion.

4.1 COMPONENTS USED IN PROPOSED WORK

4.1.1 Arduino

Fig - 1: Arduino

- A single board microcontroller created with the goal of facilitating the use of interactive environments or objects.
- Designed to increase access to the use of electronics in transdisciplinary projects.
- It takes the data from all the sensors in order to be interactive with the surroundings.

4.1.2 Relay

Fig - 2: Relay

A relay is an electrically operated switch that opens and close the circuit by receiving electrical signals from outside source. Relays are utilised in a wide range of industrial applications, including digital computers, automation systems, and phone exchanges.

4.1.3 Soil Moisture Sensor

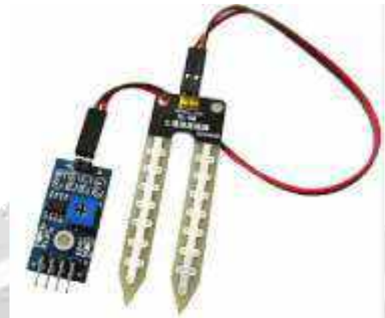


Fig -3: Soil Moisture Sensor

A device is fitted into the ground to measure the soil's moisture tension at various depths, depending on the kind of soil and plant [7],[8].

4.1.4 H Bridge

Fig - 4 : H Bridge

It is an electronic circiut tht switches the polarity of voltage applied to a load. And allows DC Motors to run forward or backwards.

4.1.5 LCD

Fig - 5: LCD

Liquid crystal display - It is a type of flat panel display which uses liquid crystals in its primary form of operation**.**

4.1.6 DC Motor

Fig - 6: DC Motor

A DC motor is a rotary electrical machines that converts direct current electrical energy into mechanical energy.

4.1.7 Perforated Board

Fig - 7: Perforated Board

Perforated board is a material for prototyping electronic circuit (also called as DOT PCB). It is a thin, rigid sheet with holes pre-drilled at standard intervals across a grid, usually a square grid of 0.1 inches (2.54 mm) spacing. These holes are ringed by round or square copper pads, though bare boards are also available.

5. METHODOLOGY

- A microcontroller called the ARDUINO interfaces with rain sensor and soil moisture sensor.
- The double-coated plastic sheet is covered over the crops by the microcontroller's initial action, which involves turning on the DC motor so that it begins rotating in a clockwise direction.
- The double coated polythene sheet is placed over the agricultural ground to safeguard the produce.
- Using a moisture sensor, the device also measures the amount of moisture in thesoil and starts taking the necessary steps to safeguard the crop.
- The computer receives the photos the camera sends and classifies the animals using them. A database is made and then filled with the collection of example photographs.
- Features like Retrieve photo, photo set, and Index image can be utilized on the programmer. The Image set stores a collection of images. Applying the index image, an image search index is created. The index image is used for looking forpictures when utilizing the find Image function.
- The captured image is given to the system for processing as the query image. Theretrieve picture function takes two inputs: the query picture and the picture that is stored in the database. The final result is the indexes for images in the pictureIndex that visually suit the query image.
- The photo IDs include the indices in ranked order, starting with the most similarmatch and ending with the most dissimilar match. Since the value match range is 0 to 1, the image fails to match if its value is 0. If the response is 1, the pictureprovided in the query and the one in the database are identical.
- If the score is found to be in the range of 0 to 1, which denotes the possibility that the query photo's content is similar to those of the stored image, the photo isclassified as a query picture.

- If a score ranges from 0.1 and 0.9, the picture is contrasted to the stored image. Once a wild animal has been identified, the properrepellent attitudes is utilized. If the live item is an elephant, the red light will be turned on.

5.1 SYSTEM ARCHITECTURE

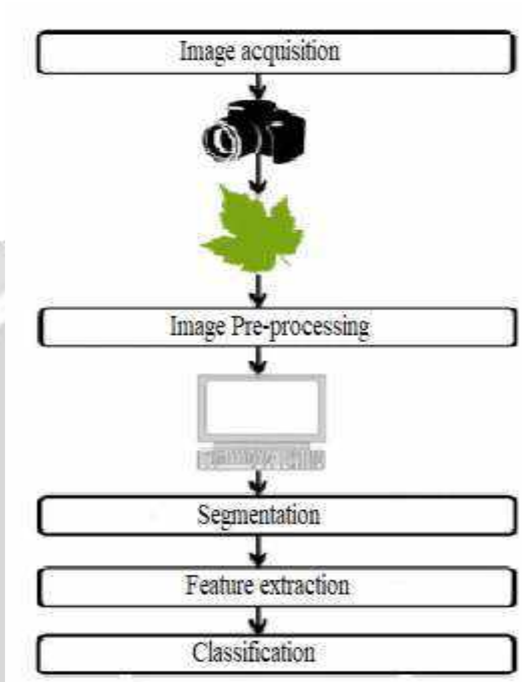


Fig -8 : System Architecture

6. OUTCOME OF THE PROJECT

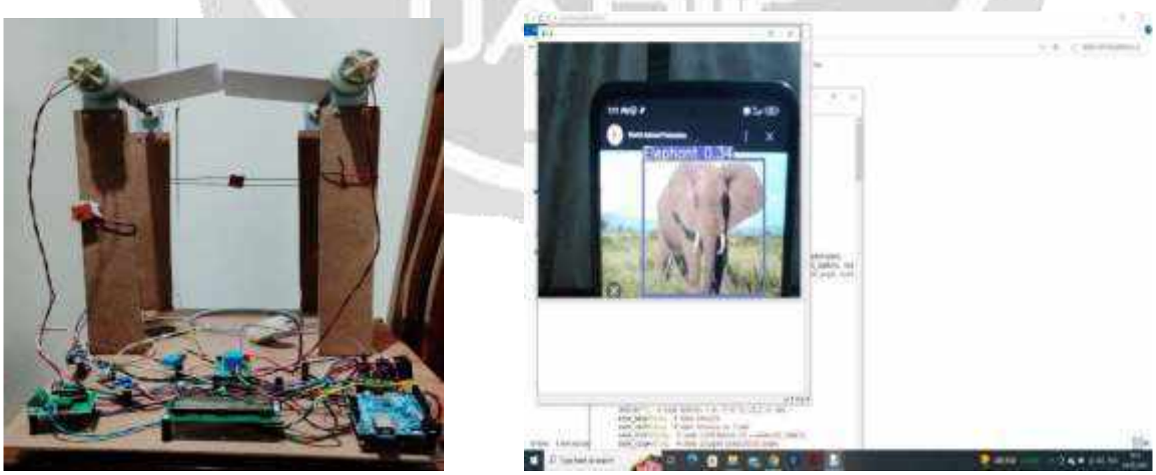


Fig -9 : Smart agriculture model

The following are some of the results of smart agriculture using IoT in terms of benefit analysis:

Enhanced crop yield: Farmers may optimise crop growth and yield by keeping an eye on soil moisture levels and other environmental parameters. They can also identify and take care of any problems like pests, infections, or nutritional deficits that might be impact crop growth.

Reduced waste: By monitoring resource utilisation and lowering the quantity of water, fertiliser, and pesticides utilised, IoT devices can assist farmers in minimising waste. Farmers can lower expenses and environmental impact by utilising these resources more effectively.

Efficiency gains: IoT-enabled smart agriculture gives farmers the ability to monitor and operate their operations remotely, decreasing the need for manual labour and boosting productivity. Cost reductions and better production are possible outcomes of this.

Better decision-making: Farmers may make better choices regarding planting, irrigation, pest control, and other important elements that influence crop output and quality by gathering and analyzing data on many aspects of their operations.

Our project's results include a number of advantages for farmers and the environment, greatly enhancing.

- Agriculture is monitored effectively.
- Animal and heavy rain protection for crops.
- Enhancing the health of crops.
- Sensors for animal detection can be installed around the field's perimeter to look for animal activity.

7. CONCLUSION

Utilising wireless sensors and network infrastructure, Internet of Things (IoT) technology integration in Indian agriculture has the potential to significantly change the sector. IoT can give farmers access to real-time information about crop growth, soil moisture levels, and other crucial parameters, empowering them to plan their resource allocation and crop management strategies.

Numerous advantages of IoT in agriculture include higher productivity, less resource consumption, and better decision-making abilities. However, there are obstacles to the adoption of IoT in agriculture, including high costs, the requirement for data privacy and security measures, and the necessity for farmers to receive adequate training and education.

Despite these obstacles, the Internet of Things (IoT) has the potential to support sustainable agricultural methods and resolve issues with food security in India. Policymakers can assist in enhancing the livelihoods of farmers, boosting food production, and advancing sustainable development by pushing the deployment of IoT technology in agriculture.

India can modernise its agricultural sector and support international efforts to embrace sustainable agricultural practises by tackling the implementation issues of IoT and encouraging its use in farming.

8. REFERENCES

[1] Programme, Water and Jobs, the United Nations World Water Development Report, UN World Water Develop. Rep. Arch., United Nations Educ., Sci. Cultural Org., Paris, France, 2016.

[2] M. S. Farooq, S. Riaz, A. Abid, K. Abid, and M. A. Naeem, ‘‘A survey on the role of IoT in agriculture for the implementation of smart farming,’’ IEEE Access, vol. 7, pp. 156237–156271, 2019, doi: 10.1109/ACCESS.2019.2949703.

[3] M. Ayaz, M. Ammad-Uddin, Z. Sharif, A. Mansour, and E. M. Aggoune, ‘‘Internet-of-Things (IoT)-based smart agriculture: Toward making the fields talk,’’ IEEE Access, vol. 7, pp. 129551–129583, 2019, doi: 10.1109/ACCESS.2019.2932609.

[4] M. Kalimuthu, P. Vaishnavi, and M. Kishore, ‘‘Crop prediction using machine learning,’’ in Proc. 3rd Int. Conf. Smart Syst. Inventive Technol. (ICSSIT), Tirunelveli, India, Aug. 2020, pp. 926–932, doi: 10.1109/ICSSIT48917.2020.9214190.

[5] P. Y. Niranjan, V. S. Rajpurohit, and R. Malgi, ‘‘A survey on chat-bot system for agriculture domain,’’ in Proc. 1st Int. Conf. Adv. Inf. Technol. (ICAIT), Chikmagalur, India, Jul. 2019, pp. 99–103, doi: 10.1109/ ICAIT47043.2019.8987429.

[6] S. Gaikwad, R. Asodekar, S. Gadia, and V. Z. Attar, ‘‘AGRI-QAS question-answering system for agriculture domain,’’ in Proc. Int. Conf. Adv. Comput., Commun. Informat. (ICACCI), Kochi,
[7] P. Radoglou-Grammatikis, P. Sarigiannidis, T. Lagkas, and I. Moscholios, ‘‘A compilation of UAV applications for precision agriculture,’’ Comput. Netw., vol. 172, May 2020, Art. no. 107148, doi: 10.1016/j.comnet.2020.107148.
[8] B. S. Faical, G. Pessin, G. P. R. Filho, A. C. P. L. F. Carvalho, G. Furquim, and J. Ueyama, ‘‘Fine-tuning of UAV control rules for spraying pesticides on crop fields,’’ in Proc. IEEE 26th Int. Conf. Tools Artif. Intell., Limassol, Cyprus, Nov. 2014, pp. 527–533, doi: 10.1109/ICTAI.2014.85.
[9] T. Nishimura, Y. Okuyama, A. Matsushita, H. Ikeda, and A. Satoh, ‘‘A compact hardware design of a sensor module for hydroponics,’’ in Proc. IEEE 6th Global Conf. Consum. Electron. (GCCE), Nagoya, Japan, Oct. 2017, pp. 1–4, doi: 10.1109/GCCE.2017.8229255
[10] K. Pernapati, ‘‘IoT based low cost smart irrigation system,’’ in Proc. 2nd Int. Conf. Inventive Commun. Comput. Technol. (ICICCT), Coimbatore, India, Apr. 2018, pp. 1312–1315, doi: 10.1109/ICICCT.2018.8473292.
[11] S. B. Saraf and D. H. Gawali, ‘‘IoT based smart irrigation monitoring and controlling system,’’ in Proc. 2nd IEEE Int. Conf. Recent Trends Electron., Inf. Commun. Technol. (RTEICT), Bengaluru, India, May 2017, pp. 815–819, doi: 10.1109/RTEICT.2017.8256711.

Environmental Monitoring using wirelessDevelopment Module with LoRaWAN

S Usha[1], Bhoomika GK[2], Chandana R[3], Bharathi R[4]

[1]Prof. & HOD, Computer Science and Engineering,RajaRajeswari college of Engineering,Karnataka,India
[2,3,4]Research scholar,Computer science and engineering,RajaRajeswari college of Engineering,Karnataka, India

ABSTRACT

This paper proposed the prototypes of a Long Range (LoRa) WAN network for environmental monitoring a air qualitysensor, soil moisture sensor, a temperature and humidity sensor, a raindrops sensor, and a LDR sensor. The different levels of soil depth with respect to the ground surface. As compare to Wi-Fi module, mobile communication, Bluetooth another wireless technique a LoRa esp32 sx1276 acts as a LoRa wireless communication module for long-rangeenvironment data transfer. The proposed network that operating with two wireless communication frequency bands, 925.2MHz for node-to-gateway communication and 2.4GHz (WLAN) for gateway-to-cloud communication. Furthermore, the proposed network with three wireless sensor nodes and a single LoRa gateway was experimental. Asa results, the sensor node able to environmental sensing and transfer data to the gateway. The environmental data of soil moisture under the ground surface 20cm, 40cm, and 60 cm more than 90% accuracy compared to the standard instrument. Additionally, the LoRa transceiver range is approximately 600 meters (Non-line-of-sight: NLOS) and the LoRa gateway automatically transmits environmental data to the cloud storage every 15 seconds.

Keyword: - *ESP32,LoRaWAN, Soil mositure, IOT, Rain drop, LDR sensor sensor,Temperature and Humidity sensor etc….*

---

1. INTRODUCTION

Environment Monitoring system are generally used to regularly observe and routinely collect data, and they have been used in this modern era being affected by various environmental phenomena and conditions. The popular environment monitoring system at the moment is wireless sensor network because its performance and easy to use in sensing and transferring data. LoRaWAN (Long Range Wide Area Network) is a technology that is capable of transmitting long distance data using a energy efficient radio frequency so that it is very good when applied to areas. The use of LoRaWAN for sensor data acquisition in environment monitoring can be applied system peer to peer connection that is sensor node and gate way for storing data.IOT supports the growth of several applications by using the theoretically massive amount and diversity of data collected by devices, subsequently providing different services for the people and communities. A wide variety of IoT applications exist to date, including smart cities, smart homes, smart streets, air and water quality monitoring systems, and healthcareapplications. More interestingly, IOT has redesigned the route in which users usually communicate with applications, subsequently supplying them with advanced networking and intermediate interfaces with socializing capabilities and sensors are used to detect and take the input from the surrounding environment the input can be light, heat, motion, moisture and pressure.

1.1 EXISTING SYSTEM OF PROBLEM STATEMENT

Environmental monitoring technology for air and water safety primarily uses manual labor along with advanced instruments and lab processing. The consistent Currently all the environmental monitoring are controlled manually. Sensors detect and measure every type of environmental change. collection of measurements and data from physicalenvironment, using sensors and connected devices. Currently it is used to detect air pollution, temperature and humidity, level of carbon and oxygen in environment.

The main reasons for inefficient environmental monitoring systems are:

i. The effects of air pollutions are alarming, causing green house effect, heart and respiratory problems.

ii. Excessive usage of vehicles also contributes to air pollution with the emission of CO_2, SO_2, CO, and nitrogendioxide.

iii. Vehicles produce air during their life style, including the emissions during vehicle service and processing of fuel. These harmful gasses not only affect human being but also cause green house effect and global warmingin cases of server air pollution.

1.2 PROJECT OBJECTIVES

- To estimate the changes in levels of the pollutants in the environment.
- Confirming and reconfirming the success of the pollution control measures.
- Collection of meaningful and relevant information.
- Know the nature and degree of pollution from various sources.
- Recommendation of improves mitigation measures to be undertaken.

2 LITERATURE SURVEY

[1] In this research, there are 3 main parts, the first main part is the proposed LoRa network design that consisted of multi LoRa wireless environment sensors node and single LoRa gateway. This part explains the whole of the proposed LoRa network. While the second main part is environment sensor node design which describes only the structure of each sensor node. The third main part presents the design of the LoRa gateway with Raspberry Pi. A. LoRa network design The designing of LoRa network for agriculture area application was consisted of multiple LoRa environment sensor nodes with microcontrollers, LoRa gateway, and cloud storages.

[2] The proposed firmware update process is applicable to any device that uses the LoRa protocol and is equipped with additional memory to store the new code. The memory can be external to the processor or internal if the criteria in Equation (1) is met. Here, Device designates the total amount of flash memory, Application represents the flash memory requirements of the application, and Bootloader represents the requirements for the boot loader. Figure 2 depicts the hardware components associated with the proposed system, and includes components to carry out RF processing, battery monitoring, and an external flash (if required). The battery monitor can vary in complexity but must be capable of approximating the remaining battery capacity, as discussed below in Section.

3 METHODOLOGY

In methodology of this research, there are 3 main parts, the first main part is the proposed LoRa network design that consisted of multi LoRa wireless environment sensors node and single LoRa gateway. This part explains the whole of the proposed LoRa network. While the second main part is a wireless environment sensor node design which describesonly the structure of each sensor node. The third main part presents the design of the LoRaWAN gateway with ESP32microcontroller. A. LoRa network design The designing of LoRaWAN network for agriculture area application was consisted of multiple LoRa environment sensor nodes with microcontrollers, LoRa gateway, and google fire base cloud storages. The LoRa network was separated to two sections as:

1) Hardware section: Each environment sensor nodes were collected environmental data in difference agricultural areas. Then 925.2MHz wireless transmitting data to a ESP32 microcontroller that dedicated to central processing unit of a LoRa gateway. Finally, all environmental data has been uplink from LoRa gateway to google fire base cloud storage with 2.4GHz of WiFi frequency band.

2) Software section: Software design has categorised into three parts that depending on microcontrollers and cloud storage. In ESP32 microcontrollers Heltec LoRa were used Arduino IDE computer software. ChirpStack LoRaWAN®Network Server served as an open source platform cloud storage. Also, MIT app represent to a data

monitor and analysis. B. Sensor nodes design Typically, a wireless sensor consists of a power source, analog or digital sensors, a microcontroller for data processing and a suitable wireless transceiver protocol. In this work, the environment wireless sensor nodes have been designs based on low-cost low complexity but high sensing accuracy.

3) The designing split intotwo sections as:
Hardware section: Each environment sensor nodes comprised of various sensors such as soil moisture sensor, temperature and humidity sensor, LDR sensor, and raindrops sensor. There are microcontrollers Heltec LoRa esp32 and act as a processor for data evaluation in various situations, also transmit data to LoRa gateway. ESP32 microcontroller provided to collected environmental data from each sensors with real-time clock (RTC) and google firebase as a self-storage.

Node LoRaWAN esp32 low power microcontroller dedicated to a 925.2MHz wireless communication unit between sensor node and LoRa gateway

(a) Air monitoring sensor
(b) Soil moisture sensor
(c) Rain drop sensor
(d) Temperature and Humidity sensor
(e) LDR sensor

3.1 BLOCK DIAGRAM

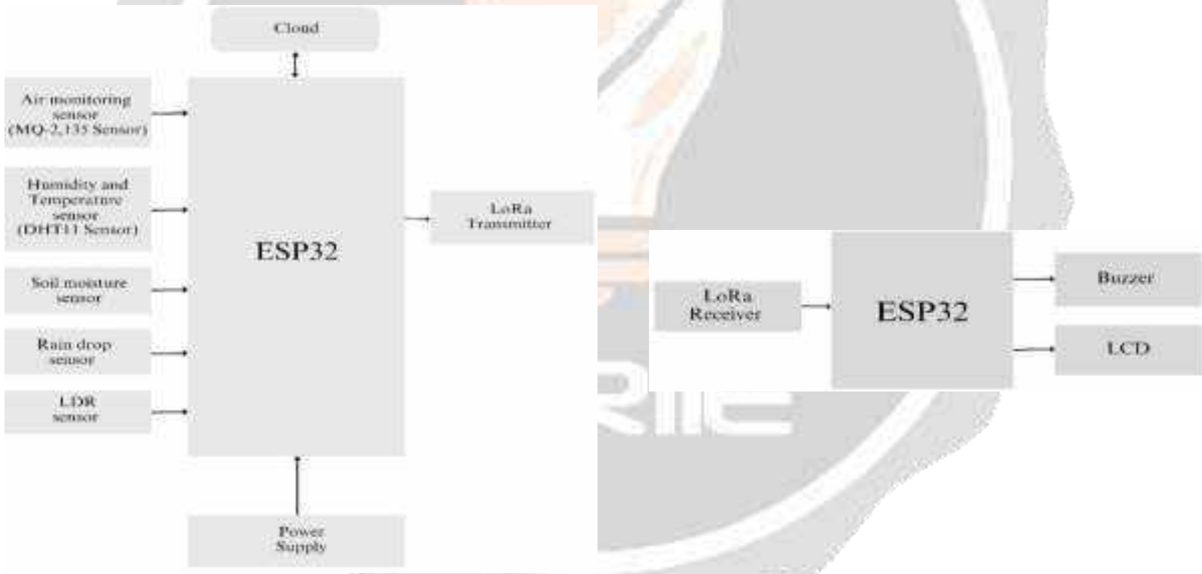


Figure 1. **LoRaWAN transmitter and receiver module**

3.2 PROPOSED METHOD:

- This Project consists of Two setups, both consisting of ESP32 microcontroller & LoRa module each.
- One setup is placed to monitor forest area and the other will be near the user in city who will monitor/check thesetup which is placed in the agriculture.
- In the first setup various Sensors are connected to ESP32 microcontroller and a LoRa module is connected to itand this complete set up which is placed, monitors the various activities going on inside the forest and transmitsinformation using LoRa whenever there is an alert detected.

- In forest fire, the flame/fire sensor detects it and water pump joined with the ESP 32 microcontroller doses of the fire. The LoRa module which is connected to ESP 32 transmits this alert generated.

- This generated alert is received by setup 2 which is present with the user and this information is sent to the Google Firebase which keeps track of these information.

3.3 MODULE DESCRIPTION

Wi-Fi Module

- ESP32 is a series of low-cost, low-power System on a chip microcontrollers with integrated Wi-Fi and dual-mode Bluetooth.
- ESP32 is highly-integrated with in-built antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules.
- ESP32 achieves ultra-low power consumption with a combination of several types of proprietary software.

Air Monitoring Sensor

Air monitoring sensor are categorized into two types: Gas sensor and Smoke sensor.

- The MQ-135 Gas sensor can detect gases like Ammonia (NH_3), sulfur (S), Benzene (C_6H_6), CO_2, and other harmful gases and smoke.
- Similar to other MQ series gas sensor, this sensor also has a digital and analog output pin.
- When the level of these gases go beyond a threshold limit in the air the digital pin goes high.

Soil Moisture Sensor

- Soil moisture sensors measure the water content in the soil and can be used to estimate the amount of stored water in the soil horizon.
- The direct measurement gravimetric of soil moisture requires removing and weighing of a sample.
- Measuring soil moisture is essential for agricultural purpose to help farmers manage their irrigation systems more efficiently.

Rain drop Sensor

- The Raindrop sensors are used for the detection of rain and also for measuring rainfall intensity.
- The raindrop sensor measures the moisture via analog output pins and it provides a digital output when a threshold of moisture exceeds.
- The raindrop sensors can be used in the automobile sector to control the windshield wipers automatically, in the agriculture sector to sense rain and it is also used in home automation systems.

Temperature and Humidity

- This are the commonly used sensor in environmental monitoring.
- Humidity sensor which provides the humidity condition within the air at any given point.
- Temperature sensor which measure the amount of heat generated from an area.

LDR Sensor

- LDR (Light Dependent Resistors) is also known as Photo resistors.
- LDR sensor are used to sense the presence and absence of light

4. CONCLUSIONS

LoRaWAN based agriculture monitoring has been proposed. To enable monitoring such as soil moisture, LDR, temperature, and humidity in wide agriculture area. There is combination of multi-wireless sensor nodes which is environment data sensing, data collecting and data transfer to LoRa gateway. A single LoRa gateway represented a data logger and data transmitter to cloud storage. Cloud is used for data monitoring in a visualization also, it can useas data analytics tools. From experimental show that, the proposed LoRa network properly operation with longest wireless distance of 600 meters. Furthermore, the environment data of LoRa wireless sensor node has validated environment data of LoRa node with standard instrument. A single soil moisture sensor which three different in soildepth indicated that all measurement defect was 9%. Additionally, the LoRa gateway capable work with two modes,first environment data self-storage and second, environmental data transfer to cloud storage via wireless communication network.

5. REFERENCES

[1] F. Turcinovic, J. Vukovic, S. Bozo, and G. Sisul, "Analysis of LoRa Parameters in Real-World Communication," Proc. Elmar - Int. Symp. Electron. Mar., vol. 2020-Septe, no. September, pp. 87–90, 2020, doi: 10.1109/ELMAR49956.2020.9219028.

[2] D. Heeger and J. Plusquellic, "Analysis of IoT Authentication over LoRa," Proc. - 16th Annu. Int.Conf.Distrib.Comput. Sens. Syst. DCOSS 2020, pp. 458–465, 2020

[3] S. Opipah, H. Qodim, D. Miharja, Sarbini, E. A. Z. Hamidi, and T. Juhana, "Prototype design of smart home system base on LoRa," Proc. - 2020 6th Int. Conf. Wirel. Telemat. ICWT 2020, 2020, doi: 10.1109/ICWT50448.2020.9243643.

[4] G. Codeluppi, A. Cilfone, L. Davoli, and G. Ferrari, "LoraFarM: A LoRaWAN-based smart farming modular IoTarchitecture," Sensors (Switzerland), vol. 20, no. 7, 2020, doi: 10.3390/s20072028.

SMART HOME AUTOMATION, SECURITY& ENERGY OPTIMIZATION

Usha S[1], Chaithanya M[2], Jesica G V[3], Lavanya N Murthy[4]

[1] Professor, Computer Science Engineering, Rajarajeswari College of Engineering, Karnataka, India [2] Student, Computer Science Engineering, Rajarajeswari College of Engineering, Karnataka, India [3] Student, Computer Science Engineering, Rajarajeswari College of Engineering, Karnataka, India 4 Student, Computer Science Engineering, Rajarajeswari College of Engineering, Karnataka, India

ABSTRACT

For almost 10 years, the home automation industry has attracted some academics' interest. Any automated system's main selling point is its reduction of manual labor, effort, time, and mistakes brought on by human error. Smartphones have become a must for every individual which results in the advancement of contemporary technology. There is an urgent need to save energy in every aspect due to the rise in population and energy usage. The main causes of energy loss is the inert to access and manage applications in remote areas. This article provides a review for these systems.

Keyword Smart Home, phone, Voice Control, wireless technology.

1. INTRODUCTION

Up until quite recently, only bigger commercial structures and affluent houses had computerized the control for all systems throughout the building. Building automation, which often just involves lighting, heating, cooling systems, seldom offered more complex management, monitoring, and scheduling features and was only available for distinct power locations in the building. We have pushed for omnipresent computation of many aspects of life since the 'Internet of Things' emerged in the past ten years.

Therefore, making it easier for people to communicate within technology is crucial. One such topic that seeks to attainsimplicity while boosting efficiency is automation. A voice-activated smart home seeks to further automation to attain simplicity. The point at which home automation truly "smart" resides in Internet-capable hardware that connects to the network which manages it. The smart home, by which many of the early smart home were created, is the standard control device. The panel which controls the security system, forexample, a app that drifts can be examined through an Internet-enabled PC, smartphone, tablet are more frequently used in today's smart home to spread program and monitor control. To compare the characteristics offered the existing systems, this study will conduct a analysis of all of them. The essay will also contrast and analyze each system, examining its many merits and downsides. Smart home come with a wide range of possibilities.

1.1 BACKGROUND

Home automation" is a concept that has been for a while. The words "Smart Home" and "Intelligent Home" were used to introduce the idea of networking gadgets inside the home.

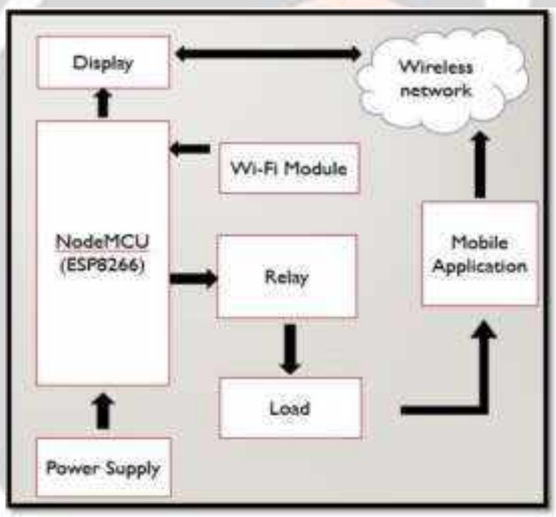
Home appliances automatically gather electrical information, analyses it, and manage it using intelligent interactive interfaces, smart sockets, and other smart devices. Home appliances also accomplish economical operation and energy control. The system may remotely operate home and other services by phone, mobile phone, internet, and other channels. We can also achieve tasks like smoke, gas leak detection, anti-robbery, extremity assistance. We can also automatically collect and manage information from water, gas meters, support systems, and daily oversight of residential. Your research work Introduction related your research work Introduction related your research work Introduction related your research work Introduction related your research work Introduction related your research work Introduction related your research work Introduction related your research work.

1.2 PROBLEM STATEMENT

One of the most well-known and well-liked examples of modern technological breakthroughs is smart homes. Who wouldn't want to be able to quickly and easily control their household appliances from their smartphones? Smartphones and tablets, which can do a lot of the work that a computer can do, are becoming more and more commonplace. In order to assist automate the entire home, we have decided to develop a low-cost embedded technology that works with smartphones. The industry has made considerable advancements in automation, and most car and bottling plants now use automated assembly lines. If automation was used in houses, life would be simpler on a daily basis. It is capable of monitoring internal activity and using a home automation system, outside our house. These security cameras also record images of suspected on-property visitors. When we are not at home, we can also unlock the door remotely for visitors, the elderly, or children. Even if you aren't home, it will get real-time notifications from your smartphone on who is entering your house.

2. ARCHITECTURE

The block diagram displays the project's overall functioning. The main controller, or microcontroller, of the systems, is the Node MCU unit. The mobile application is used by the user to program commands for the devices to follow. Here the user speaks or switches to switch mode, the web app recognizes their command and utilizes wifi communication over the wireless network and sends the signal to node mcu.



Flowchart

The system's main controller or microcontroller is Node MCU. Using a mobile application, the user configures commands for the appliances' operation. The user's voice command or switch-mode command is translated by the web app into a signal that is transmitted over the wireless network to the Node MCU established up utilizing Wi-Fi communication. The power for the microprocessor, relay, and finishing appliances comes from independent power supplies. On a display unit, the application's status is also displayed. Before transmitting the user's command to the Node MCU unit through a wireless Wi-Fi network, the mobile application understands the user's command form in voice or switch mode. The Wi-Fi module, which is really incorporated inside Node MCU, enables this as a result. T the microcontroller to set up a wireless network connection for a device and receive instructions from the application.

The programmer takes user commands in one of two ways:

• Switch mode: This mode makes use of the check boxes often found on smart home appliances. The check box relays the switch's current status.

• App mode: Using the internet or Wi-Fi, we can control our smart home appliances in app mode from a distance. Thedata is analyzed and processed.

2.1 PROPOSED SYSTEM ARCHITECTURE

The design of the intended smart home system. The system is composed of a variety of sensors, including smoke and flame detectors, and actuators, including buzzers and displays. The MCU of the system is the microcontroller found in Node MCU unit. Using a mobile app, the user configures commands for the appliances to operate. The Node MCU employs a relay to switch on or off the appliance after receiving the signal. The relay, final appliances, and Node MCU are connected physically. One power brick supplies electricity to the final appliances, the relay, and the CPU. On a display unit, the application's status is also shown.

2.2 HARDWARE COMPONENTS

- **Node MCU** is a low-cost, user-friendly open source IoT platform. It began with firmware and hardware based on Espresso Systems' ESP8266 Wi-Fi SoC. Later, the list of compatible devices was expanded to include the ESP32 32-bit MCU. Using a NodeMCU ESP8266, the Home Network's web server was developed. The information in Section indicates that the Home Network has an Internet connection. An ESP8266, a Ten silica L106 32-bit RISC processor which can be programmed in C over USB, powers the open-source Node MCU microcontroller. Node MCU also has 16 digital pins and 1 analogue pin for input and output functions, allowing connections to other devices.
- **A flame-sensor** is a particular kind of detector that is mainly used to identify and react to the existence of a fire or flame. The installation of the flame detector may have an impact on how it responds. Included are a fire suppression system, a propane line, a natural gas line, and an alarm system. This sensor is utilized in industrial boilers. The main goal of this is to check the boiler is functioning correctly. These sensors respond faster and with more accuracy than a heat/smoke detector caused by the technology employed to detect the flame. An electrical circuit and an electromagnetic radiation receiver can be used to create this sensor/detector. It employs the infrared flame flash technique.

3. TECHNOLOGIES

interactive control of home appliances: based on user demands, analysis of household electrical load, create and enhance the electricity program to direct customers towards sensible power consumption; according to the user's request for hosting services, an operation program for power equipment optimization for a home intelligent interactive terminal, or automatic management acceptable electricity use for household appliances.

Management of household electricity: Real-time access to home and appliance electrical data, such as electricity, voltage, current, load curve, etc., allows for the viewing of various pricing data, such as the current price and the price at the time the appliance is being used. Set the designated electrical running time to give consumers a customized electricity program. home items and appliances for electricity analysis and energy-saving recommendations.

Power information service: Grid operation is a part of the service. user electricity consumption, remaining electricity, electricity, electricity, electricity balance and electricity purchase records, as well as real-time electricity pricing, electricity policy, electricity service, and other information release.

3.1 MAIN FEATURE

The developed prototype has the following characteristics:

- It develops a wireless remote switching system for household appliances;
- The prototype has an inside range of about 150 feet due to Wi-Fi wireless control.
- By tapping the radio buttons on the application on a smartphone, users may remotely switch on and off domestic appliances by using a function developed to use voice commands on smartphones.
- Any device with Wi-Fi connectivity can use the prototype.
- SSH and SSL over TCP are used to provide secure connections in order to run home appliances.

The easy design makes it simple to expand the range and include into a number of appliances, and it shows the state of each appliance on the display.

4. CONCLUSIONS

Smart home services are an essential component for electricity consumption and a key way to achieve real-time interactive user response, improve all-inclusive service capability, reach the demand for interactive marketing, services, and improve communication linking client and the grid. Real-time sharing and interaction are integrated to achieve brilliant use of electricity, to further enhance power operation and user power usage, and to raise end users' energy efficiency.

Testing and development of related hardware and operating system which achieve the smart included brilliant interactive ends, set-top boxes, smart sockets, and other smart home sensor tool, networking programs. Household equipment the authentic design of the power information collects system below the hybrid network mode was completed, and an power information additional device and system that form the broadband power network mode and the wireless network were developed to provide domestic users. Dependable power supply stint expanding the capabilities of a home automation.

5. REFERENCE

[1]. By Satyendra K. Vishwakarma, Prashant Upadhyaya, Babita Kumari, and Arun Kumar Mishra, "Smart Energy Efficient Home Automation System Using IOT".

[2]. At the 2016 Third International Conference on Computing Measurement Control and Sensor Network, Tui-Yi Yang, Chu-Sing Yang, and Tien-Wen Sung presented "A Dynamic Distributed Energy Management Algorithm of Home Sensor Network for Home Automation System".

[3]. By Suraj, Ish Kool, Dharmendra Kumar, and Shovan Barman, "Visual Machine Intelligence for Home Automation"

DEVELOPMENT AND ANALYSIS OF POTHOLE DETECTION AND ALERT BASED ON NODEMCU

Hemavathi J [1], Ganavi C V[2], Harshitha Jayasree R[3] , Hemanth R[4]

[1] *Assistant Professor, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*
[2] *Student, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*
[3] *Student, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*
[4] *Student, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

The system is implemented using an ultrasonic sensor to detect the presence of a pothole and uses NodeMCU for data transfer to send the information of the potholes detected. When a pothole is detected, the GPS module captures the potholes' location, and the Global System for Mobile communication (GSM) module sends a message to the user's phone, alerting them about the pothole's presence and providing the location information. This information can help road users to avoid the pothole and decreases the risk of accidents. This system is an innovative solution to the problem of potholes on roads. By alerting road users about the presence of potholes, the system helps to improve safety of roads, decreases accident rate, and save lives. The system is also cost-effective and can be easily implemented on existing roads without any significant modifications.

Keyword : - *Pothole.*

---

1. INTRODUCTION

Roads are an essential part of our transportation infrastructure, connecting people and goods across long distances. However, road maintenance is a very critical issue, as the degradation of roads may lead to numerous problems, including increased accidents and damage to vehicles. A major problem faced on the roads is the formation of potholes, which causes severe accidents and damage to vehicles. Potholes are formed due to various factors, which includes weather changes, heavy traffic, and poor road maintenance. To address this issue, the proposed system uses an IoT-based approach to detect potholes on roads. In the system we use an ultrasonic sensor for the detection of potholes on the road. When a pothole is detected, the system sends an SMS alert to the user's mobile phone, including the location of the pothole using GPS technology. The system can help in reducing accidents and vehicle damage caused by potholes, ensuring safer and smoother journeys for people and goods. The system consists of an ultrasonic sensor, a GSM module, a GPS module, and a NodeMCU development board. The ultrasonic sensor detects the presence of a pothole on the road, and the GSM module sends an SMS alert to the user's mobile phone, including the potholes location. The GPS module provides the location of the pothole, ensuring accurate identification of the pothole's location.

2. PROPOSED WORK

The system being proposed aims to develop a reliable and efficient method for detecting potholes on roads using IoT technology. The system consists of an ultrasonic sensor, NodeMCU, GPS module, GSM module, and a battery. An ultrasonic sensor is mounted on a vehicle, using which potholes that are present on the road surface is detected. When the ultrasonic sensor detects a pothole, it sends a signal to the NodeMCU, is a microcontroller board with Wi-Fi capabilities. The NodeMCU processes the signal and sends SMS alerts to the user's mobile phone, using the GSM module. The SMS alert includes the potholes' location, which is obtained using the GPS module. The system is powered by a battery, which makes it portable and easy to use. The system proposed poses many advantages over the existing methods for the detection of potholes. It is automated, efficient, and can detect potholes in real-time. Moreover, it does not require a specialized skill or manual inspection, which saves time and resources. Additionally, the GPS technology used provides accurate location information, which helps to plan road maintenance and repair work more effectively.

3. COMPONENTS USED IN PROPOSED WORK

3.1 NodeMCU :
NodeMCU is a development board based on the ESP8266 microcontroller, which is conventionally used in IoT projects due to its built-in WiFi capabilities and ease of programming. NodeMCU provides a low-cost and efficient solution for connecting various sensors and devices to the internet, enabling remote control and monitoring. It can be programmed using the Arduino IDE and supports a extensive range of popular programming languages such as Lua and MicroPython.

Fig -1: NodeMCU

3.2 GSM Module :

GSM modules are mainly used in IoT projects for remote communication over the cellular network. They provide a way to send and receive SMS messages and make phone calls, allowing devices to communicate with each other or with humans. GSM modules are conventionally used in applications such as home automation, security systems, and vehicle tracking. They are available in various form factors, including miniaturized modules for wearable devices, and can support multiple frequency bands for global use.

Fig - 2: GSM Module

3.3 Ultrasonic Sensor :

Ultrasonic sensors are majorly used in IoT projects for distance measurement and object detection. They emit high-frequency sound waves and measure the time it takes the sound waves to bounce back from the object, calculating the distance to the object. These sensors are widely used in applications such as robotics, parking sensors, and security systems. They are available in various ranges and form factors, including waterproof sensors for outdoor use.

Fig - 3: Ultrasonic Sensor

3.4 GPS Module :

GPS modules are used in IoT projects for location tracking and navigation. They use the Global Positioning System to obtain the device's location and provide accurate coordinates, speed, and altitude data. GPS modules are conventionally used in applications such as fleet management, logistics, and outdoor sports. Integration with other sensors and devices like accelerometers and gyroscopes are also possible to provide advanced positioning information.

Fig - 4: GPS Module

4. CONCLUSION

This system effectively detects potholes on the road and notifies the relevant authorities and road users about their locations. Our system is designed aiming for the improvement of road safety and reducing the rates of accidents caused by potholes. The system's technical feasibility and economic realizability were determined through the feasibility study, which indicated that this system could be implemented with reasonable costs and technology. The system's implementation and testing were successful, as evidenced by the accurate detection of potholes in real-world scenarios. The integration of this system with existing road maintenance systems are also possible to streamline the process of pothole repairs. The project achieves its objectives, and the system can be further improved and expanded for more extensive road network coverage and additional functionalities. Overall, the proposed system developed has the potential to contribute to a safer and more efficient transportation system.

5. REFERENCES

[1]. Amitha Terish, Shiji Johnson T D, Sinu Valsan, Sooraj P, Indrasena N V "Real Time Pothole Detection and Road Monitoring System" International Journal of Innovative Research in Science, Engineering and Technology, Vol. 8, Issue 6, June 2019.

[2]. Vaishnavi Kinderley, Chaitali Malode, Janvi Bhojwani, Sujata Chiwande "Pothole recognition and alert using ultra sonic, GPS and GSM" International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 7, Issue 2, March 2018.

[3]. G. Singal, A. Goswami, S.Gupta,T choudhury " PITFREE: Pot Holes Detection on Indian Roads Using Mobile sensors" IEEE 8th International Advance Computing Conference (IACC), 14th-15th Dec,2018.

[4]. Stepheena Joseph, Mr.K.Edison Prabhu "ROLE OF ULTRASONIC SENSOR IN AUTOMATIC POTHOLE AND HUMP DETECTION SYSTEM" International Journal of Scientific & Engineering Research Volume 8, Issue 7, July-2017.

FACE RECOGNITION FOR ATTENDANCE MANAGEMENT

T.Auntin Jose[1], Kruthika S Murthy[2], Sumanth V[3]

[1] *AssistantProfessor,ComputerScienceEngineering,Rajarajeswari College of Engineering,Bangalore,India*
[2] *Student, ,Computer Science Engineering,Rajarajeswari College of Engineering,Bangalore,India*
[3] *Student, ,Computer Science Engineering,Rajarajeswari College of Engineering,Bangalore,India*

ABSTRACT

The suggested attendance management takes footage from a webcam, detects faces, and compares them to a database of recognized faces using the OpenCV and face_recognition libraries. Arrays are used to store the names and known faces. The script examines the video feed and uses the face encodings of the known faces to compare each identified face to the known faces. If a match is discovered, the student's name and a message confirming their attendance are shown on the screen. A CSV file with the current date as the filename is also created by the script to store the attendance information. The 'q' key can be used to halt the attendance system. It can be applied to offices, institutions, and schools to speed up and save time on the attendance process.

Keyword : - *Face recognition , Image Encoding, OpenCV, Real-Time.*

1. INTRODUCTION

Facial recognition is swiftly overtaking other types of biometrics (Fingerprints, RFID, etc.) because facial recognition systems use a collection of attributes specific to one person. Image processing is now a very exciting issue that has only scratched the surface. For image processing and facial recognition, the project makes use of a number of open-source tools and the Python programming language. The project's primary goal is to develop an automated attendance system that makes use of facial recognition technology. Pen and paper attendance taking is a time-consuming process that can lead to mistakes, proxies, and manipulations. The suggested method intends to address these issues and improve the effectiveness and dependability of the attendance procedure. The task entails employing a webcam to capture photographs of students, processing the images to identify faces, then contrasting the identified faces with a database of known students' faces. The system records the identified students' attendance after which it saves the attendance information in a CSV file. Additionally, the system shows the real-time names of identified students on the screen. The project is adaptable and can be changed to fit the unique requirements of other institutions.

The proposed study underlines the value of investigating the potential uses of image processing and recognition in numerous industries and illustrates how facial recognition technology has the potential to revolutionize conventional attendance systems.

1.1 Existing System

Currently, most educational institutions track students' attendance manually using tools like pen and paper or attendance registers. Due to its reliance on the accuracy of the person marking the attendance, this procedure takes a long time and is prone to mistakes. Students can sign on behalf of their classmates in this system, which makes attendance records unreliable. Another widely used technique is the use of swipe cards or RFID-based systems, where students swipe their cards to log their attendance. This system is expensive to build and operate, and there is still a potential that students will swipe for their absent classmates. Overall, the current procedures have problems, including the possibility for mistakes and manipulation, and are neither time- nor money-efficient. To overcome these limitations, a system that is more precise and efficient is needed.

1.2 Proposed System

The suggested method makes use of facial recognition technology to accurately record attendance in an effort to replace the current approach, which is cumbersome and vulnerable to fraud. The technology employs a camera to record each student's face who is physically present in the classroom. A list of recognized faces and their accompanying encodings are then used to compare the acquired image to. The programme recognizes the face and compares it to known faces using the face recognition library. If a match is found, the name of the student is displayed on the screen and the system records the time the student arrived. The system also saves the attendance record in a CSV file with the current date as the file name.Utilising OpenCV and face recognition libraries, it is implemented in Python. The loaded picture files contain the known faces and their encodings. To identify the students, the system consults a list of recognised facial encodings and their related names.The suggested solution is anticipated to be more precise and efficient than the current attendance system. It does away with the necessity for manual attendance taking, which saves time and lowers the possibility of proxies. Since the system recognises students using facial recognition technology, it also makes sure that the attendance record is accurate.

2. SYSTEM DESIGN

In order to automate the taking of attendance in a classroom context, the suggested system for the Attendance Management System utilising Facial Recognition makes use of computer vision and machine learning. The technology is intended to take the place of the time-consuming, proxies- and manipulation-prone old pen-and-paper method.A camera attached to a computer or laptop is used in the system design to take a picture of each student as they enter the classroom. The OpenCV library is then used to process the image, enabling facial detection and recognition. The pre-trained facial recognition model offered by the face_recognition library is used to compare the faces to a database of recognised faces.

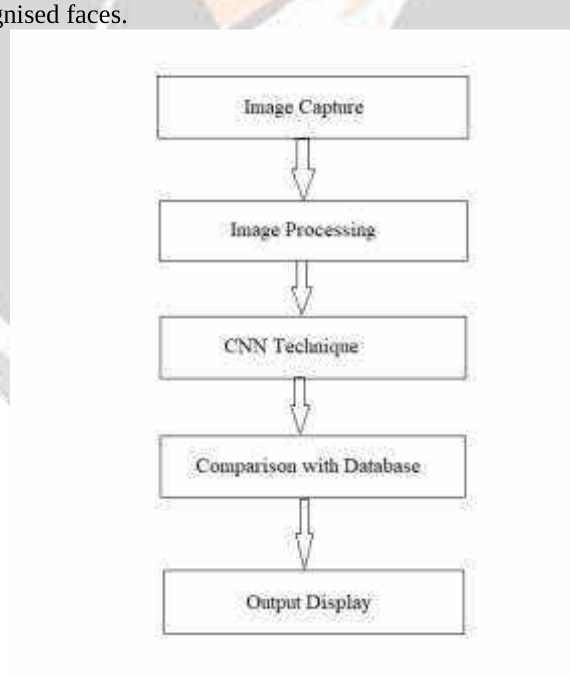


Chart -1: Flowchart of the Proposed System

A database of recognised faces and their accompanying names is also part of the system. Prior to the commencement of class, this database is filled with pictures of the students. The associated name and a message stating that the student is present are displayed on the screen when a face is identified and recognised. A CSV file containing this data is also kept as a record of it.With the ability to speed up and improve the accuracy of the attendance-taking process, the system is made to be effective, accurate, and simple to use. Facial recognition technology can also assist in preventing proxy attendance and enhancing the integrity of the attendance system as a whole.

3. METHODOLOGY

To successfully complete the process of developing an intelligent attendance management system, various measures must be taken. These are the steps that can be defined:

- Database Creation
- Face detection
- Face recognition
- Report generation

.

3.1 Database Creation

A critical stage in the system's implementation is building a database for the Attendance Management System utilising facial recognition. The relevant student data, including names and identification numbers, will be kept in the database.The system will take a picture of the student at registration in order to train the facial recognition algorithm. Each pupil will have a single photograph taken by the system for training reasons. Along with the student's data, this picture will be kept in the database.

3.2 Face Detection

The corners of the eyes, the nose, the corners of the mouth, and other prominent facial features are among the 68 hallmarks of faces. A technique known as shape predictor is used to find these landmarks in a face image by predicting their locations using a machine learning algorithm.The faces in the input image are aligned using the landmarks that have been discovered. Face alignment refers to the transformation of the face into a standardised position and orientation. This enhances facial recognition accuracy and lessens the impact of changes in stance, lighting, and other factors.

3.3 Face Recognition

Deep learning models called convolutional neural networks (CNNs) are frequently employed in image processing and object recognition tasks. Because they can extract features from the unprocessed image data, they are especially good at identifying patterns in images.In the context of face recognition, CNNs can be trained to recognise and extract significant facial features from the raw input image, such as the eyes, nose, mouth, and so on. The face in the image is then recognised using these extracted features.A huge dataset of labelled face photos is often fed to the network during the training of a CNN for face recognition. The network gains the ability to identify key face traits that are helpful for distinguishing between various people throughout training.After being taught, the network may be used to identify faces in fresh, unlabeled pictures. To accomplish this, a new image is fed into the network, and the network's output is used to identify if the face belongs to one of the well-known people in the training dataset.One benefit of employing CNNs for face recognition is that they can handle differences in lighting, facial expressions, and other environmental elements that can make it challenging to reliably recognise faces using conventional techniques. CNNs can also be used to identify faces even when just a portion of the face is visible, like when the face is partially hidden by a mask or another object.

3.4 Report Generation

The names and enrollment numbers of the students who were identified as being present during the lecture are included in the report, which is generated in Excel format. The inclusion of this data in the report may be beneficial for future analysis and evaluation of student involvement and attendance.

4. RESULTS

a trustworthy and precise face recognition-based attendance management solution. The CNN algorithm has a remarkable 99.27% accuracy rate. The system was put to the test under a variety of circumstances, including variable lighting conditions, head motions, facial expressions, and the students' proximity to the camera. Additionally, the system was effective at distinguishing between faces with and without beards and glasses. Overall, the suggested approach proved to be a dependable and precise instrument for applying facial recognition technology to manage attendance.

Fig -1: CSV file Output

Fig -2: Live Input

5. CONCLUSIONS

It may be said that the traditional attendance system can be greatly enhanced by the application of facial recognition technology. The suggested system replaces human attendance sheets by using face recognition algorithms to automatically detect and identify students in a classroom and record their attendance. Compared to the conventional pen and paper method, this system is intended to be more effective, accurate, and resistant to manipulation.

The system's design entails taking video input from a camera, processing it through a number of libraries and algorithms, and then matching the results with a database of student photos and encodings to identify faces. After the identified students are marked present, their attendance is recorded in a CSV file for further analysis.

The system can yet be improved even though it achieves a high level of accuracy. Deep learning methods or more sophisticated algorithms may be used to increase the accuracy of facial recognition.

6.REFERENCES

[1] V. Shehu and A. Dika, “Using Real Time Computer Algorithms in Automatic Attendance Management Systems.” IEEE, pp. 397 – 402, Jun. 2010.
[2] Prof. P.K Biswas, Digital Image Processing
[3] Yohei Kawaguchi, Tetsuo Shoji, “Face Recognition-based Lecture Attendance System”, “3rd AERU…”, 2005.
[4] B. Kavinmathi, S.Hemalatha, “Attendance System for Face Recognition using GSM module”, 4th International Conference on Signal Processing and Integrated Networks”, 2018.

DETECTING ACCURACY OF FALSEHOOD USING MACHINE LEARNING ALGORITHMS

Chinmaya G[1], Ravikumar K P[2], Anuradha Kumari [3], Nishant Madhukar[4]

[1] *Student, Electronics and Communication Engineering, JSSATEB, Karnataka, India*
[2] *Assistant. Professor, Electronics and Communication Engineering, JSSATEB, Karnataka, India*
[3] *Student, Electronics and Communication Engineering, JSSATEB, Karnataka, India*
[4] *Student, Electronics and Communication Engineering, JSSATEB, Karnataka, India*

ABSTRACT

In recent years, due to the booming development of online social networks, fake news for various commercial and political purposes has been appearing in large numbers and widespread in the online world. With deceptive words, online social network users can get infected by these online fake news easily, which has brought about tremendous effects on the offline society already. An important goal in improving the trustworthiness of information in online social networks isto identify the fake news timely. This paper aims at investigating the principles, methodologies and algorithms for detecting fake news articles, creators and subjects from onlinesocial networks and evaluating the correspondingperformance. This project addresses the challenges introduced by the unknown characteristics of fake news and diverse connections among news articles, creators and subjects. This project introduces a novel automatic fake news credibility inference model, namely FAKE DETECTOR. This project reviews various fake news detection methods involving feature extraction methods like Count vectorizer, TF-IDF Vectorizer, Word Embedding and also different classification algorithms like SVM, Logistic Regression and Gradient Boosting, Random Forest, Decision Trees, KNN and XG- Boost.

Keyword: *Count vectorizer, TF-IDF Vectorizer, Word Embedding, SVM, LR and Gradient Boosting, Random Forest, Decision Trees, KNN and XG-Boost.*

---

1. INTRODUCTION

Fake news denotes a type of yellow press which intentionally presents misinformation or hoaxes spreading through both traditional print news media and recent online social media. Fake news has been existing for a long time, since the "Great moon hoax" published in 1835. In recent years, due to the booming developments of online social networks, fake news for various commercial and political purposes has been appearing in large numbers and widespread in the online world. Data has been increasing at an unprecedented range in an exponential manner and is producing 2.7 quintillion bytes of data everyday. The definition of fake news is information that pushes people down the wrong road. Fake news is spreading like wildfire these days and people are sharing it without confirming it. This is frequently done to promote or impose specific views, and it is frequently accomplished through political agendas. As a result, it is vital to recognize phony news. "Fake news" means "news articles that are intentionally and verifiably false" designed to manipulate people's perceptions of real facts, events, and statements. It's about information presented as news that is known by its promoter to be false based on facts that are demonstrably incorrect, or statements or events that verifiably did not happen.

2. LITERATURE SURVEY

Mykhailo Granik et. al.[16] in their paper shows a simple approach for fake news detection using naive Bayes classifier. This approach was implemented as a software system and tested against a data set of Facebook news posts. They were collected from three large Facebook pages each from the right and from the left, as well s three large mainstream political news pages (Politico, CNN, ABC News). They achieved classification accuracy of approximately 74%. Classification accuracy for fake news is slightly worse. This may be caused by the skewness of the dataset: only 4.9% of it is fake news.

Himank Gupta et. al.[17] gave a framework based on different machine learning approach that deals with various problems including accuracy shortage, time lag (BotMaker) and high processing time to handle thousands of tweets in 1 sec. Firstly, they have collected 400,000 tweets from HSpam14 dataset. Then they further characterize the 150,000 spam tweets and 250,000 non- spam tweets. They also derived some lightweight features along with the Top-30 words that are providing highest information gain from Bag- of-Words model. 4. They were able to achieve an accuracy of 91.65% and surpassed the existing solution by approximately18%.

Marco L. Della Vedova et. al.[11] first proposed a novel ML fake news detection method which, by combining news content and social context features, outperforms existing methods in the literature, increasing its accuracy up to 78.8%. Second, they implemented their method within a Facebook Messenger Chabot and validate it with a real- world application, obtaining a fake news detection accuracy of 81.7%. Their goal was to classify a news item as reliable or fake; they first described the datasets they used for their test, then presented the content-based approach they implemented and the method they proposed to combine it with a social-based approach available in the literature. The resulting dataset is composed of 15,500 posts, coming from 32 pages (14 conspiracy pages, 18 scientific pages), with more than 2, 300, 00 likes by 900,000+ users. 8,923 (57.6%) posts are hoaxes and 6,577 (42.4%) are non-hoaxes.

Cody Buntain et. al. [15] develops a method for automating fake news detection on Twitter by learning to predict accuracy assessments in two credibility- focused Twitter datasets: CREDBANK, a crowd sourced dataset of accuracy assessments for events in Twitter, and PHEME, a dataset of potential rumours in Twitter and journalistic assessments of their accuracies. They apply this method to Twitter content sourced from Buzz-Feeds fake news dataset. A feature analysis identifies features that are most predictive for crowd sourced and journalistic accuracy assessments, results of which are consistent with prior work. They rely on identifying highly retweeted threads of conversation and use the features of these threads to classify stories, limiting this works applicability only to the set of popular tweets. Since hithe majority of tweets are rarely retweeted, this method therefore is only usable on a minority of Twitter conversation threads.

In his paper, **Shivam B. Parikh** et. al.[14] aims to present an insight of characterization of news story in the . modern diaspora combined with the differential content types of news story and its impact on readers. Subsequently, we dive into existing fake news detection approaches that are heavily based on text- based analysis, and also describe popular fake news datasets. We conclude the paper by identifying 4 key open research challenges that can guide future research. It is a theoretical Approach which gives Illustrations of fake news detection by analysing the psychological factors.

3. PROBLEM SATEMENT

Fake news have become more prevalent in recent years and with great amount of dynamism in internet and social media, differentiating between facts and opinions, relating to commercial or political upheavals has become more difficult than ever. We use various NLP and pre-processing methodologies like tokenization, stop words removal, lemmatization, stemming and machine learning classification algorithms-LR(Logistic Regression),SVM(Support Vector Machine), Random Forest , XGBoost to built a model that differentiate between fake news and realnews and to analyze the performance of these various classification methodologies to choose the best classifier ondataset.

4. PROPOSED MODEL

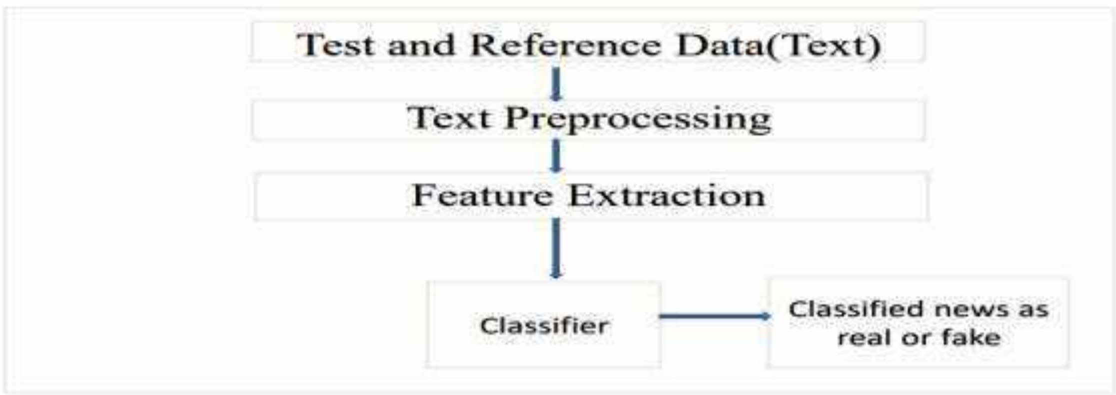


Fig: Model Architecture

5. METHODOLOGY

Step:	News Content
1.	Convert text to lowercase
2.	Remove punctuations, digits, stop words from text
3.	Repeat: Input: Receive each news article Calculate count vector for it Append the count vector to count_feature vector Until the end of news article
4.	Repeat: Input: Receive each news article Calculate the TF-IDF vector for it Append the count vector to tfidf_feature vector Until the end of news article
5.	Repeat: Input: Receive each news article Calculate spacy vector for it Append the spacy vector to Spacy_feature vector Until the end of news article
6.	Parse count_feature vector, tfidf_feature vector and spacy_feature vector into classifier Return feature vector gives us highest accuracy
7.	Build model with the feature vector
Output:	Predict label of news-Fake or Real

Fig: Step by step implementation to solve the problem

6. RESULT & CONCLUSION

S. No.	Models	Accuracy	Precision	F1-score	Recall
1.	Logistic Regression(LR)	0.987973	0.986926	0.987387	0.987848
2.	AdaBoost (ADA)	0.988241	0.987661	0.987661	0.987661
3.	Passive Aggressive Classifier(PAC)	0.995724	0.994958	0.995516	0.996074
4.	XGBoost	0.990468	0.994342	0.989954	0.985605
5.	Random Forest(RF)	0.984677	0.986835	0.983874	0.980931
6.	Naive Bayes	0.952339	0.951087	0.949930	0.948775
7.	Support Vector Machine(SVM)	0.994833	0.993287	0.994586	0.995887
8.	Decision Tree(DT)	0.985835	0.986684	0.985114	0.983548

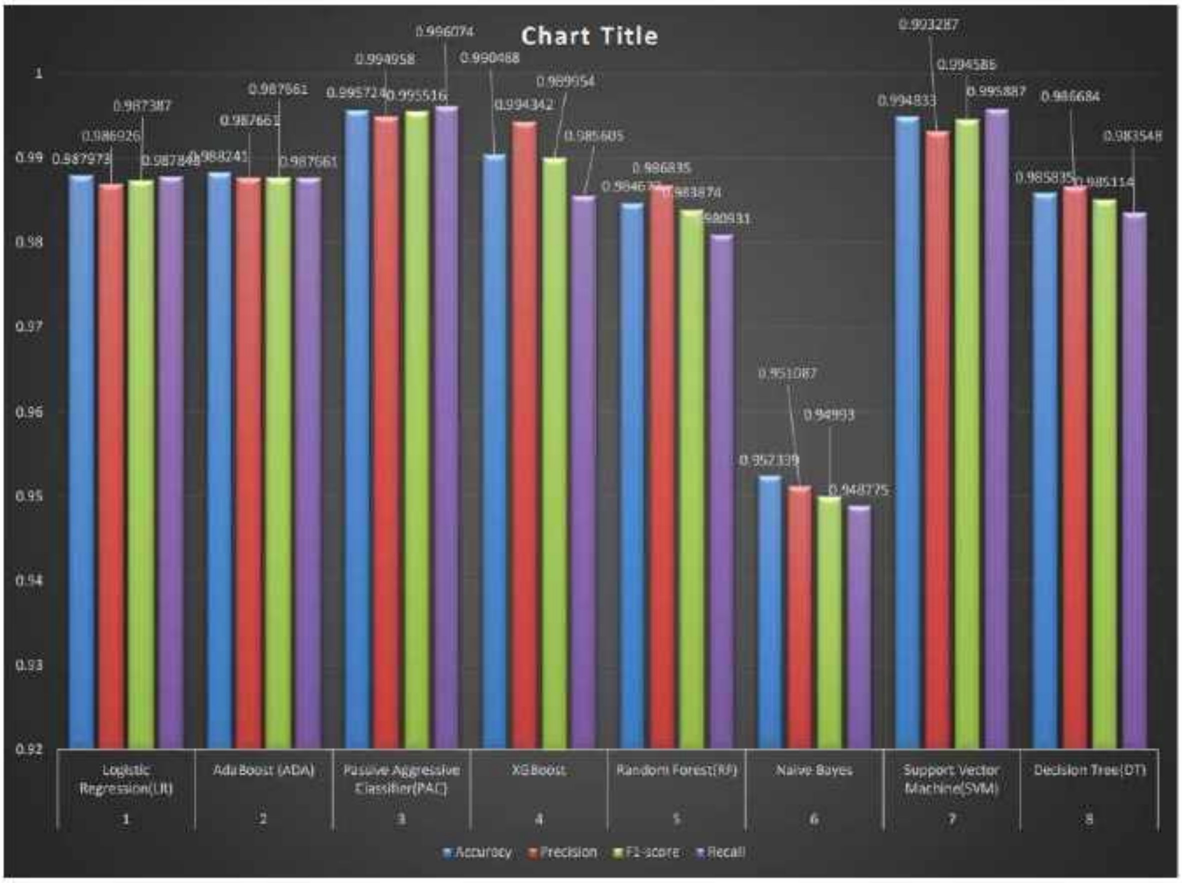


Chart: Result Chart

In recent years, deceptive content has grown in popularity, and its influence on online users has increased. The authors of this paper have surveyed on fake news detection methods involving three different feature extraction methods like Count vectorizer, TF-IDF Vectorizer, Word Embedding and also, different classification algorithms. The greatest accuracy attained by classification techniques is by using SVM Linear classification algorithm with TF-IDF feature extraction with 0.94 accuracy, as shown in TABLE above. Even though both Neural Network and Count vectorizer achieve the same accuracy, the Neural Network takes longer to train and is more sophisticated. So, in the proposed system, Linear SVM is used, which is less difficult and takesless time to compute (where ADA = ADABoost, PAC = Passive Aggressive Classifier, XGB = XGBoost, RF = Random Forest , SVM = Support Vector Machine, DT = Decision Tree , RNN = Recurrent Neural Network).

7. REFRENCES

[1] S. A. García, G. G. García, M. S. Prieto, A. J. M. Guerrero, and C. R. Jiménez, "The impact ofterm fake news on the scientific community scientificperformance and mapping in web of science,"Social Sciences, vol. 9, no. 5, 2020. View at:Google Scholar.

[2] D. M. J. Lazer, M. A. Baum, Y. Benkler et al., "The science of fake news," Science, vol. 359, no. 6380, pp. 1094–1096, 2018. View at: Publisher Site| Google Scholar.

[3] H. Jwa, D. Oh, K. Park, J. M. Kang, and H. Lim, "exBAKE: automatic fake news detection model based on bidirectional encoder representations fromtransformers (bert)," Applied Sciences, vol. 9, no. 19, 2019. View at: Publisher Site | Google Scholar.

[4] J. Hua and R. Shaw, "Corona virus (covid-19)"infodemic" and emerging issues through a datalens: the case of China," International Journal of Environmental Research and Public Health, vol.17, no. 7, p. 2309, 2020. View at: Publisher Site |Google Scholar.

[5] J. Soll, "The long and brutal history of fake news,"Politico Magazine, vol. 18, no. 12, 2016. View at:

Google Scholar.
[6] K. Shu, A. Sliva, S. Wang, J. Tang, and H. Liu, “Fake news detection on social media,” ACM SIGKDD Explorations Newsletter, vol. 19, no. 1, pp. 22–36, 2017. View at: Publisher Site | Google Scholar.

[7] S. Vosoughi, D. Roy, and S. Aral, “The spread of true and false news online,” Science, vol. 359, no. 6380, pp. 1146–1151, 2018.

[8] H. Allcott and M. Gentzkow, “Social media and fake news in the 2016 election,” Journal of Economic Perspectives, vol. 31, no. 2, pp. 211– 236, 2017. View at: Publisher Site | Google Scholar.

[9] V. L. Rubin, N. Conroy, Y. Chen, and S.Cornwell, “Fake news or truth? using satirical cues to detect potentially misleading news,” inProceedings of the Second Workshop onComputational Approaches to DeceptionDetection, pp. 7–17, San Diego, CA, USA, 2016.View at: Google Scholar.

[10] Della Vedova, M. L., Moret, B., Pianta, E., &Ruffolo, M. (2020). A Machine LearningApproach for Fake News Detection and its Application to a Real-world Business Use Case. Journal of Information Science Theory and Practice, 8(4), 36-52.

[11] H. Ahmed, I. Traore, and S. Saad, “Detecting opinion spams and fake news using text classification,” Security and Privacy, vol. 1, no. 1, 2018.

[12] Kaggle, Fake News Detection, Kaggle, SanFrancisco, CA, USA, 2018.

[13] Parikh, S. B., Shah, S., & Kotecha, K. (2018). Understanding differential impacts of news content types: Characterization and analysis of news stories in modern diaspora. IEEE Access, 6, 16292-16301.

[14] Buntain, C., Golbeck, J., & Kipp, C. (2017). Automatic identification of fake news in Twitter. In Proceedings of the 2017 ACM on web science conference (pp. 13-17).

[15] Granik, M., Kuzmenko, E., Pivniuk, T., & Ponomarenko, A. (2020). Simple Approach for Fake News Detection using Naive BayesClassifier. arXiv preprint arXiv:2012.08005.

[16] Gupta, H., Kumaraguru, P., Castillo, C., & Meier, P. (2013). TweetCred: Real-time credibility assessment of content on Twitter. In Seventh international AAAI conference on weblogs and social media.

AN IOT BASED NASOGASTRIC FEED MONITORING OF PRETERM LBW NEONATES

P Bhuvaneswari[1], Indushree KP[2], Vaishnavi B[3]

[1]*HoD & Associate professor,Biomedical Engineering,ACS collegeof Engineering,Karnataka,India*

[2]*Student, Biomedical Engineering,ACS collegeof Engineering,Karnataka,India*

[3]*Student, Biomedical Engineering,ACS collegeof Engineering,Karnataka,India*

ABSTRACT

In the modernization of the healthcare sector the mortality outlay of the preterm neonates have been guarded. The feeding of low birth weight(LBW) neonates is important in order to improve their survival and subsequent growth development. This project discusses about the development of a monitoring system for nasogastric tube feeding of preterm neonates that eliminates the feeding difficulties in the infant. While in this approach the low birth weight neonates feeding can be done using gastrointestinal tube feeding through which the medication and nutrition will reach the infant digestive tract. In the software requirements embedded C language is used and monitored data is being displayed on the LCD that helps to known the flow rate of medication which is so important during the neonate feeding. So finally, this system has designed for a real time monitoring system with Nasogastric feeding for the LBW neonates.

Keyword:*Gastrointestinal tube feeding,Low birth weight(LBW)*

---

1 INTRODUCTION

The World Health Organization (WHO) defines low birthweight as, neonates having birth weight less than 2.5 kg (2500 grams). If the neonate's birthweight is less than 1.5 Kg (1500 grams) they are considered as very low birthweight neonates. Nasogastric Tube feeding is mostly recommended to preterm neonates with birth weight less than 1500 grams [4]. Nasogastric tube (NGT) feeding is a method in which a plastic or rubber tube of flexible type is used in medical purposes, through which a nutritional support is administered to the neonates. Tip of the NGT is inserted through the nose of the infant manually, and then the tube is directed downwards into the small intestine. Here, dose of the medication and duration of administration will be decided by the doctor and medication will be delivered to the infant through NGT [2]. NGT feeding for administration of Nutrition or medications is mainly used in premature low birthweight neonates having intolerance to oral intake but with functional Gastrointestinal (GI) tract [5]. Nasogastric feeds can be either continuous feeding or intermitted bolus feeding. In neonates with this problem of ineffective swallowing, NGT will support them to recover their ability of swallowing [1]. During tube placement, intragastric placement of the tube must be confirmed because administration of even small quantity of tube feed into the lung can lead to severe complications including death. Typical methods currently used in hospitals for tacking the location of the tube are pH test and X-ray visualization. pH record of misleading values will be shown during gastro-oesophageal reflux and long exposure to X-ray will cause radiation effects to the neonates [6]. So, much research is being conducted in nasogastric tube feeding in neonates to confirm the correct position during tube placement. For example, electromagnetic sensors based tacking system can be used during the process of tube insertion to obtain a 3D real time path of NGT, this tracking helps to determine whether the tube is progressing wrongly into the lung or not and for safety reasons magnet will be removed after insertion of the tube. This helps in avoiding the harm caused due to tube insertion in the wrong path [3]. During internship in the hospitals, it was noticed that in the Neonatal Intensive Care Unit (NICU) while nasogastric feed administration after tube insertion, there is no monitoring of the flow of medication or nutrition through the NGT into the neonate. This monitoring is required especially in the case of preterm low birthweight neonates because even small variations in the feed administration can cause several problems to the neonate.

Inspiration for this prototype came after realizing the following problems:

Tube feeding may cause respiratory instability. This effect depends on the rate at which feeding is administered. Therefore, monitoring and management of feeding rate is very much needed.

This issue can be resolved by using the Flow sensor in the prototype to monitor Rate (ml/hour). If too much of the feeding formula is given to the infant through a tube, this may lead to vomiting or a bloated stomach. Therefore, monitoring the amount of feed to be delivered and how long is very much needed.

If the feed is going too fast, it can cause stomach infection or diarrhea. In this case, monitoring of the flow of the feed through the tube at the rate recommended is very much needed.

This can be done by monitoring the number of drops dispensed per minute. This can be overcome by using a Transmitting type of PPG sensor in the prototype by monitoring Dose (ml), Time (hours), and drop/min. When the infant is asleep, feeding must be stopped. Here, a small break of 30mins will be given and feeding is continued if the neonate is sleepy.

In this problem, accelerometer sensors can be placed on the surface of the bed mattress below the neonate for movement monitoring.

Therefore, to fulfill all these requirements an efficient system with feed monitoring must be designed. This proposal mainly focuses on building a prototype for the Nasogastric feed monitoring of low birthweight neonates. In this prototype flow sensor and transmission type PPG sensor will be used to measure Rate (ml/hour), Dose (ml), Time (hours) and drop/min. Accelerometer sensors can also be implemented for movement monitoring. All this information will be sent into the microcontroller for processing and after processing data will be displayed on the Blynk app through IOT. Implementing this can improve the efficiency of the Nasogastric tube feeding thus improving the survival, health, and wellbeing of Individual infants in the Neonatal Care.

2 RELATED WORK

Nutritional support is crucial for a preterm newborn low birth infant's growth, metabolism, and immunity. Infants can get nutritional supplementation via a Ryles or Nasogastric tube. A nasogastric (NG) tube is a flexible plastic tube inserted through the nostrils, down the nasopharynx, and into the stomach or the upper portion of the small intestine. In infants, NG tube feeding may be necessary because of swallowing difficulties, digestive issues, inflammation, or other medical conditions. The length and type of the Ryles tube are greatly affected by the diameter of the tube and material (like silicone or polyurethane) including the biocompatibility factor. The tube placement is mostly preferred by considering a loop over one of the patient’s ears and placing the tip at the patient’s xiphoid process. The first 4 weeks for an infant are crucial and enteral tube feeding is mostly advised. The amount of fluid that is fed to premature infant’s ranges from 135-200 ml per day. A small preterm infant of 1 kg contains only 1% fat and 8% protein and has a noncaloric reserve of 110 kcal/kg body weight. With these reserves survival from starvation then will last for about 4 days in the absence of exogenous substrates being administered. The neonate should be continuously fed for 5-10 minutes every 2-3 hours [7].

The current state of the art of intravenous (IV) fluid administration systems lacks remote monitoring and control capabilities. Skidmore et al. in [9] proposed an intelligent infusion pump system for automatic and remote management and monitoring of IV drips. This work used an Arduino-based microcontroller for controlling drop counters, detecting tube blockage, and monitoring the emptying of drip bags. This system used low-power laser diodes and optical sensors for the mentioned monitoring tasks. The flow rate (in drop per minute) and infusion-interruption problems were monitored remotely via transmission of data wirelessly to users' smartphones using

Blynk mobile application and computer-based applications In our proposed study, we can also include an Arduino-based microcontroller for monitoring drop counts and along with the flow sensor, we can integrate a PPG sensor and an accelerometer together into an Arduino-based microcontroller for the data recording and can be transmitted and displayed in a Blynk mobile app.

Hagihghi et al. [11] proposed a developed real-time monitoring device through which an administrator can review, evaluate, and modify the IV infusion process. The flow sensor they utilized possessed an erected polymer hair cell on a multi-layered silicon base forming from a patterned gold strained gauge layer on a piezoresistive liquid crystal polymer (LCP) membrane. Gold strain gauges on an LCP membrane have been used instead of a piezoresistive silicon membrane as the sensing element. The combination of gold strain gauges and LCP membrane provides better sensitivity than a piezoresistive silicon membrane of the same dimensions and thickness. The flow sensor in our case will be used for monitoring the flow. In the case of neonates, it is crucial to handle the flow rate and volume.

Accelerometers have been used to analyze infants' spontaneous upper and lower extremity movements, but do not provide postural information. When the infant is asleep, feeding through the tube must be stopped. For monitoring neonatal movement, information from the accelerometer can be shared with the Blynk app and can be assessed by the doctors and other paramedical staff. Purwar et al.in [12] proposed an ADXL335 which is a 3-axis accelerometer provided with signal-conditioned voltage outputs. It is known for compactness and low power consumption. The changes in acceleration in three axes are monitored continuously and the output signals are directly proportional to acceleration. The same concept can be utilized for our case where we are trying to implement a 3-axis accelerometer for tracking infant movement. Any discrepancies can be informed to the doctors and other paramedical staff. An IoT-based Blynk server application will serve the purpose of visual display of the data and rendering information to the team.

Firdaus et al. [13], proposed a study to analyze the accuracy of the TCRT5000 as a drop sensor, based on readings of the infusion pump monitoring system. This module consists of a TCRT5000 drop sensor module, comparator circuit, monostable circuit, stepper motor, L298N motor driver, and ATmega328 microcontroller. The droplets were detected by the TCRT 5000 sensor, then amplified by a comparator and monostable circuit, then the flow rate and remaining volume readings are generated by the ATmega328 microcontroller. Similarly, in our study, we can utilize the drop sensors integrated with the PPG sensor to measure the drop count and estimate the time of medication delivery. Furthermore, this data can be sent to the Personal Computer (PC) via wireless HC-11.

The smart feeding tube is part of the smart platform that also includes the ability to instruct the user on the correct positioning of the tube (initially and in continuous use). According to Kagan et.al [16], Smart technology is a system that includes a nasogastric tube equipped with multiple sensors to detect reflux as well as with the ability to automatically stop feeding, evacuate the stomach, and inflate an esophageal balloon (in massive reflux events) in order to prevent aspiration and compensate the losses of feeding due to reflux events. The detection of the reflux events is performed by using algorithms combining multichannel intraluminal bioimpedance sensors embedded in the smart feeding tube.

3 PROPOSED METHODOLOGY

This project is centered on real-time implementation, Atmega328 microcontroller is the main part and center of this project. The software used for the above analysis is Arduino IDE and the monitoring part will be displayed in the LCD.

When the Atmega328 IC is placed on the Arduino Uno board a complete Arduino microcontroller is formed.
The input side of the microcontroller is connected to Infrared (IR) sensor, and Flow sensor which are mounted on the human body, a power supply is connected to the microcontroller and the connected sensors are activated by this microcontroller, then one by one all the sensors will sense the human body and the signal is sent to Atmega328 microcontroller. Here, Embedded C language code is fed into the microcontroller, with the help of this code one by one all the sensor signals are converted to a piece of significant information and processed in the microcontroller.
The output side of the microcontroller has an LCD, IOT monitoring module, and Alarm unit, after processing the output is displayed on both the LCD display. If there are any fluctuations in the flow that is a critical level will be

fixed and if the value goes above or below the critical level, an alarm will be activated. The methodology is implemented in the figure 3.

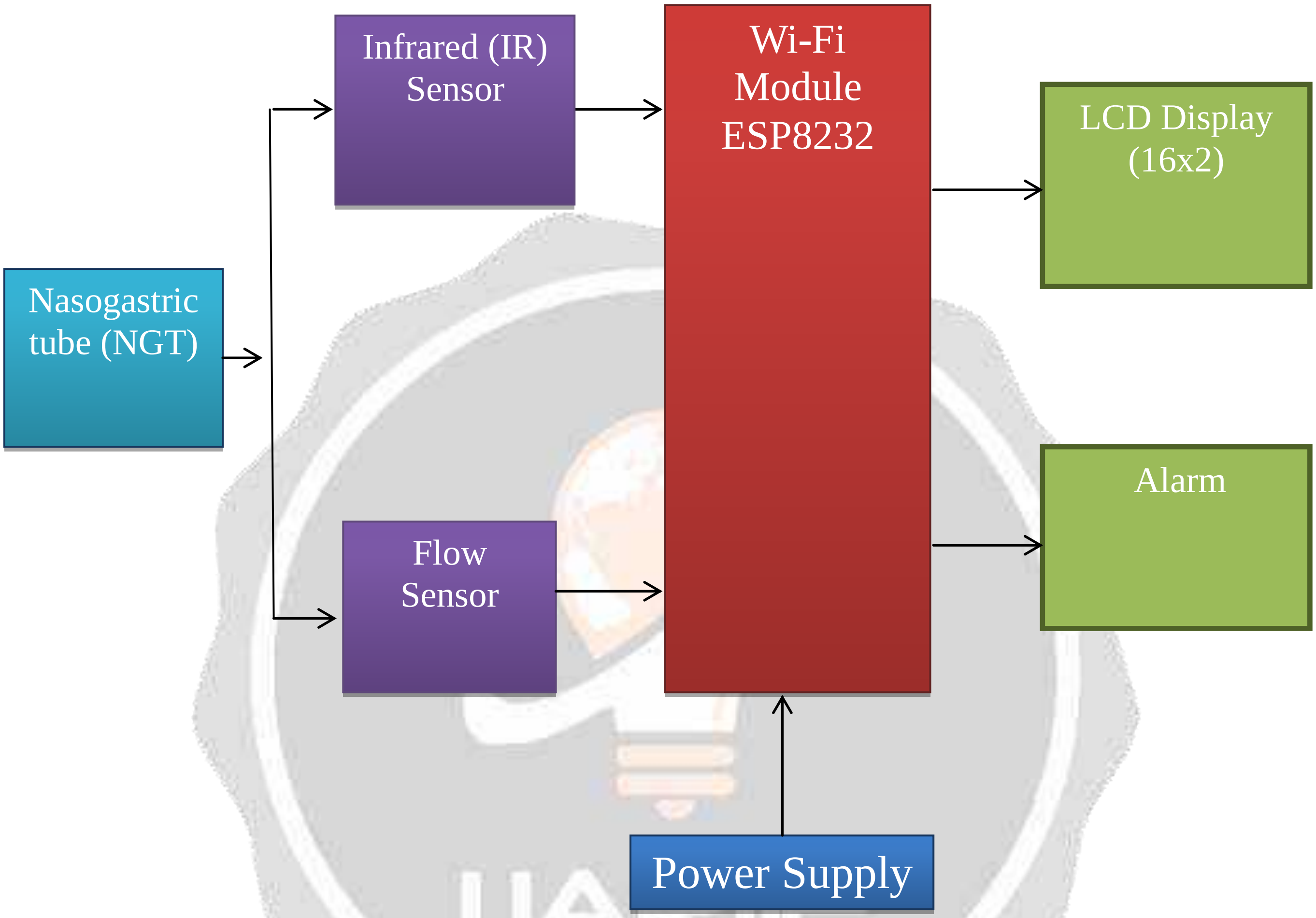


Fig 3 The block diagram of the proposed methodolgy

3.1 WORKFLOW

The flow chart for the working principle of the proposed prototype is shown in figure 3.1 which gives details of the code to be developed to achieve the objectives and the below algorithm is a step-bystep analysis of the process.

Algorithm:

1) Connect to neonate
2) Start the process by connecting to 12V power supply.
3) Reading information from the two sensors.
4) Processing data in the microcontroller.
5) Activate the alarm if an emergency is detected

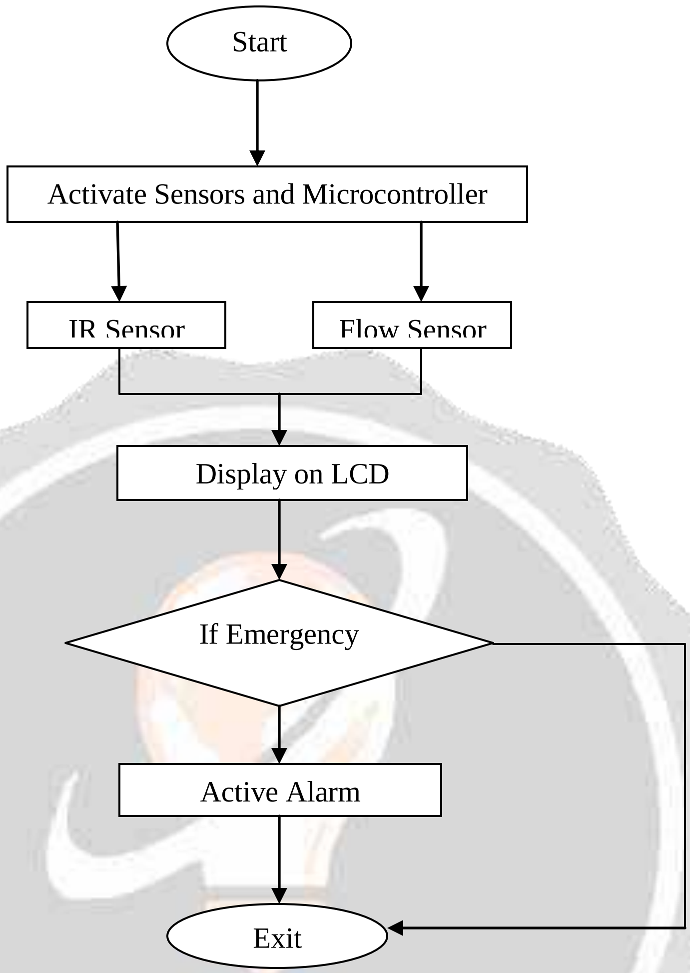


Fig 3.1 Flow Chart of Monitoring Part of the Proposed Prototype

4 RESULTS AND DISCUSSION

The infants who are usually born before 32 to 34 weeks gestation have inadequate body stores most of the nutrients. The amount of protein, energy, calcium, phosphorus, trace elements (iron, zinc) and vitamins (D, E & K) present in expressed breast milk is often unable to meet their high daily requirements . Hence, these infants require multinutrient supplementation till they reach term gestation (40 weeks postmenstrual age). After this period, their requirements Feeding of Low Birth Weight Infants are similar to those infants with birth weights of 1500-2499 grams. The determination of flow rate for LBW neonate feding is important in the NICU. The flow rate is calculated using the formula given below:

$$Flow\ rate = \frac{Dose(ml)}{Time(hr)}$$

The medication or nutrition requirement for the neonate of different weights are shown in below table:

	Daily fluid requirement (mL/kg)			
Birth weight(g)	**Day 1**	**Day 2**	**Day 3**	**Day 4**
<750	100-140	120-160	140-200	140-160
750-1000	100-120	100-140	130-180	140-160
1000-1500	80-100	100-120	120-160	150
>1500	60-80	80-120	120-160	150

The essential flow information's like Rate (ml/hour), Dose (ml), Time (hours) and drop count are acquired from the sensors by reading the signal from the flow of medication or nutrition in NGT, the microcontroller will get this signal using analog and digital pins based on the sensor type. The microcontroller will process this signal and output data can be seen on the LCD. The connection of hardware components and the displaying part is shown in fig 4.

Fig 4 The proposed prototype

5 CONCLUSION AND FUTURE WORK

This project helps in easy monitoring and management for the flow of medication or nutrition through a GI tube to a very low birth neonate in Neonatal Intensive Care Unit(NICU). This monitoring rate can be controlled and stored in cloud using blynk application and can be be used for future references for feeding the neonate with a required amount of medication or nutrition.

6 REFERNCES

[1] Yan Wang, Wei Zhu, and Bi-ru Luo, "Continuous feeding versus intermittent bolus feeding for premature infants with low birth weight: a meta-analysis of randomized controlled trails." European Journal of Clinical Nutrition, 2022

[2] Sigmon DF, and An J, "Nasogastric Tube." StatPearls Publishing, 2022.

[3] Muneaki Miyasaka, Hao Li, Kon Voi Tay, and Soo Jay Phee, "A Low-Cost, Point-of-Care Test for Confirmation of Nasogastric Tube Placement via Magnetic Field Tracking." Sensors (Basel), 2021.

[4] Clare L. Cutland, Eve M. Lackritz, Tamala Mallett-Moore, Azucena Bardají, Ravichandran Chandrasekaran, Chandrakant Lahariya, Muhammed Imran Nisar, Milagritos D. Tapia, Jayani Pathirana, Sonali Kochhar, Flor M. Munoz,l and The Brighton Collaboration Low Birth Weight Working Group, "Low birth weight: Case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data." Vaccine,2017. PubMed Central 35(48Part A): 6492–6500.

[5] Audrey Fenin, Jill C. Newman, and Sarah N. Taylor, "Very low birth weight infants receive full enteral nutrition within 2 postnatal weeks." Journal of Perinatology volume 40, pages1849–1856 (2020).

[6] Malcolm Lemyze, MD."The placement of nasogastric tubes." Canadian Medical Association Journal (CMAJ), 2010.

[7] Badran, A.T., Hashish, M., Ali, A., Shokeir, M. and Shabaan, A., 2021. Nasogastric versus orogastric bolus tube feeding in preterm infants: pilot randomized clinical trial. American journal of perinatology, 38(14), pp.1526-1532.

[8] Rosdi, M.R. and Huong, A., 2021, April. A Smart Infusion Pump System for Remote Management and Monitoring of Intravenous (IV) Drips. In 2021 IEEE 11th IEEE Symposium on Computer Applications & Industrial Electronics (ISCAIE) (pp. 285-288). IEEE.

[9] Skidmore, F.D., 1980. Flow rate of nutrient preparations through nasogastric tubes. Annals of the Royal College of Surgeons of England, 62(4), p.287.

[10] Miyasaka, M., Li, H., Tay, K.V. and Phee, S.J., 2021. A Low-Cost, Point-of-Care Test for Confirmation of Nasogastric Tube Placement via Magnetic Field Tracking. Sensors, 21(13), p.4491.

[11] Ohgi, S., Morita, S., Loo, K.K. and Mizuike, C., 2008. Time series analysis of spontaneous upper-extremity movements of premature infants with brain injuries. Physical Therapy, 88(9), pp.1022-1033. 12. Gima, H., Ohgi, S., Morita, S., Karasuno, H., Fujiwara, T. and Abe, K., 2011. A dynamical system analysis of the development of spontaneous lower extremity movements in newborn and young infants. Journal of physiological anthropology, 30(5), pp.179-186.

[12] Sudharsanan, S. and Karthikeyan, B., 2013. The design of a real-time accelerometerbased baby sleeping position monitoring and correction system. International Journal of Biomedical Engineering and Technology, 12(2), pp.189-198.

[13] Zakaria, N.D., Numan, P.E. and Malarvili, M.B., 2018. Fetal movements recording system using accelerometer sensor. ARPN Journal of Engineering and Applied Sciences, 13, pp.1022-1032.

[14] Watanabe, S., Hasegawa, Y., Matsushima, M., Kawabe, T. and Shikida, M., 2017. Micromachined tube type thermal flow sensor for adult-sized tracheal intubation tube. Multidisciplinary Digital Publishing Institute Proceedings, 1(4), p.357.

[15] Kagan, I., Hellerman-Itzhaki, M., Neuman, I., Glass, Y.D. and Singer, P., 2020. Reflux events detected by multichannel bioimpedance smart feeding tube during high flow nasal cannula oxygen therapy and enteral feeding: First case report. Journal of Critical Care, 60, pp.226-229.

ENHANCED LSB REPLACEMENT ALGORITHM IN APATIAL DOMAIN OF STEGANOGRAPHY

S Usha[1], Sriraksha PJ [2], Arshiya Nazneen [3], Avinaasi L J [4], Chaitanya Mahaprabhu S M [5] ,Farheen Taj [6]

[1]*Prof. & HOD Dean Research, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*

[2]*Assistant Professor, Department of Computer Science and Engineering, Rajarajeswari Collegeof Engineering, Karnataka, India*

[,3,4,5,6]*Research Scholar, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

Most common methods used in steganography to hide information in digital photos is the east significant bit algorithm. Poor ability to encrypt sensitive data, lack of robustness against attacks, and obvious deformation of stegoimages are some of its drawbacks. In the spatial domain of steganography, an extended LSB replacement innovation was developed to circumvent these limitations. The proposed algorithm adopts a hybrid strategy that combines the advantages of the algorithm with some additional techniques to increase the embedding capacity, improve flexibility, and reduce visual distortion. The suggested method is to first divide the cover image into non-overlapping blocks and then use the private key to generatea random sequence of pixels in each block. The hidden data is then embedded in the tiny selected pixels, making it difficult for an attacker to detect the embedded data. In addition, the algorithm uses a dynamic threshold to determine the number of bits that need to be replaced. This reduces visual distortion and increases attack strength

KEYWORD : - *Steganography, LSB, Embedding, Detection, Block selection*

1. INTRODUCTION

As internet usage increases, it's important to be cautious when sharing personal information and ensure that it's transmitted securely. There are various methods to transform data to make it unrecoverable, but a more effective solution is touse stegonography technology to hide the data intransmission channels, preventing unauthorized access. Stegonography techniques can help to enhance security and privacy by concealing criticalinformation in seemingly harmless ways. TheLSB (least significant bit) substitution algorithmis a popular steganographic technique, where the least significant bits of the cover media are replaced with hidden message bits. In the basic LSB replacement method, a pixel in the middle of the cover is selected, and its least significant bit is altered, followed by the next pixel until the entire message is integrated. This approach ensures that the hidden message is not detected and protects against plagiarism.

1.1 Existing System

The current LSB replacement algorithm works in the spatial domain and consists of directly modifying the LSB of the cover image pixels to integrate the clandestine message. However, this basic algorithm has several limitations including low capacity, low robustness and poor visual excellence of the stegoimage. The current LSB replacement approach integrates the clandestine message directly into by changing each pixel's LSB value. It operates in the spatial domain. The low capacity, low robustness, and poor stego picture visual quality of this fundamental method are just a fewof its drawbacks. A threshold-based approach is another method that has been suggested for figuring out how many bits can fit into each individual pixel. This method involves creating a threshold based on the coverage image's statistical characteristics and only integrating the clandestine message in pixels with LSB values higher than the threshold. The stego image is more resistant to attacks like filtering and has more options than the simple LSB replacement algorithm thanks to this technique.Other existing techniques include using a genetic algorithm to optimize the integration process, using a fuzzy logic approach to determine how many bits can be integrated into each pixel, andusing a multi-criteria optimization approach to optimize the integration capability and the visual effectat the same time. image quality-stego.

1.2 Problem Statement

Steganography is the practice of concealing secret information within a cover medium, such as an image, audio file, or video, in a way that is imperceptible to an observer. LSB replacement is one of the most common techniques used in steganography, where the least significant bit of each pixel in the cover image is replaced with a bit of the secret message. The basic LSB algorithm is simple and easy to implement, but it suffers from several limitations. One major limitation is that it causes significant distortion in the cover image, making it more susceptible to visual detection by unintended recipients or steganalysis algorithms. Additionally, LSB replacement is sensitive to lossy compression techniques, which further degrade the hidden information.

2. LITERATURE SURVEY

[1] Stegonography in Modern Smartphones and Mitigation ways

By offering sophisticated services and polarizing a huge volume of particular data, ultramodern smartphones changed the way we fraternize, entertainand work. To this end, they calculate upon complex tackle/ software fabrics leading to a number of vulnerabilities, attacks and hazards to profile individualities or gather sensitive information. still, the maturity of workshop assessing the security degree of smartphones neglects stegonography, which can be substantially used to i)exfiltrate nonpublic data via disguise styles, and ii) camouflaged precious or particular information into blameless looking carriers.

[2] A Survey of Image Steganography ways

Steganography is going to gain its significance due to the exponential growth and secret communication of implicit computer druggies over the internet. It can also be defined as the study of unnoticeable communication that generally deals with the ways of hiding the actuality of the communicated communication. Generally data embedding is achieved in communication, image, textbook, voice or multimedia content for brand, military communication, authentication and numerous other purposes. In image Steganography, secret communication is achieved to bed a communication into cover image(used as the carrier to bed communication into) and induce a stegoimage(generated image which is carrying a retired communication). In this paper we've critically anatomized colorful steganographic ways and also have covered steganography overview its major types, bracket, operations.

[3] A New Steganography Method grounded on high figures

The proposed system is grounded on the Chinese Remainder Theorem, which is a fine theorem that provides a result to a system of direct tune. The Chinese Remainder Theorem is used to hide secret information in high number sequences. The paper provides a detailed algorithm for embedding and rooting the secret communication. The proposed system has been estimated on colorful parameters similar as capacity, security, and robustness. The experimental results demonstrate that the proposed system is effective, secure, and can repel statistical attacks. The proposed system has a high capacity for bedding secret information, and it can maintain the quality of the cover medium indeed after the secret information has been bedded. The proposed system is also robust against colorful steganalysis ways, which are styles used to descry the presence of retired information.

[4] A Novel Steganography Method Grounded on Fibonacci Series

The paper provides a detailed algorithm for embedding and rooting the secret communication using the Fibonacci series. The proposed system uses the values of the Fibonacci series as indicators to bed the secret communication.

The paper also provides a detailed analysis of the capacity, security, and robustness of the proposedmethod.The experimental results show that the proposed system is effective, secure, and can repel colorful steganalysis ways. The proposed system has a high capacity for bedding secret information, and it can maintain the quality of the cover medium indeed after the secret information has been bedded.The paper also compares the proposed system with other being steganography styles and demonstrates its superiority in terms of capacity and security. The paper concludes with a discussion on the implicit operations of the proposed system in colorful fields similar as data caching, secure communication, and digital watermarking. The proposed system has the implicit to be applied to colorful media sim.

3. PROPOSED SYSTEM

The proposed system of the enhanced LSB replacement algorithm in the spatial domain of steganography builds upon the basic LSB algorithm by introducing various enhancements to improve the imperceptibility and robustness of the hidden information. The system incorporates techniques to minimize visual distortion and increase the embedding capacity while maintaining the security of the hidden data.

3.1 Methodology

The section outlines a method for concealing information by splitting an image into 8 distinct bit-planes. The approach involves converting pixel values into their corresponding 8-bit binary forms and then taking each ith bit from every pixel byte to produce the corresponding ith bit-plane image. This approach is a popular technique employed in steganography, which involves embedding confidential information within other types of data, such as images or audio files

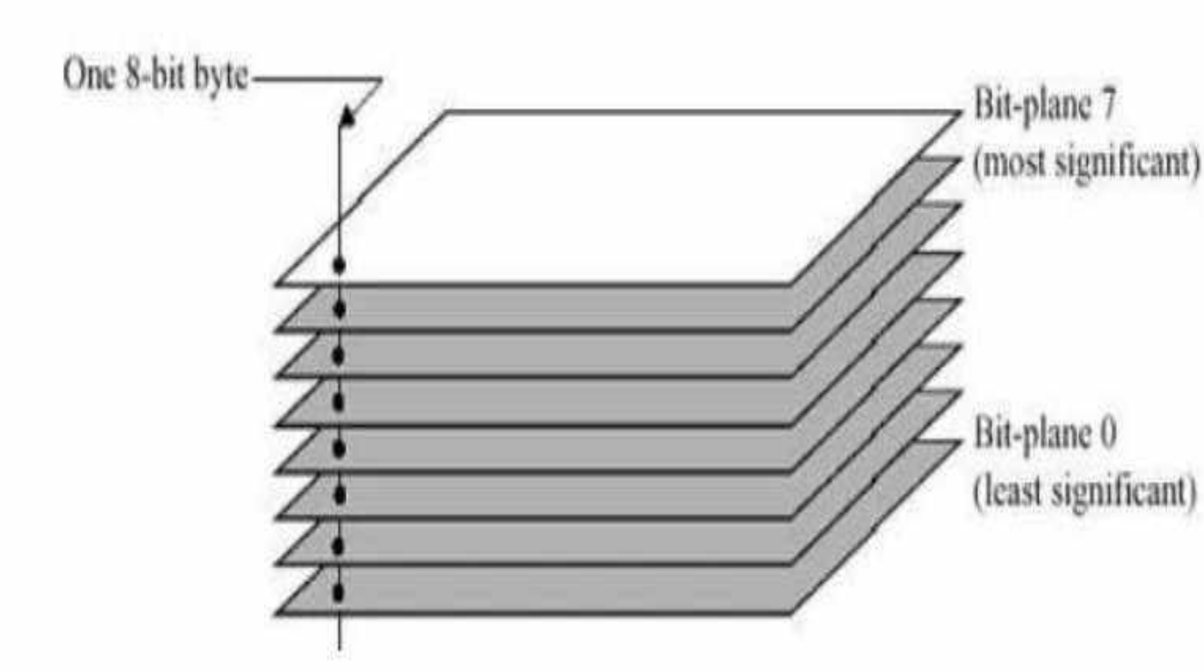


Fig -1 : Bit slicing

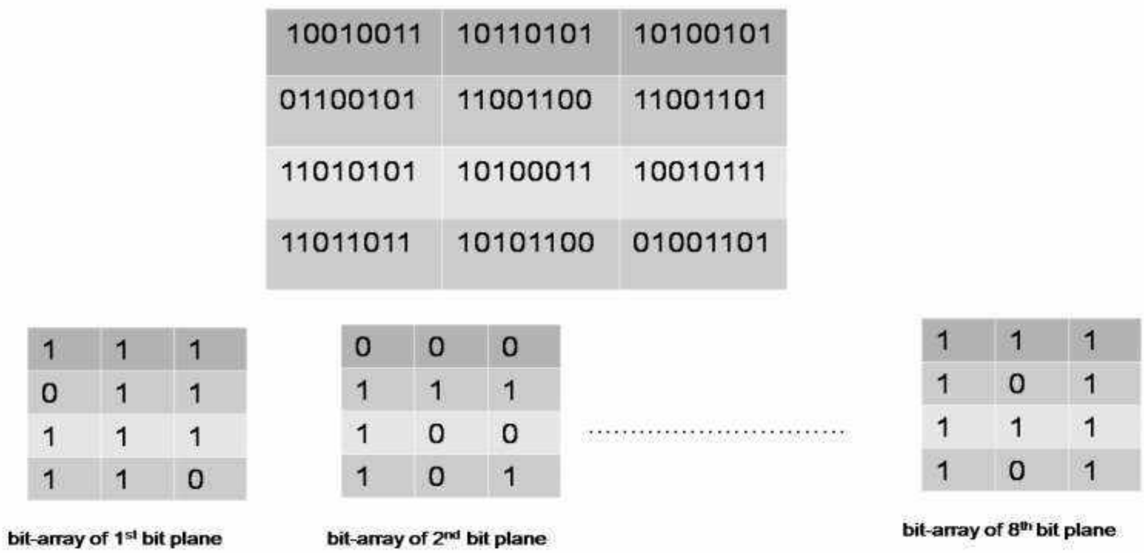


Fig-2 : Bit array representation

3.2 System architecture

Steps involved are:

- Firstly, the text and image files need to be read.
- In Step 2, the image is resized to match the dimensions of the cover video

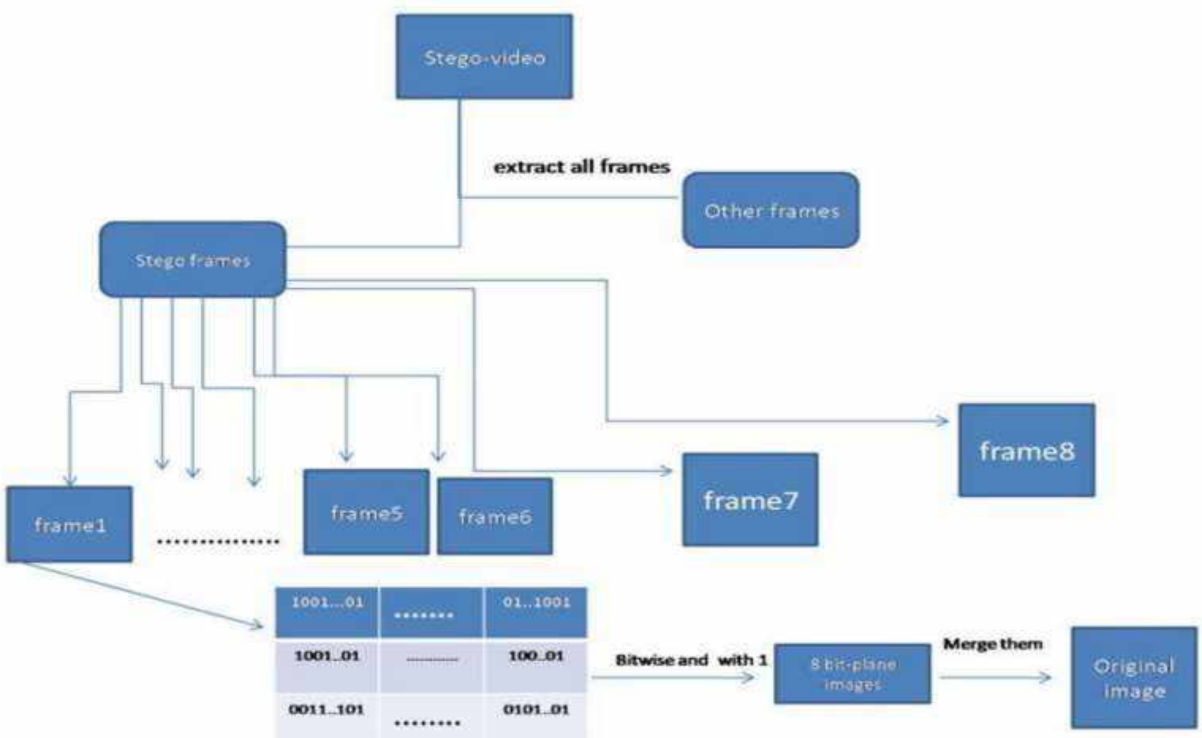


Fig -3: System architecture

- Next, in Step 3, the images are divided into segments using the bit-slicing method
- Moving on to our next step, the cover video is inputted
- The input multi-media will be split into individual frames.
- In Step 6, 8 frames are selected where a bit-sliced pic will be implanted.
- The LSB bit of the envelop frames is located in this step
- In this step, these bit planes are embedded into the image frames before returning them to their original positions.
- Finally, the video frames are regenerated

4 . APPLICATIONS

Confidential Communication: The algorithm can be used to embed confidential messages within digital images, allowing for secure communication. The hidden information can be transmitted over public channels without arousing suspicion, providing a covert means of exchanging sensitive data.
Digital Watermarking: The enhanced LSB replacement algorithm can be employed for digital watermarking applications. Watermarking involves embedding imperceptible information, such as copyright or ownership details, within digital media. The algorithm can hide the watermark within an image, ensuring its integrity and authenticity.
Digital forensics: In the field of digital forensics, the enhanced LSB algorithm can be used for the detection and extraction of hidden information from digital media. Law enforcement agencies and forensic investigators can employ steganalysis techniques to analyze images and uncover hidden messages or evidence.
Anti Censorship tools: The algorithm can be employed in anti-censorship tools to bypass content filtering and surveillance measures. By hiding blocked or sensitive information within innocuous-looking images, individuals can circumvent censorship and communicate freely.

5. CONCLUSIONS

Several of the most common image steganography techniques are covered in this article, highlighting the various ways to hide information within photographs. There are different methods of disguising information in each of the popular image file formats, each with advantages and disadvantages. Although some techniques exhibit resilience, other have poor payload capacities. For instance, the patchwork technique is highly resistant to most attacks but can only effectively conceal a limited quantity of data. While the LSB method in BMP and GIF makes up for this, both techniques result in suspicious files that raise the possibility of being discovered.

6. REFERENCES

[1] S. Rani and N. S. Gill, ‘‘Hybrid model for Twitter data sentiment analysis based on ensemble of dictionary based classifier and stacked machine learning classifiers-SVM, KNN and C5.0,’’ J. Theor. Appl. Inf. Technol., vol. 98, no.4, pp. 624–635, 2020.

[2] K. T. Chui, R. W. Liu, M. Zhao, and P. O. D. Pablos, ‘‘Predicting students’ performance with schooland family tutoring using generative adversarial network-based deep support vector machine,’’ IEEE Access, vol. 8, pp. 86745–86752, 2020, doi: 10.1109/ACCESS.2020.2992869.

[3] M. Adnan, A. Habib, J. Ashraf, S. Mussadiq, A. A. Raza, M. Abid, M. Bashir, and S. U. Khan, ‘‘Predicting at-risk students at different percentages of course length for early intervention using machine learning models,’’ IEEE Access, vol. 9, pp. 7519– 7539, 2021, doi: 10.1109/ACCESS.2021.3049446.

[4] Y. Cui, F. Chen, and A. Shiri, ‘‘Scale up predictive models for early detection of at-risk students: Afeasibility study,’’ Inf. Learn. Sci., vol. 121, nos. 3–4, pp. 97–116, Feb. 2020.

[5] A. Behr, M. Giese, H. D. Teguim, and K. Theune, ‘‘Early prediction of university dropouts— A random forest approach,’’ Jahrbücher Nationalökonomie Statistik, vol. 240, no. 6, pp. 743– 789, Feb. 2020.

[6] L. A. B. Macarini, C. Cechinel, M. F. B. Machado, V. F. C. Ramos, and R. Munoz, ‘‘Predicting students success in blended learning—Evaluating different interactions inside learning management systems,’’ Appl. Sci., vol. 9, no. 24, p. 5523, Dec. 2019, doi: 10.3390/app9245523

AN EFFICIENT VIRTUAL DRESSING ROOM OF AUGMENTATION REALITY

[1]Shashidhar V, [2]Adarsh Murthy T M, [3]Ajay M S, [4]Goutham M, [5]Govardhan G P

[1]*Asst. Prof. Department of Computer Science and Engineering, Rajarajeswari Collegeof Engineering, Karnataka, India*
[2,3,4,5]*Research Scholar, Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

Technology is gradually transforming the way we shop for garments in today's society. With the advent of e-commerce and online shopping, Companies are exploring novel approaches to enhance the customer purchasing journey. Virtual dressing rooms, which provide customers with an immersive and entertaining method to try on clothes and accessories without having to physically change into multiple ensembles, are one possible answer. The aim of my project thesis was to develop a functional virtual dressing room utilizing augmented reality technologies. Customers can use the virtual dressing room to visualize how various garments might look on them in a virtual environment. This technology has the potential to transform the way we shop for clothes by making it more engaging, fascinating, and efficient. The thesis will include a detailed account of the virtual dressing room's design and development process, including system technical details, software and hardware used, and challenges encountered during the development process. Furthermore, the thesis will evaluate the virtual dressing room's usability and user experience, as well as its potential impact on the fashion industry. Furthermore, the thesis will investigate both theoretical and practical issues.

Keyword : - *Virtual Dressing Room, Deep Learning, OpenCV and ComputerVision*

.

---

1. INTRODUCTION

The user's live video is taken by openCV in the virtual dressing room using augmented reality technology, and deep learning CNN (Convoluted Neural Network) algorithms are then utilized to evaluate the user's posture and calculate their skeletal position. The segmentation module uses Semantic Segmentation to distinguish between the background and the object (person), resulting in a color-coded image. The color coding added to the image's segments aids in the subsequent process of researching the region of interest. Using the content fusion matrix, the cloth wrapping module adjusts the target fabric to meet the item's dimensions. The fabric is then spatially altered before being mapped to the users' spatial points collected from the segmentation module. The missing body component parts are then synthesized by this module to fit the new fabric. By enveloping the altered cloth and the user image in the GAN algorithm, an output image of the user wearing the textiles is created.

2. LITERATURE SURVEY

[1] “Implementation Of Virtual Fitting Room Using Image Processing” paper by Srinivasan K and Vivek S refers to extracting the foreground from the background, extracting the human silhouette, extracting feature points, warping the shirt, and virtual fitting. The process involves pre-processing the image, removing small objects, applying morphological dilation, and performing edge detection.It is implemented using k-means clustering for color clustering, Viola-Jones Algorithm for face detection, and image fusion for superimposing the shirt onto the person.

[2] “Image Processing Design Flow for Virtual Fitting Room Applications used in Mobile Devices” by Cecilia Garcia, Nicolas Bessou, Anne Chadoeuf and Erdal Oruklu which presents a new algorithm for detecting a user's body size and displaying clothes based on that size. The algorithm locates the user's face and adjusts a reference point at their neck to determine the size. Automated body feature extraction is used to extract points on the shoulders and belly, which are used to measure the distance between them and the camera.

[3] "A Virtual Trial Room using Pose Estimation and Homography" by Kshitij Shah, Mridul Pandey, Sharvesh Patki, and Radha Shankarmani outlines their application interface, which uses firebase to authenticate users. When a user signs in to the system, they can access all the clothing that is present in the firebase. To locate important locations on the body and detect it, TensorFlow lite is employed. The mapped image is then obtained by use of OpenCV.

[4] "Human Body Pose Estimation using Convolutional Neural Networks" by Alejandro Newell, Kaiyu Yang, and Jia Deng describes a technique for determining the human body stance from photographs using a CNN architecture. The suggested method entails finding important points on the human body and connecting them to create a skeleton model. important points are often referred to as landmarks or keypoints. To teach the CNN how to relate picture pixels to important body parts, a sizable dataset of labelled images used in training. The main points and relationship between them represent the pose of the human body in the image can then be predicted using the trained model.

[5] "Multi-Task Learning for Fine-Grained Clothing Classification and Semantic Segmentation" by W. Hu et al. The approach uses a convolutional neural network based architecture that jointly optimizes both tasks using a shared backbone and task-specific branches. The shared backbone learns general feature represents the input images, while the task-specific branches are responsible for learning the specific features required for each task. The authors evaluate their approach on several benchmark datasets and demonstrate that it achieves state-of-the-art results in both fine-grained clothing classification and semantic segmentation tasks. The method outperforms several single-task and multi-task learning baselines, demonstrates the effectiveness of the joint optimization of two tasks.

[6] "DeepFashion2: A Versatile Benchmark for Detection, Pose Estimation, Segmentation and Re-identification of Clothing Images" presents a sizable dataset for a variety of tasks involving clothing photos, such as detection, segmentation, pose estimation, and re-identification. More than 800,000 photos of clothing are included in the collection, together with extensive annotations for each image including bounding boxes, segmentation masks, and pose estimate critical points. It is appropriate for training and testing models for virtual try-on and other similar applications since the photos include a wide range of clothing designs and variants, including occlusion and distortion.

[7] "Splines minimizing rotation-invariant seminorms in Sobolev spaces" by Jean Duchon. he introduces a type of spline function known as the Thin-Plate Spline (TPS). TPS is a type of radial basis function that is commonly used for interpolation and deformation of images and surfaces.The key feature of TPS is that it can minimize a rotation-invariant semi-norm in Sobolev spaces. This property makes TPS well-suited for modeling deformations that preserve local shape and size and also flexible enough to capture global shape variations.

[8] "Virtual Try-On via Generative Adversarial Networks" describes an approach for virtual try-on utilising fabric simulation techniques and generative adversarial networks (GANs). The suggested method comprises combining realistic photographs of people wearing various garments to give consumers to view in various attire. To create images of humans wearing clothing that are not present in the input image, the authors employ a GAN-based architecture.To create realistic textures and folds in the synthesised clothing, they use a fabric

simulator. To teach the GAN about the correlation between clothes and body shape, a sizable dataset of clothing images and their accompanying poses was used.

[9] "Spatial Transformer Networks" suggest a neural network component called the Spatial Transformer Network (STN), which can train to carry out spatial transformations on input images in a differentiable manner. This enables the network to perform better across a range of computer vision tasks by dynamically adapting to various geometric modifications. Three parts make up the STN module: a sampler, a grid generator, and a localization network.

3. DESIGN AND IMPLEMENTATION

3.1 System Design

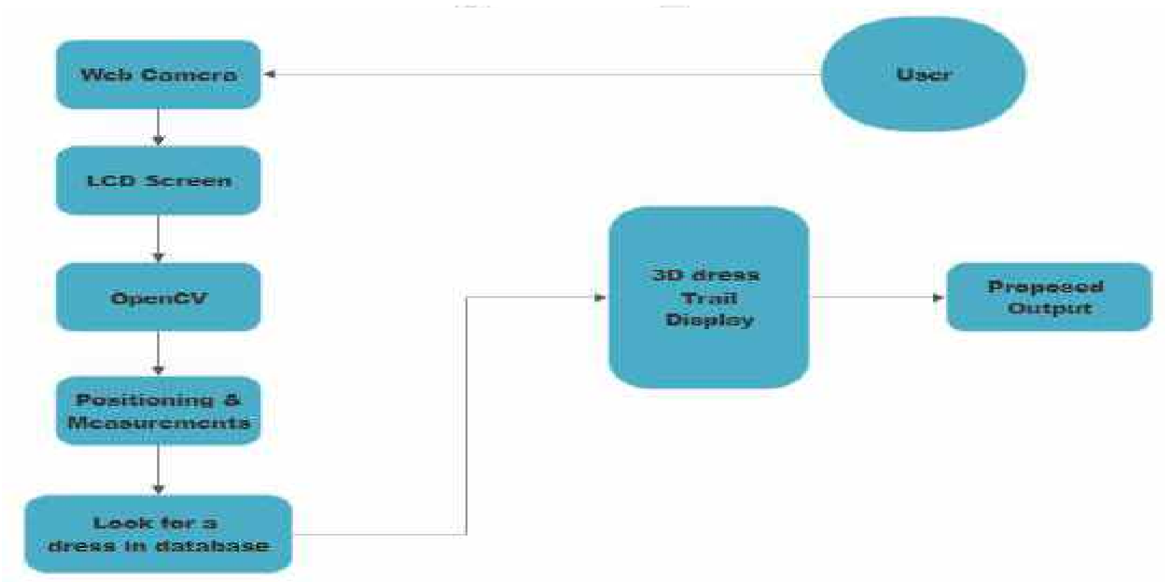


Figure 1: System Design of Virtual Dressing Room

The working of the project goes like

- Step 1: The user must stand in front of the device's computer screen or LED screen (depending on the figure's name).
- Step 2: The camera of the gadget will interact with the human body in a manner similar to how it identifies the human body's structure and, with the aid of specific alignments, enables the addition of a specific product to the user's body.
- Step 3: Since it is a real-time project, OpenCV and its various modules will respond to the user's alignment and assign it to the user in a suitable manner.
- Step 4: The NumPy framework will take into account how the user is situated and how big the human body is. While the user is testing a certain product, the results of the calculation will be displayed on the LED screen.
- Step 5: The source is where the project gets its database from (via. Internet).
- Step 6: After the product's database-based calculations and alignment, it is now available for the user to test out.
- Step 7: On the system's LED screen, the entire process is visible

Trying on clothes in real stores can be time-consuming and inconvenient, resulting in a subpar consumer experience. Furthermore, the COVID-19 pandemic has made in-person purchasing even more difficult, increasing demand for internet shopping. To solve these issues, Virtual Dressing Room technology provides a viable solution by allowing customers to virtually try on garments in the comfort of their own homes, resulting in a more convenient and engaging shopping experience.

3.2 Pose Estimation

The VDR's Posture Detection phase is its initial stage. This process aids in producing the human's spatial coordinates in the supplied image.

The Convolution Neural Network in deep learning, and HaarCascade Classifiers are used for posture identification. In the initial phase, the human figure in the picture or live video feed is identified as the region of interest using HaarCascade Classifiers as a pre-processing step. The CNN algorithm is then trained to recognise the characteristics in the interest region. Here, the CNN algorithm is trained for the tasks of object detection and image classification.

The 18 (0–17) features the CNN is trained to recognise, including as eyes, ears, nose, neck, shoulders, elbows, wrists, hip, knee, and ankle, are referred to as the "Image Classification and Object Detection." The CNN will produce a set of coordinates that identify where each body part is located in the image. These coordinates are coupled to create a Framework model, which depicts the human position in the input.

The OpenCV Library and TensorFLow are primarily required for Posture Detection. OpenCV is utilised to obtain the system's camera's live feed as well as train the Haar Cascade classifiers. TensorFLow provides a high-level API called Keras that can be used to design and train CNN models.

The VDR (Virtual Dressing Room) has two phases, with Semantic Segmentation being the second one. In the first phase, the user's image is analyzed to detect the human and generate a framework model. The Semantic Segmentation phase takes the framework model as input and generates a semantic image of the human, showing different body regions in colors. This helps identify where the Selected Dress should be placed. However, the image may have merged regions that are too close or covered, making it difficult to generate realistic images.

To solve this limitation, this module uses binary masks to highlight specific areas of the image. The pixel mask generated distinguishes the merged regions using the Conditional Generative Adversarial Network with U-net architecture. The pixel map and the framework model provide the region where the Selected Dress should be placed. This region and the Selected Dress are mapped together using the CGAN algorithm to generate a binary map for the Dress region.

The original semantic image is divided into two parts: the region that needs to be enveloped in the Selected Dress (S(D)) and the rest of the semantic image (S(R)). The missing regions of the human are identified and regenerated by comparing the semantic image S(D) and the pixel mask. The generated missing region is combined with S(R) to create a new semantic image that lacks only the region of the Selected Dress (S(FD)).

3.3 Cloth wrapping module

A simulation of the Dress is made using the binary map created in the earlier stage to make it appear as though the user is wearing it. Thin-Plate Spline (TPS) and Spatial Transformer Network (STN) transformations are used in this technique.

The selected Dress is warped to match the pose and location of the human in the input image using an affine transformation matrix that is computed using the binary map and the posture. The Dress is further deformed via TPS modification to better fit the posture. Additionally, it creates a natural distortion of the dress to fit the posture while preserving the rich texture. The simulation of the Final Dress is the process' outcome.

3.4 Try-on Module

The VDR's final stage is the dress rehearsal. This stage simulates the chosen dress on the photograph to create a realistic portrayal of the dress rehearsal.

Here, the semantic image S(R) and the original image are contrasted and compared to create the image I(R), which contains every region in the semantic image S(R).

To create the final Dress Rehearsal image, the CGAN is fed the Semantic image S(R), image I(R), the Dress Rehearsal image from the previous phase, the binary map, and the semantic image S(R)

4. RESULTS

Figure 2: Opening page of Virtual Dressing Room

The figure 2 represents the opening page of virtual dressing room .This page gives us options to initiate course of actions such as "Upload Dress", "Upload Image", "Star camera" and "Click To Check Output".

Figure 3 :Windows after uploading dress and image.

The figure 3 represents the appearance of the desired image of the model after the user's selection.

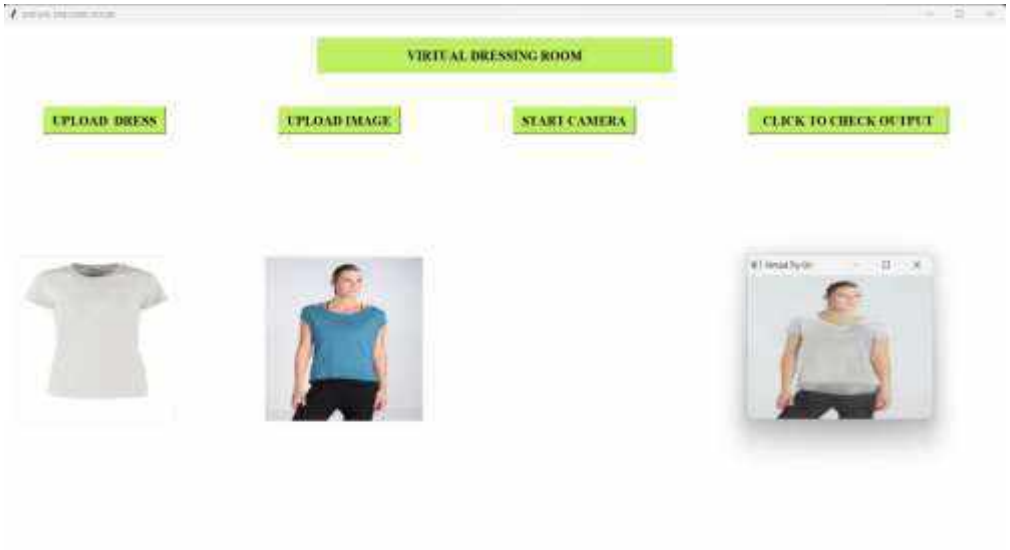


Figure 4 : Final Output Of Virtual Dressing Room.

This figure represents the final output of the Virtual Dressing Room upon the selection of the “Click To Check Output” option.

5. CONCLUSION

In this project, we have developed a functioning model that realistically photosynthesizes or tries on clothing on the provided input image while preserving the rich texture and colour of the garment as well as the user's body posture. Using the VITON dataset is classified into different levels of difficulty for each stage of the model training, VDR operates in 4 phases systematically divided into 4 modules, namely Pose Estimation, Semantic Segmentation, Cloth Wrapping, and lastly Try-On module. Because the model algorithm is new and hasn't been optimized, the resultant image of the created body parts being slightly smeared. VDR can be utilised for real-world applications as is with a few minor tweaks. The findings display the VDR's current operational configuration together with comparison information regarding the installed systems.

6. REFERENCES

[1] “Implementation Of Virtual Fitting Room Using Image Processing” Srinivasan K, Vivek S IEEE International Conference on Computer, Communication and Signal Processing (ICCCSP-2017)

[2] “Image Processing Design Flow for Virtual Fitting Room Applications used in Mobile Devices” Cecilia Garcia, Nicolas Bessou, Anne Chadoeuf and Erdal Oruklu Department of Electrical and Computer Engineering Illinois Institute of Technology Chicago, Illinois, USA.

[3] “A Virtual Trial Room using Pose Estimation and Homography”. Kshitij Shah, Mridul Pandey, Sharvesh Patki and Radha Shankarmani , Department of Information Technology Sardar Patel Institute of Technology Mumbai, India.

[4] Xintong Han, Zuxuan Wu, Zhe Wu, Ruichi Yu, and Larry S. Davis. VITON: an image-based virtual try-on network. In CVPR, pages 7543–7552. IEEE Computer Society, 2018.

[5] Tero Karras, Timo Aila, Samuli Laine, and Jaakko Lehtinen. Progressive growing of gans for improved quality, stability,and variation. In ICLR. OpenReview.net, 2018.

[6] Tero Karras, Samuli Laine, and Timo Aila. A style-based generator architecture for generative adversarial networks .In CVPR, pages 4401– 4410. Computer Vision Foundation/ IEEE, 2019.

[7] Phillip Isola, Jun-Yan Zhu, Tinghui Zhou, and Alexei A. Efros. Image-to-image translation with conditional adversar- ial networks. In CVPR, pages 5967–5976. IEEE Computer Society, 2017

[8] Thin-Plate Spline (TPS) : Jean Duchon. Splines minimizing rotation-invariant semi- norms in sobolev spaces. In Constructive theory of functions of several variables, pages 85–100. Springer, 1977.

[9] Haoye Dong, Xiaodan Liang, Yixuan Zhang, Xujie Zhang, Zhenyu Xie, Bowen Wu, Ziqi Zhang, Xiaohui Shen, and JianYin. Fashion editing with multi-scale attention normalization. CoRR, abs/1906.00884, 2019.

[10] Max Jaderberg, Karen Simonyan, Andrew Zisserman, et al. Spatial transformer networks. In Advances in neural information processing systems, pages 2017–2025, 2015

CROSS AGE IDENTITY VALIDATION ANALYSIS USING FACE VERIFICATION

T Auntin Jose[1],Kumar C[2], Lakith Kumar G K[3], Madan Kumar D N[4], Manoj S J[5]

[1] *AssistantProfessor,CSE,Rajarajeswari College of Engineering,Bangalore,India*
[2] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[3] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[4] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India*
[5] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India*

ABSTRACT

Due to the numerous application areas, including user authentication, targeted advertisements, video surveillance, and human-robot interaction, face recognition research has grown. Applications that combine the cutting-edge fields to determine age and gender as technology advances. In today's world, age plays a big role in whether you get a health checkup and interview. Numerous organizations in the public, private, and advertising sectors use age information perpetrators, employees who are qualified for the position, and potential customers for product promotion. However, determining a person's age is difficult, and there are limitations from determining the correct age from the collection of images. A crucial task is locating the appropriate dataset for training the model. The real-time data is huge, requiring a lot of computation and time to prepare the model. After incorporating machine learning techniques, the task has been challenging, but accuracy has significantly improved. By mapping the face in accordance with the age that is found, age estimation in applications like biometric evaluation, virtual makeup, and virtual try-on applications for jewelry and eyewear. Focal point kart is such an application that gives the take a stab at choice for their clients. Face recognition and face tracking are both subfields of age estimation, both of which have the potential to predict an individual's health. This mechanism is used by numerous health care applications to monitor people's daily activities and keep track of their health. This face detection method is used to identify service drivers and jaywalkers in China. We employ a significant variety of machine learning algorithms to predict age and gender. One of the most common methods for determining an individual's age and gender is the CNN (convolution neural network). OpenCV and CNN will be used in this implementation to predict a person's age and gender.

Keyword : *Age-Gender Recognition, cross-age ,identity validation, analysis, face verification, facial recognition.*

1. INTRODUCTION

Face acknowledgment innovation has forever been compelled by its dependence on contrasting comparable highlights and limits. That is, as of not long ago. With its smart utilization of picture distinction includes, the imaginative Cross-Age Character Contrast Examination (CIDA) system is changing the game.

The Immediate Cross-age Confirmation Organization (DCVN) and the Character Contrast Component Extractor (IDFE) are at the core of CIDA. These two fountain networks work couple to explore and approve the errors in the IDs of the info picture pairings. However, CIDA's methodology recognizes it. Dissimilar to run of the mill facial acknowledgment frameworks, which depend on looking at qualities and characterizing limits, CIDA avoids all of that and depends entirely on picture contrasts for confirmation.With CIDA, the possibilities are endless. From identifying lost or missing children to catching identity thieves, this groundbreaking framework has the potential to transform the way we approach facial recognition. The future of face verification is here, and it's all thanks to CIDA.

1.1 Identity Difference Feature Extractor

IDFE represents Character Component Extractor. This state of the art programming has altered picture ID and characterization, making it quicker and more exact than any other time.

One of the IDFE's essential assets is its capacity to recognize unmistakable characters in a given picture. The IDFE can give a superior discriminative portrayal of the people being referred to by eliminating pointless information and zeroing in on character-related data.
We have likewise incorporated the Distinction Component Streamlining Misfortune (DFOL) to work on the precision of the IDFE. This trademark empowers the IDFE to perceive interesting character contrasts between people, as well as intra-class changes brought about by age.

The IDFE can at the same time learn individual element portrayals for each info picture as well as the different component portrayals between them by combining these two impressive capacities into a solitary misfortune capability. This outcomes in more exact picture distinguishing proof and classification than any time in recent memory. Taking everything into account, the IDFE with DFOL is the ideal decision for each and every individual who requires quick, exact picture ID. Attempt it now and see the distinction for yourself.

1.2 Direct Cross-Age Verification Network

Face acknowledgment innovation has forever been obliged by its dependence on looking at comparable elements and edges. That is, up to this point. With its astute utilization of picture distinction includes, the inventive Cross-Age Character Contrast Investigation (CIDA) structure is changing the game.
The Immediate Cross-age Check Organization (DCVN) and the Personality Contrast Element Extractor (IDFE) are at the core of CIDA. These two fountain networks work couple to explore and approve the disparities in the IDs of the info picture pairings.

In any case, CIDA's methodology recognizes it. Not at all like average facial acknowledgment frameworks, which depend on looking at qualities and characterizing limits, CIDA skirts all of that and depends entirely on picture contrasts for check. This strategy expands the framework's precision, however it likewise opens up new open doors for face acknowledgment in cross-age character situations.
The conceivable outcomes are boundless with CIDA. This cutting edge strategy can possibly modify the manner in which we approach facial acknowledgment, from recognizing lost or missing youngsters to capturing character fraudsters. CIDA is liable for the eventual fate of face check.

The qualification vector is a significant part of our model. We perceive that age distinctions can create enormous intra-class disparities and hoodwink the affirmation communication. Accordingly, we cautiously look at the qualification between picture elements and breaking point our choices similarly. While simply deciding, we don't depend exclusively on component equivalence. All things being equal, our model utilizes a complicated cycle that incorporates investigating the one of a kind components and playing out a twofold portrayal. Accordingly, we can make more exact and sure determinations.

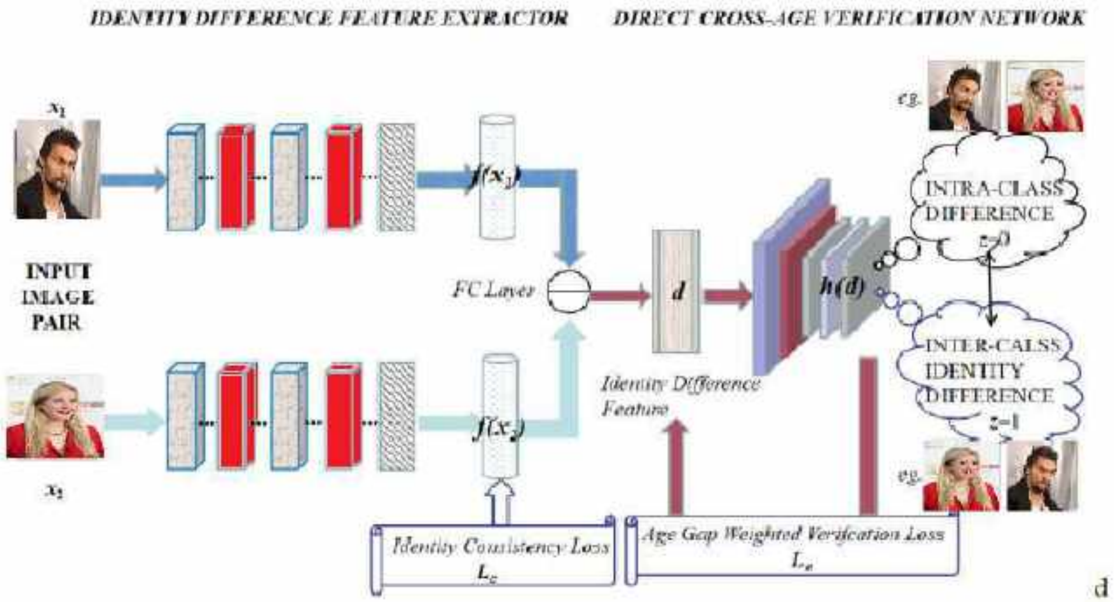


Chart -1 The Framework of Cross-Age Identity Difference Analysis Model.

We led extra preliminaries to think about the ROC bends of our technique with those of CARC, HFA, and human execution in our quest for laying out the most solid and precise cross-age face check model. We were eager to test how our model piled facing customary philosophies and human gifts. We saw that our model had a ROC twist like human execution after cautious assessment of the outcomes. We were delighted to find that our model outflanked customary models like CARC and HFA with an impressively higher AUC. This extraordinary achievement obviously affirmed the sturdiness of our adequacy of our techniques.

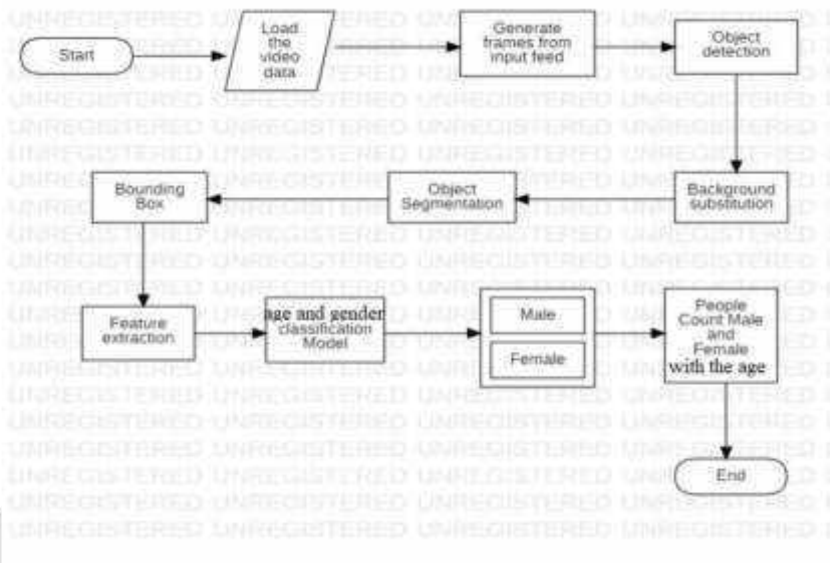


Fig -1 System Architecture of the Proposed System

2. METHODOLOGY

Convolutional brain organizations, or CNNs or ConvNets, are recognized sorts of brain networks utilized for picture distinguishing proof and classification. CNN picture portrayals gather information, process it, and afterward order it. To get ready and test, every data picture will use a succession of convolution layers with procedures (Kernals), pooling, and completely related layers (FC) and utilize the sanctioning capacity to classify a thing with the help of profound learning CNN models. Convolutional brain networks are magnificent models for picture grouping, division, object acknowledgment, and an assortment of other picture-handling errands. Various structures, including VGGNet, Origin Net, Alex Net, and ResNet, can be utilized to build the exactness of CNN models.

2.1 Face Verification on CALFW Dataset

It felt perfect to see that our persistent effort and devotion had paid off and that we had arrived at a huge achievement in cross-age face confirmation. The capacities of our model significantly surpassed our assumptions and have set another norm in the area. In general, the aftereffects of these examinations affirmed our viewpoint that our techniques and model were huge advantages in the field of cross-age face checks. We were unable to stand by to impart these discoveries to the local area and proceed with our chase after considerably more prominent disclosures.

2.2 Effects of IDFE

To assess the effect of IDFE, we first lead analyses to examine what various components mean for preparing. Our model utilizes two weight factors: where is utilized to adjust the two parts of the IDFE misfortune capability, and where is used to integrate age hole weighted misfortune into the preparation IDFE. Thus, we run two unmistakable arrangements of trials with shifting qualities to explore the last confirmation execution on CALFW and CACD-Versus for each condition.

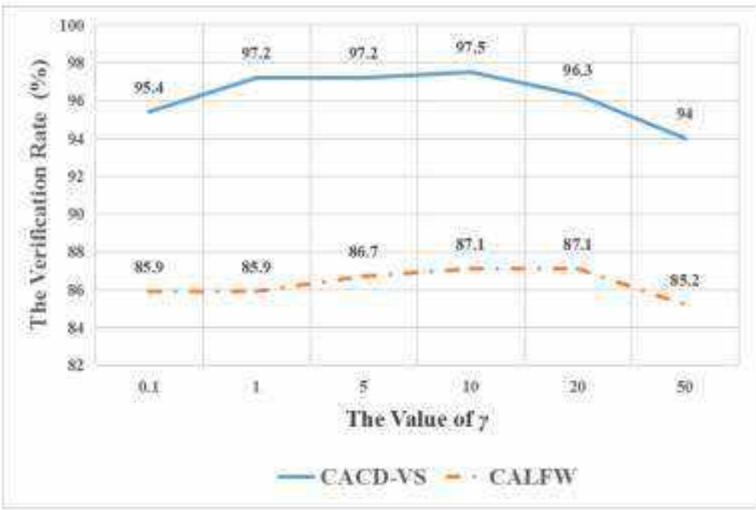


Chart -2 The Face Verification Accuracy with Different Value on CACD-VS and CALFW

The next step is to look at the system's viability if the management accepts the system proposal. The main purpose of a feasibility study is to evaluate a proposed system's viability, user needs, and resource efficiency. Technical, operational, financial, and scheduling feasibility are the several categories for these. The basic objective of a feasibility study is to attain the scope, not to fix the issue. A feasibility study delivered to management is the outcome. This might be approved or disapproved. The process cycle Face.xml, Trained Webcam Dataset, Trainer.

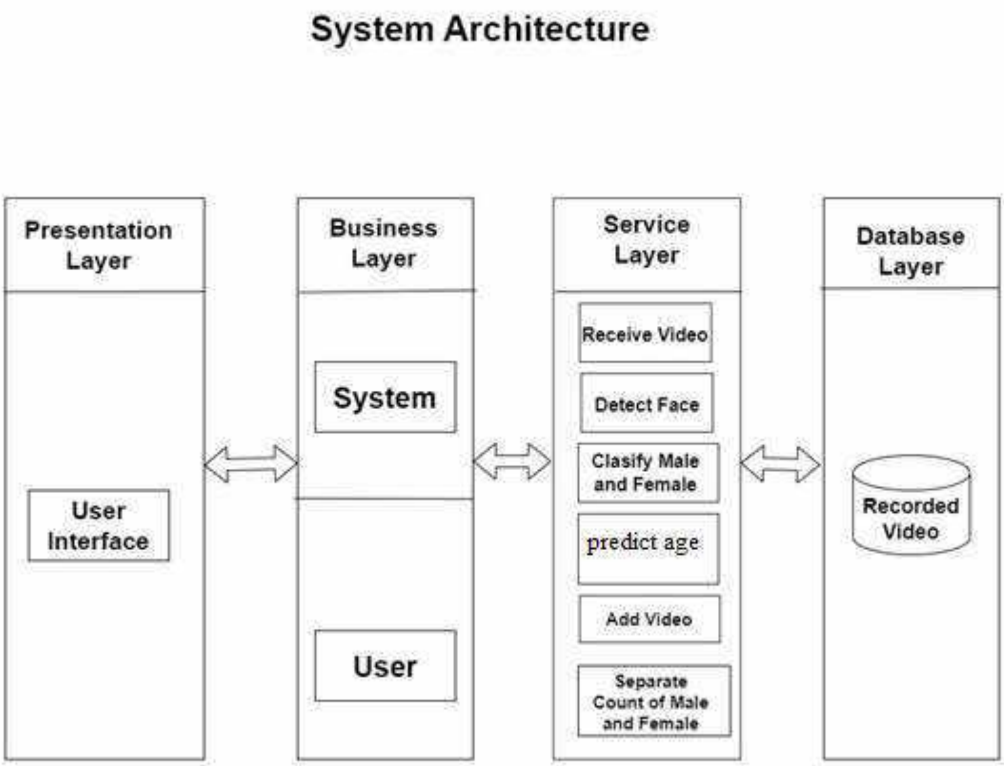


Fig -2 System Architecture Layers of the Proposed System

3. CONCLUSIONS

The Cross-Age Character Distinction Investigation (CIDA) model, a spic and span cross-age face confirmation procedure, utilizes picture pairings to examine faces straightforwardly. The primary stage is to make a character Distinction Component Extractor (IDFE) that extricates personality related contrast data from input photograph matches while smothering character heartless components like enlightenments and stances. Second, the Immediate Cross-age Check Organization (DCVN) is proposed as a quick classification technique for the info picture pair. To support discriminant power when there is an impressive age contrast, an original misfortune capability is recommended that gives tests with more prominent age inconsistencies more weight during the preparation stage. A bound together system is likewise settled by combining the misfortune elements of IDFE and DCVN. CACDVS and CALFW benchmark CAFR datasets\

4. REFERENCES

[1] Abhilash Nelson: "Computer Vision: Face Recognition Quick Starter in Python", IEE, pp, 102-234, Jan 2023
[2] Rajeev D. Ratan: "Modern Computer Vision™ PyTorch, Tensorflow2 Keras & OpenCV4", Dec 2022
[3] Emenwa Global:" Computer Vision In Python! Face Detection & Image Processing", Nov 2022
[4] Yohei Kawaguchi, Tetsuo Shoji, "Face Recognition-based Lecture Attendance System", "3rd AERU…", 2005.

DEEP NEURAL NETWORK MODEL FOR AUTOMATIC DISEASE DETECTION IN CITRUS FRUIT AND LEAVES

Manasa G V Kumar[1], Sahana B M[2], Sahanashree[3], Vaidehi A[4], Yogitha[5]

[1]*Assistant Professor, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[2,3,4,5]*Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

Illnesses of the citrus fruit are the main reason for drastic decreases in citrus fruit supply. It is essential to have an automated approach to identifying citrus plant diseases. Because a variety of artificial intelligence issues, and deep learning approaches have lately demonstrated promising solutions, we chose to use them to address the problem of identifying citrus fruit and leaf diseases. This study uses an integrated technique to provide a convolutional neural network (CNN) model. The proposed CNN model intends to differentiate between fruit and leaf types with healthy citrus diseases including black spot, canker, scab, greening, and Melanose, and those that do not. The suggested CNN model incorporates complementary discriminative properties by integrating various layers. The CNN model performed well on the Citrus and PlantVillage datasets.

Keywords: - *Citrus leaf diseases, citrus fruit diseases detection, convolutional neural network, deep learning.*

1. INTRODUCTION

Fruit trees are crucial for a state's economic success. Among the most well-known types of fruit plants is the vitamin C-rich citrus plant, which is well-liked throughout the Middle East, Africa, and the Indian subcontinent. In addition to their many health advantages, citrus trees are used as a raw material in the agricultural industry to create a variety of different Agri-products, including jams, sweets, ice cream, and confectionery, among others. Citrus, Pakistan’s most extensively cultivated fruit crop, makes up the majority among country's horticulture exports. In Pakistan, 2.5 million tons of citrus are expected to be produced annually in 2018. However, citrus fruit plants are vulnerable to several diseases, including such as greening, melanose, black patches, cankers, and scabs. Citrus trees are susceptible to the highly infectious canker, which mostly affects the leaves or fruit.

1.1 *Existing problem*

Creating and Quickening Advanced Tools Scanning has been made simpler by computer-aided technologies. Automatically discover genuine crop irregularities. This was accomplished using conventional machine learning approaches, with notable success in plant recognition and illness detection.

1.2 *Proposed System*

India produced, according to estimates, about 2.5 million tons. As opposed to that, citrus fruit plants are susceptible to a variety of illnesses, such as black spots, cankers, scabs, greening, and Melanose. Citrus trees can develop the canker, which is usually on the leaves or fruit and is very contagious. Extreme citrus fruit yield drops are primarily brought about by illnesses, which ultimately reduce fruit quality and result in losses for the growers.

1.3 *Objectives of the Project*

To build technology that accurately identifies agricultural diseases and pests. Assemble a pesticide database for each pest and illness. To offer a cure for the ailment that has been identified.

2. RELATED WORK

Previously, there extensive research on the finding of leaf and fruit diseases for many years. To increase the precision of disease diagnosis, researchers have researched many pattern recognition and machine learning techniques. These innovative techniques are applied to many different types of crops, such as wheat, rice, maize, and maize. Golhani has published a variety of experiments on neural network techniques used for identifying and categorizing diseases from images of plant leaves and fruit. Citrus canker and Huanglongbing (HLB) were detected using an SVM and a fluorescent imaging system by Wetterich et al. The approach had a classification accuracy of 97.8% for citrus canker and scab, whereas it had a classification accuracy of 97.6% for HLB and zinc insufficiency of 95%. Recursively Separated Weighted Histogram Equalisation (RSHE) was used by Padmavathi and Thangadurai to more clearly separate illnesses of citrus. The noise in the photos of citrus is removed in the second stage. The remedies provided improve the citrus photos' quality so that they may be used for more in-depth study. K-Means segmentation has been utilized to locate the sick regions in pre-processed orange images, as discussed by Patel. The SVM classifier is utilized for categorizing the affected area's color, texture, and shape using the training set's data. GLCA models produced a precision of 67.74%. Singh employed the Support linear approach Discriminant Analysis, Vector Machine Technique, K-Nearest Neighbours, and Multi-Layer Perceptron approaches to find citrus leaf diseases.

3. METHODOLOGY

For the classification of citrus and leaves afflicted with various illnesses, a Multilayer Convolutional Neural Network is developed. Implement a train prediction algorithm using datasets. The ability of artificial intelligence to close the gap between human and machine skills has dramatically increased. Both professionals and amateurs focus on many facets of the field to achieve great results. The field of computer vision is among several such disciplines. This field aims to give computers a place to see and understand the world similarly to humans. Following that, they will be able to apply this knowledge to a diverse array and tasks, such as video and image recognition, visualization and categorization, media entertainment, systems for recommendation, machine translation, etc. With time and effort, Deep learning has enhanced the ability to see, specifically when using the following algorithm:

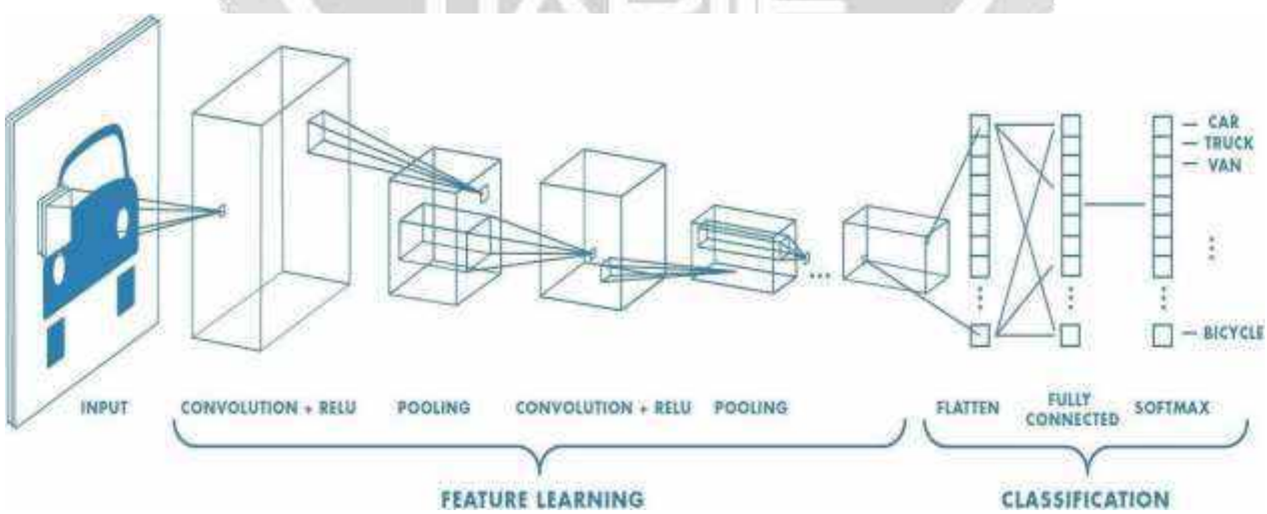


Fig 1: Proposed Block Diagram

3.1 NURAL NETWORK THAT USES CONVOLUTIONS.

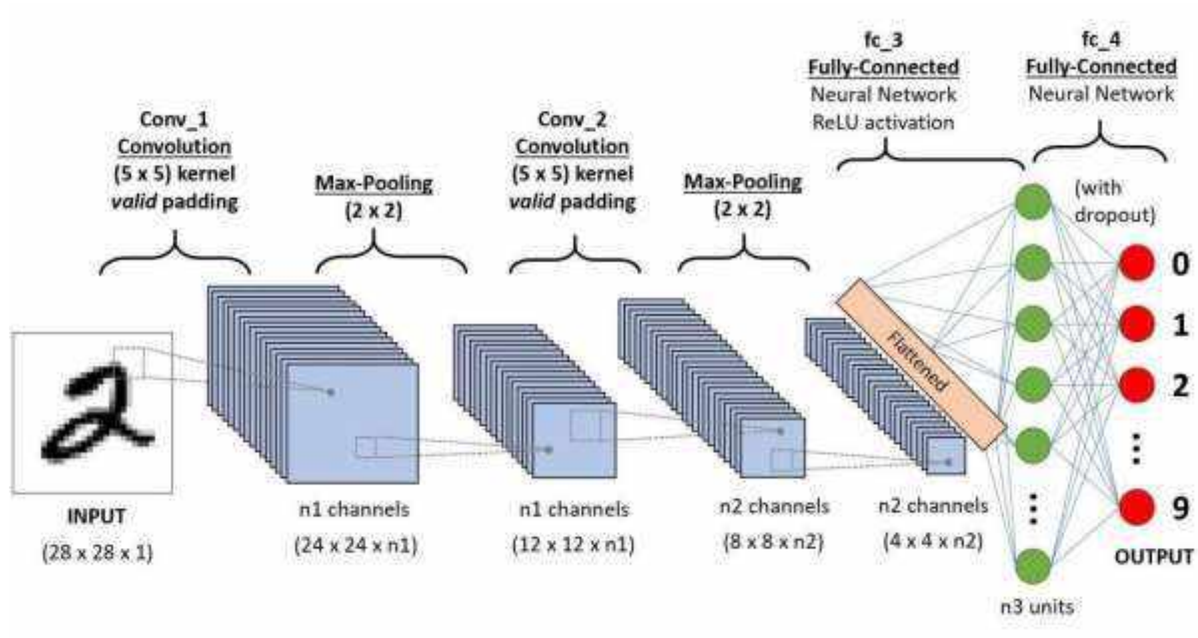


***Fig 2**:* Neural Network That Uses Convolutions.

A Neural Network That Uses Convolutions., also referred to as an is a Deep Learning technique that may receive a source picture, assign different components and entities of the photo equal importance (learnable weights and biases), as well as can differentiate between them. Comparatively speaking, a ConvNet requires substantially less preprocessing than other classification techniques. Contrary to primitive techniques, where filters must be handengineered, neural networks are capable of learning these filters and their properties.

A ConvNet's architecture was influenced by The Vision Cortex's organizational structure and similarity to a human brain's neural connection network. The receptive Field, the limited region of the field of sight, is the only place where perception occurs do individual neurons react to stimuli.

4. RESULT

Model for identifying leaf disease. The problem of categorization was addressed using the CNN model. The To distinguish between healthy and sick citrus fruits and leaves, suggested CNN-bing photos of citrus fruit and leaf ailments shown in this experiment can be usedThe components of our suggested model are as follows: data collection, preparation, and implementation of the CNN model Two convolutional layers were used in the suggested CNN model. The first convolutional layer divides the low-level few.

Images, while the second convolutional layer employs high-level properties to integrate them. This results in categorization of citrus fruit and leaves into numerous melanose groups, including Greening, Canker, Scab, and Black Spot. Datasets about plant diseases, it was assessed using a variety of machine learning and deep learning models, and the results were published.

Fig 3: Proposed system's training and test accuracies.

4. CONCLUSIONS

The proposed CNN-based model for leaf disease identification can distinguish between healthy and diseased citrus fruits and leaves. The problem of categorizing citrus fruit and leaf sickness pictures utilized in this experiment was addressed using the CNN model. Images with low-level few are segregated by the first convolutional layer, and Different classes of citrus fruit and leaves exist. of melanose by the second convolutional layer using an assembly of high-level features. Datasets about plant diseases, it was assessed using a variety of machine learning and deep learning models, and the results were published.

5. REFERENCES

[1] Detection and classification of citrus illnesses in agriculture based on optimised weighted segmentation and feature selection] M. Sharif, M. A. Khan, Z. Iqbal, M. F. Azam, M. I. U. Lali, and M. Y. Javed, Comput. Electron. Agricult., vol. 150, pp. 220-234, July 2018.

[2] R. Manavalan, "Automatic identification of diseases in grains crops through computational approaches: A review," Comput. Electron.

[3] "A smart mobile diagnosis system for citrus diseases based on densely connected convolutional networks," W. Pan, J. Qin, X. Xiang, Y. Wu, Y. Tan, and L. Xiang. 2019's IEEE Access, volume 7, pages 87534–88542.

[4] "Automatic image-based plant disease severity estimation using deep learning," by G. Wang, Y. Sun, and J. Wang 2017's Comput. Intell. Neurosci.

[5] "Multilayer convolution neural network for the classification of mango leaves infected by anthracnose disease," IEEE Access, vol. 7, no. 4, 2019, pp. 43721-43729; U. P. Singh, S. S. Chouhan, S. Jain, and S. Jain.

[6] "An automated detection and classification of citrus plant diseases using image processing techniques: A review," Comput. Electron. Agricult., vol. 153, pp. 12-32, Oct. 2018. Z. Iqbal, M. A. Khan, M. Sharif, J. H. Shah, M. H. ur Rehman, and K. Javed.

[7] "Detection of citrus leaf diseases using a deep learning technique," International Journal of Electrical and Computer Engineering (IJECE, April 2021.

[8] "Performance evaluation of supervised machine learning techniques for efficient detection of emotions from online content," M. Z. Asghar, F. Subhan, M. Imran, F. M. Kundi, S. Shamshirband, A. Mosavi, P. Csiba, and A. R.
[9] Varkonyi-Koczy

[10] Fuzzy-based sentiment analysis system for analysing Student feedback and satisfaction, by Y. Wang, F.
[11] Subhan, S. Shamshirband, M. Zubair Asghar, I. Ullah, and A. Habib. Computing, Materials Continua,

[12] "An efficient approach for subimage separation from large-scale multi-panel images using dynamic programming," M. Ali, M. Z. Asghar, and A. Baloch. Appl. for Multimedia Tools,

Neural Network-Based Brain Hemorrhage Detection Using CT Scan

Abhishek K, Devaraja, Parameshwari M, Pragathi K

[1,2,3,4]*CSE, Rajarajeswari College of Engineering, Bengaluru, Karnataka, India*

ABSTRACT

Brain hemorrhage, which can result in catastrophic damage or death, is the eruption of the brain's arteries as a result of excessive blood pressure or excessive blood coagulation. It is a medical emergency where a doctor also needs years of training to quickly identify the site of internal bleeding before beginning therapy. Convolutional Neural Network (CNN), is deep learning model that is suggested in this study for the categorization of brain hemorrhages. To increase the deep learning models' accuracy and processing speed, brain CT scan pictures are employed as the dataset.

Keyword : - *S Brain hemorrhage, image classification, deep learning, CNN, image augmentation, CT scan*

1. INTRODUCTION

Brain haemorrhage is the medical term for internal bleeding in the brain. Haemorrhage is a word used in medicine to describe bleeding from either within or outside the body. Internal bleeding brought on by an arterial rupture in the tissues surrounding the brain causes this, as can an unanticipated blood clot in the arteries supplying blood to the brain. Trauma, excessive blood pressure, aneurysms, anomalies in the blood arteries, amyloid angiopathy, bleeding disorders, and brain tumours are the most typical causes of haemorrhage. These are the primary causes of severe disability and death. Brain haemorrhage caused 30% of fatalities in the USA in 2013, with a ratio of 100,000:7 in the West and 100,000:200 in Asia. In addition, women are affected 3:2 more frequently than men by weak spots in their brain arteries from birth, which affects 80% of people. According to estimates from the World Health Organization (WHO), there were 15 million stroke victims in 2009, 5 million of whom died and 5 million of whom suffered impairments.

Medical professionals frequently advise fast diagnosis and efficient first treatment to prevent damage and death. The internal anatomy of the skull and brain may be seen with a CT scan and an MRI. Since CT scans are more accessible, less expensive, and sensitive to early diagnosis of brain hemorrhage than MRIs, medical specialists advise using them to examine the interior anatomy of the human body, including the brain. The CT scan is a compilation of numerous X-ray images made by a computer using 3D imaging from various angles and cross-sectional perspectives. Tissues can be photographed using the arc-transmitting X-ray photons that the CT scanner uses. creating an image sub-segmentation that is associated with at least one item, support for either size or color. There are many intensity levels employed, depending on how well the tissues absorb X-rays. Medical practitioners can diagnose internal bleeding and blood clots in the brain thanks to the CT scan's broad information on internal body structure and tissues of solid organs. The CT scan is frequently employed in emergencies to identify inside infections, tumors, serious injuries, and hemorrhagic strokes that are difficult for a person to distinguish. Because they can be quickly obtained for initial therapy, CT scans are preferred over MRIs. The diagnosis of the brain hemorrhage is a challenging stage since it is brought on by internal bleeding in the head, and medical professionals need years of experience to pinpoint the bleeding spot in the CT scan. Every life matters, and the patient's life is in danger. In earlier studies, experts invested their time and expertise in creating the ideal technique for identifying the precise location of the brain hemorrhage, but they were unable to succeed due to issues like the length of the diagnostic processes and the lack of sufficient results to save every patient's life.

2. EXISTING SYSTEM

The Existing systems either make use of computerized decision-making systems or traditional clinical methods. Existing clinical practices and CT image processing methods have low sensitivity to detecting small, non-hemorrhagic problems.

3. PROPOSED SYSTEM

The proposed system is motivated to implement deeply trained model for accurately diagnosing brain hemorrhages in CT images. The proposed System implements CNN for effective feature extractions. To cut down on medical costs, the suggested System has been prompted to employ CT scans rather than MRI data.

3.1. Objectives

The primary goal of the effort is to facilitate fast identification and categorization of various hemorrhage types.

3.2. Methodology

In this project, The CT scan of the hemorrhage must be preprocessed before further deep learning processing. First, resize the photographs to a constant size because the images are of varying sizes and the deep learning model cannot accept input of varying sizes. When the train-test split is activated, image augmentation is utilised to enhance the number of training photos. Deep learning models consist of completely connected dense layers three convolutional 2D layers, two max-pooling layers, one global average pooling layer, and fully linked dense layers.
The layers are all linked together to extract characteristics from picture data and pass them on to the next layer.
Finally, the dense layer removes the neuron connections in order to locate the brain hemorrhage in CT scan pictures of the brain.
This process is done in few simple steps, which are:
1. Examine an open source picture dataset for hemorrhage detection.
2. Using the dataset we produced, train CNN to identify hemorrhage in photos automatically.
3. Assess the outcomes from an educational standpoint.

4. LITERATURE SURVEY

Sl.no	Title	Description	Advantages	Disadvantages
1.	**A method for automatic detection and classification of stroke from brain CT images**	**Classify abnormality into Acute, Infarct, Chronic hemorrhage**	**Ability to detect all types of strokes.**	**fails if a same type of stroke has occurred symmetrically in both hemispheres**
2.	**Intelligent Brain Haemorrhage Diagnosis System**	**Classification Using Fuzzy C means & watershed algorithm**	**Can be Used by Medical students to practice for Surgical simulation.**	**High Power Consumption, Small Dataset**

3.	**Brain Hemorrhage Diagnosis by Using Deep Learning**	**Classification using LeNet, GoogleNet, ResNet.**	**Deals with Large Dataset and HPC.**	**Couldn't achieve the recognition of EDH and SAH, over-fitting**
4.	**Detecting Intracranial Hemorrhage with Deep Learning**	**Detection of Four Types of Inter-Cranial Hemorrhage.**	**Use Deep Learning to analyze than conventional method**	**subarachnoid hemorrhages were difficult to detect**
5.	**Automatic Detection and Classification of Brain Hemorrhages**	**Classification CT images into Normal, Epidural, Subdural , Intraparenchymal Hemorrhage**	**More than 92% accuracy achieved.**	**Computational complexity**

5. SYSTEM REQUIREMENTS

5.1. System analysis

The assessment of its attainability in terms of information, yield, projects, and procedures is dependent on the system prerequisite's design plan. Following the definition of a model system, the analysis will continue to recommend the type of equipment required to build the framework, as well as the technique required to run the framework once it has been designed. The project is enlarged to the point where the essential capacities and execution are met within the constraints. The task is produced by the most recent invention. Despite the fact that the technology may become obsolete after a given period of time owing to the fact that it never creates more advanced versions in the same programming, the system is still in use. The system was created using the convolution neural networks technique.

5.2. Functional requirement

Useful requirements explain the product's internal operations, such as technological nuances, data monitoring and processing, and other specialized functions indicating how to support the use cases. They are supported by non-utilitarian necessities that compel the planning or execution of imperatives.

- Data processing should be done by the system.
- The brain picture from the CT scan should be segmented by the system.
- The technology should be able to recognize brain pictures from CT scans.
- Using CT scan brain pictures, the system should anticipate brain hemorrhage.

5.3. Non-functional requirement

Unnecessary prerequisites are requirements that indicate parameters to be utilized to evaluate the operation of a framework rather than particular actions. This is distinct from useful needs that indicate explicit behavior or skills. Non-practical needs include dependability, adaptability, and cost.

System utilities are terms used to describe non-practical preconditions. Non-practical needs are also known as "limitations," "quality characteristics," and "administrative requirements."

The architecture should be designed such that additional modules and features may be added, supporting application development. Because programming packages are freely available, the cost should be low.

• Usability: The program need to be simple to use.
• Dependability: The system has to have dependability.
• Efficiency: It shouldn't take the system too long to detect a brain hemorrhage.
• Upgradability: The system should be simply upgradeable in the future.

5.4. TOOLS AND TECHNOLOGY USED

- System: Intel i3 2.4 GHz.
- Hard Disk: 40 GB.
- Ram: 512 Mb (Min.).

5.5. SOFTWARE:

- Operating system: Windows XP/Windows 7 or more
- Software Tool: TensorFlow 2.5, Open CV
- Coding Language: Python.

6. SYSTEM DESIGN

The system is made to allow classification of any image, which will aid in identifying the item for future use. The following phases or components make up the design:

6.1. Preprocessing:

It required years of work and experienced people to create algorithms for picture categorization. Deep learning cuts years of labor into hours or minutes using neural networks. Image classification is widely utilised in the study of neuroscience. Image input comprises o0af numeric pixel values supplied to neurons.

Each neuron has a single numerical value, and the connections between neurons have weights that describe the strength between neurons in various levels. CNN Deep Learning was used in this study.

6.2. Resize the images Data:

The deep learning models must be trained with photos of the same size. The reduction of the photographs into the same sizes accelerates the learning process and decreases the possibility of overfitting. The model's performance and accuracy rate suffer as a result of data loss during picture resizing, which is one of the most difficult aspects of resizing image data. The suggested study uses 128 128 dimensions to shrink photos to a fixed size. It is effective in overcoming overfitting and rapid learning rate difficulties while maintaining the highest accuracy rate.

6.3. Train and Test Data Split:

The method of dividing data into a predetermined ratio to training and testing deep learning models is known as the train-test split. The diagnosis of a brain hemorrhage is critical in a medical emergency. Before making an accurate forecast, deep learning models need to be trained on as much data as feasible.

Here we will take different types of random images of objects. Images can be combined with different objects or of a single object. We will be taking the images and then tally with the dataset given and will identify what is the object along with it our system will also identify objects using the live feed irrespective of number of objects appearing in from of the camera.

6.4. Image Augmentation:

The method of artificially creating data is known as picture augmentation, and it is used to improve forecast accuracy and facilitate efficient learning. A short dataset is the main impediment to learning in deep learning ideas. As a result, image augmentation is employed to artificially increase the training and validation datasets through flipping, rescaling, shearing, adjusting the zoom level, rotating the image at various angles, adjusting the width or height ranges, and using fill mode. The picture dataset contains varied pixel values, and by rescaling the pixel values of Every image is converted into the range of [0, 255] to [0, 1], all the photos are treated equally. By zooming at 0.05, shearing in the opposite direction, altering the image height and breadth range at 0.05, and keeping the filling mode at constant, the picture augmentation approach enhances the little dataset for the training process.

7. SYSTEM IMPLEMENTATION

7.1. Image Collection:

Input to the proposed system is Classification of Scan images of different objects are taken. The dataset for training is taken from the Brain CT scan Image Database Consortium (LIDC) and the Image Database Resource Initiative (IDRI). LIDC and IDRI consists of 1000 CT images of both major and minor hemorrhages recorded in Digital Imaging and Communications in Medicine (DICOM) format.

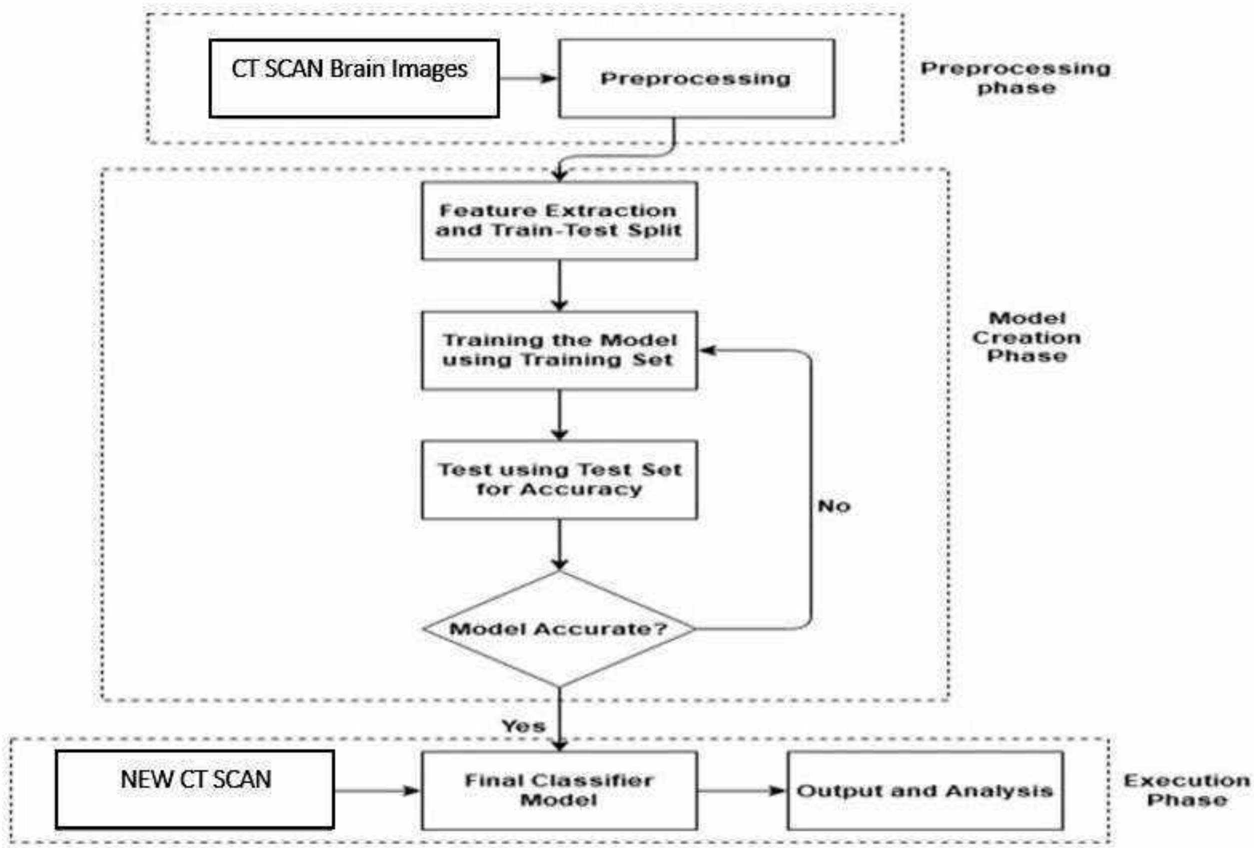


Fig 7.1.1: System Architecture

7.2.2. Image Preprocessing

Pre-processing aims to improve picture data by reducing undesirable distortions and enhancing specific aspects that are crucial for further image processing. There are three primary components to image pre-processing things

a) Grayscale conversion b) Noise removal c) Image enhancement

a) **Grayscale conversion:** A grayscale image only carries information about brightness. In a grayscale picture, each pixel value corresponds to an amount or quantity of light. In a grayscale image, the brightness gradient can be seen. The grayscale picture merely measures light intensity. The brightness of an 8-bit picture will range from 0 to 255, with '0' representing black and '255' representing white. Grayscale conversion converts a color image to a grayscale image. Colored photographs are more difficult and time-consuming to process than grayscale photos. On a grayscale image, all image processing techniques are used.

b) **Noise Removal:** Noise removal detects and removes undesirable noise from digital images. The challenge is determining which elements of a picture are real and which are the result of noise. Noise is defined as random fluctuations in pixel values.

To reduce undesired noise, we are use a median filter. The median filter is a nonlinear filter that preserves edges. A sliding window of odd length is used to construct the median filter. The value in the centre represents the median of the samples inside the window, which is a filter output, and each sample value is sorted by magnitude.

d) **Image Enhancement:** The goal of image enhancement is to process a picture to make a feature of interest more visible. To achieve a higher quality outcome, contrast enhancement is performed.

7.2.3 Image segmentation

Segmentation techniques include clustering, thresholding, neural network-based segmentation, and edge-based segmentation. For picture segmentation, we use the mean shift clustering technique in this implementation. For converging to the maximum dense region, this approach employs the sliding window method. This approach uses numerous sliding windows to find the most dense region. Algorithm for Mean Shift Clustering This method is mostly used to detect dense regions.

7.2.4 Feature Extraction

An Image has several features, the most important of which are color, texture, and form. We are looking at three elements here: color histogram, texture that resembles color, form, and texture.

7.2.5 Testing:

A training dataset consisted of images of known Hemorrhage stages. Classifiers are trained on the created training dataset. A testing dataset is saved in a temporary folder. Test case predictions, To increase the precision of image processing models, classifier graphs are plotted and feature sets are added to test case files.

7.2.6 Classification

Convolution Neural Network is a binary classifier that uses the hyper-plane as the decision border between two classes. Some of the problems involve pattern recognition, such as texture classification, which uses of CNN. In CNN, mapping nonlinear input data to linear data enables effective classification in high dimensional space. CNN maximises the marginal distance between classes. Different Kernels are used to divide the classes. CNN is essentially a binary classifier that finds the hyperplane when splitting two classes. The border between the hyperplane and the two classes is maximised. Support vectors are the samples closest to the margin that will be used to determine the hyperplane.

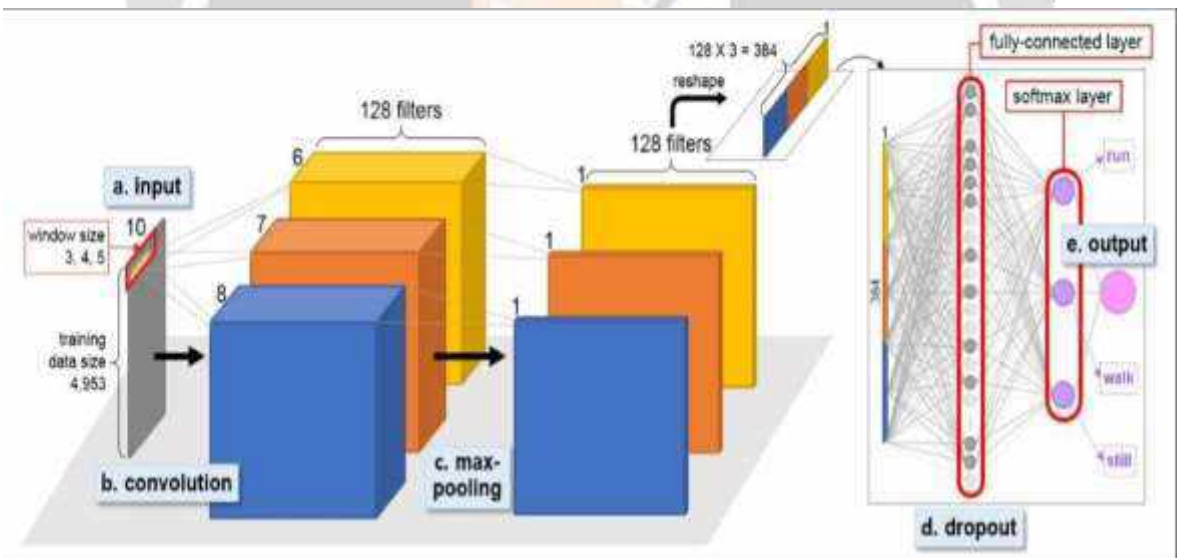


Fig 7.2.1 Convolutional Neural Network General Architecture

8. CONCLUSION

This paper proposes a deep learning model, CNN, to detect brain hemorrhages. Image augmentation is used to enhance the training dataset's 180 photos to 1000 images. The trials are done out on datasets that are both balanced and unbalanced. A balanced dataset with an equal number of classes representing brain hemorrhage and non-brain hemorrhage was used for the first experimental phase. The 96% accuracy attained with a balanced dataset using the CNN model results in the loss of one life since the model focuses on false-negative findings, which indicate that the patient has brain hemorrhage in reality but the CNN model predicts non-brain hemorrhage.

The use of image segmentation will be investigated in the future since it would allow for the accurate elaboration of internal bleeding in CT images by color separating segments.

9. RESULT

The CNN model surpasses other algorithms with 96% accuracy and the fewest wrong predictions, saving the patient's life. The proposed model can accurately diagnose brain hemorrhage at high fast and has a prediction accuracy of over 96%, which can help save valuable lives.

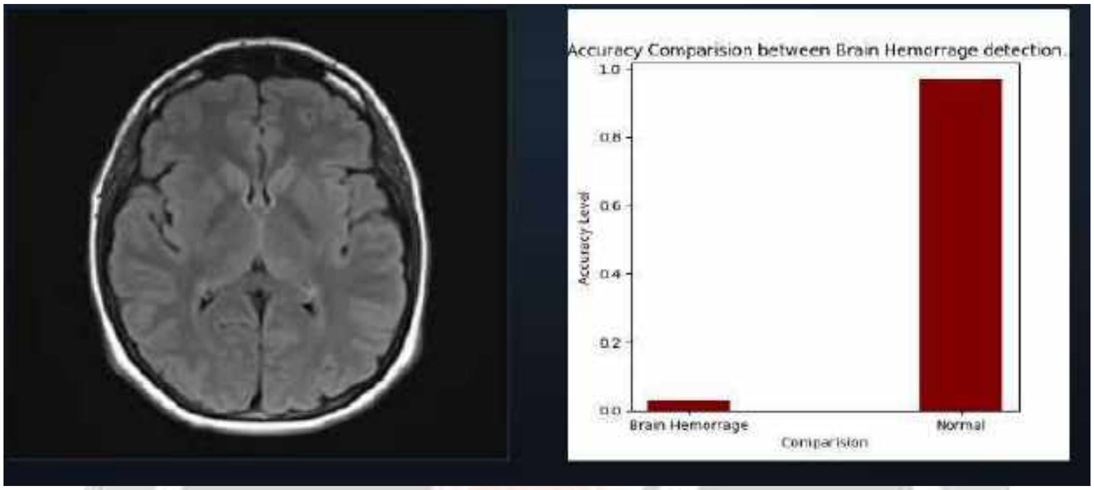


Fig 8.1: Normal CT Scan

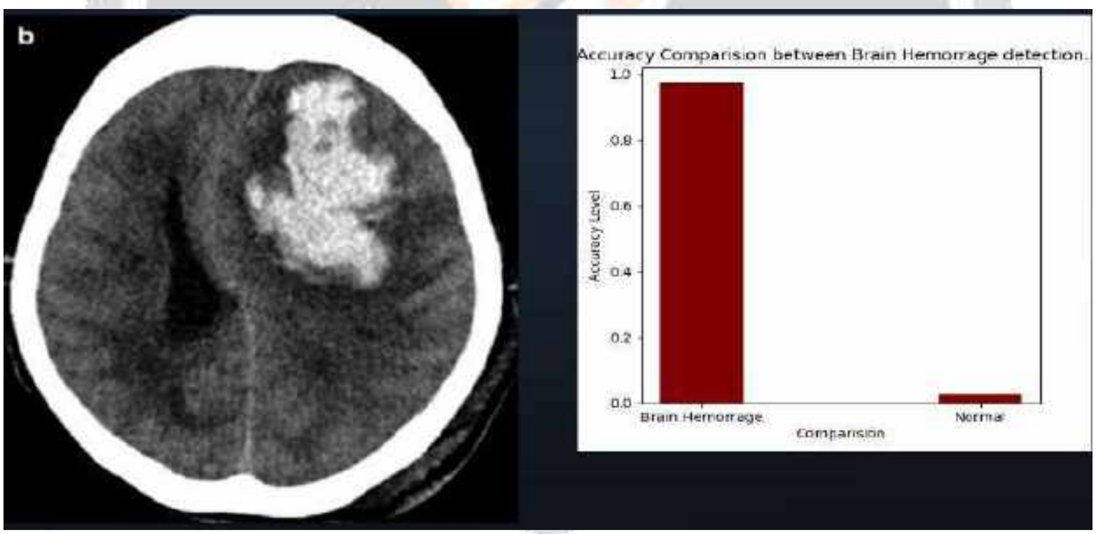


Fig 7.2: Scan with Hemorrhage

10. REFERENCES

[1] X. Ma, Y. Cheng, R. Garcia, and J. Haorah, ‘‘Hemorrhage associated mech anisms of neuroinflammation in experimental traumatic brain injury,’’ J. Neuroimmune Pharmacol., vol. 15, no. 2, pp. 181–195, Jun. 2020.

[2] A. Barman, V. Lopez-Rivera, S. Lee, F. S. Vahidy, J. Z. Fan, S. I. Savitz, S. A. Sheth, and L. Giancardo,‘‘Combining symmetric and standard deep convolutional representations for detecting brain hemorrhage,’’ Proc.SPIE, vol. 11314, Mar. 2020, Art. no. 113140D.

[3] M. Fallenius, M. B. Skrifvars, M. Reinikainen, S. Bendel, S. Curtze,G. Sibolt, N. Martinez-Majander, and R.Raj, ‘‘Spontaneous intracerebral hemorrhage,’’ Stroke, 2019

[4] P. Annavi, ''Method and system for identification of cerebrovascular abnormalities,'' U.S. Patent 16 365 548, Jan. 16, 2020.

[5] N. Kakhandaki, S. B. Kulkarni, K. Ramesh, and U. P. Kulkarni, ''Classification of brain hemorrhages in MRI using Naïve Bayes-probabilistic kernel approach,'' J. Cases Inf. Technol., vol. 21, no. 3, pp. 51–65, 2019

[6] A. Sharma and S. Jain, ''Brain region segmentation using low MSE based active contour model and convolutional neural network,'' Int. J. Adv. Trends Comput. Sci. Eng., vol. 9, no. 2, pp. 1848–1853, Apr. 2020

[7] H. Chen, S. Khan, B. Kou, S. Nazir, W. Liu, and A. Hussain, ''A smart machine learning model for the detection of brain hemorrhage diagnosis based Internet of Things in smart cities,'' Complexity, vol. 2020, pp. 1–10, Sep. 2020.

[8] V. Ravi, M. Alazab, S. Srinivasan, A. Arunachalam, and K. P. Soman, ''Adversarial defense: DGA-based botnets and DNS homographs detection through integrated deep learning,'' IEEE Trans. Eng. Manag., early access, Mar. 12, 2021

[9] A. Shalini, P. V. Vijayashree, S. Vishal, and S. C. Chacko, ''An automated system of brain hemorrhage detection using deep learning,'' Int. J. Sci. Res. Eng. Trends, vol. 6, no. 2, pp. 1–5, 2020.

[10] M. Burduja, R. T. Ionescu, and N. Verga, ''Accurate and efficient intracranial hemorrhage detection and subtype classification in 3D CT scans with convolutional and long short-term memory neural networks,'' Sensors, vol. 20, no. 19, p. 5611, Oct. 2020

SIGN LANGUAGE RECOGNITION USING NEURAL NETWORKS

Rajkumar R[1], Mohan N[2], Rakshith Kumar D[3], Rohith S[4], Prajwal M[5]

[1]*Assistant Professor, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[2] *Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[3] *Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[4] *Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*
[5] *Student, Computer Science, Rajarajeswari College of Engineering, Karnataka, India*

ABSTRACT

In current society, there is a lack of communication with the deaf. The origin of Sign Language (SL) helped to break down this barrier. Sign language uses visually transmitted sign patterns to communicate meaning to non-sign language users. The use of sign language is beneficial for those with autism spectrum disorder (ASD). Normal people are unable to interpret the signs used by the deaf since they are not familiar with their meaning. This system's aim is to find a solution to this issue. This device makes use of camera to record different hand motions. The image is then processed using a variety of techniques. In this study, an enhanced convolutional neural network (CNN) called MobileNetV2 has been used to design the SLR. The primary step is pre-processing the image. Then, an edge detection algorithm is used to determine the edges. The text is displayed once the sign is identified by a template-matching algorithm. Since the output is text, it is simple to determine what a particular sign means. Once logged into the system, users can choose to use the sign language translation and recognition features, capture images using OpenCV, and then process them using the trained CNN neural network. Additionally, it makes it easier to interact with the deaf. OpenCV-Python is used in the system's implementation.

Keywords: - *Sign Language Recognition, American Sign Language, Deep Learning, CNN,*

1. INTRODUCTION

Technologies like gesture and facial recognition have gained significant traction in the sign language field in recent years. Different movements known as gestures are used during communication. Hand or body movements are used. Gestures used in sign language typically involve visually communicated patterns. The estimated number of people with hearing difficulty worldwide is 4,94,93,50,000. Some existing systems for translating sign language taking into consideration hand orientation, hand shape, and hand movement. Every sign in sign language has a specific meaning ascribed to it so that one can easily understand and interpret it. The people create distinct and unique sign languages depending on their native tongues and geographic locations so no sign language that is widely recognized. Around the world, different sign languages are adopted by people.

In India Sign Language uses both the right and left hands to depict a variety of hand gestures. The suggested project focuses on hand position and shape while utilizing American Sign Language. One hand is all that is required for ASL. The system's implementation is therefore made simple. ASL has its own growth path and is independent of all spoken languages.

In a nutshell, the procedure involves utilizing a camera to obtain photographs. then pre-processing the sample, that involves changing the RGB-model image that was acquired to a grayscale image. Afterward, use a clever edge detection algorithm to follow the edges. Finally, this produces the result as text after applying a template-matching technique to find the pattern. This technology eliminates the need for a middle translator by bridging the communication gaps between hearing people and deaf people. It succeeds in its goal of turning motions into language.

2. EXISTING SYSTEM

MICROSOFT KINECT FOR SIGN LANGUAGE TRANSLATOR: The speech recognition program helps people with hearing difficulty, mute people, and regular people who have trouble utilizing sign language. Through the uses of Microsoft Kinect for Windows technology, this application can understand hand signals and gestures and convert them into text, voice, or gesture.

SIGN ALL: Human languages are incredibly diverse and complex. There are numerous number ways for us to communicate, including speaking and signing. Signed languages are understood visually, as opposed to spoken languages. Users of sign languages can process multiple things at once because of their expressive and visual nature. Additionally, it poses a special set of difficulties for sign language technology.

The success of Sign All can be ascribed to a variety of elements, including high levels of knowledge in the following areas

1. Deaf culture and community
2. Technology (artificial intelligence + computer vision)
3. Linguistic expert

MYO ARM BAND: Rather than using special cameras that sense motion and depth, startup Thalmic Labs' Myo armband detects a wearer's movements and translates them into computer controls. After slipping the Myo armband on your forearm, its sensors begin reading electrical activity in your muscles.

SIGN LANGUAGE GLOVE: The device then converts the electrical signals from the finger movements into signals that are transferred to a wrist-worn circuit board the size of a dollar coin. The board wirelessly sends those impulses to a smartphone, which converts them into spoken words at a pace of roughly one per second. In order to record the facial expressions used in American Sign Language, the researchers additionally attached adhesive sensors to the testers' faces, in the space between their eyebrows and on one side of their mouths. The lightweight, affordable, flexible polymers used in the UCLA team's invention are long-lasting and durable. Additionally, very versatile and reasonably priced, electronic sensors

3. DATA DESCRIPTION

The system proposed here uses American Sign Language (ASL) to recognize the signs made by the gesture. We made our own samples, though there are many open-source datasets available that we could use, it is recommended to create your own dataset to train your model on as it provides control on number of samples, quality and variety of samples. The Dataset contains numbers labelled from 0 to 9, and the alphabets labelled from A to Z. This dataset has around 500 samples for every 36 symbols. A few samples are shown in Fig 1. These samples of each symbol cover all the hand shapes and movements. The features are all of right hand. Every sample set is, characterized with its equivalent sign. A unique sign letter corresponds to every sample. The samples are in JPG format with the size of 300x300 pixels.

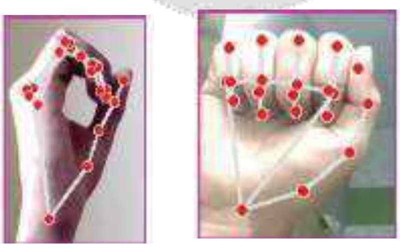


Fig -1: Dataset Samples

Fig -2: Alphabets of ASL

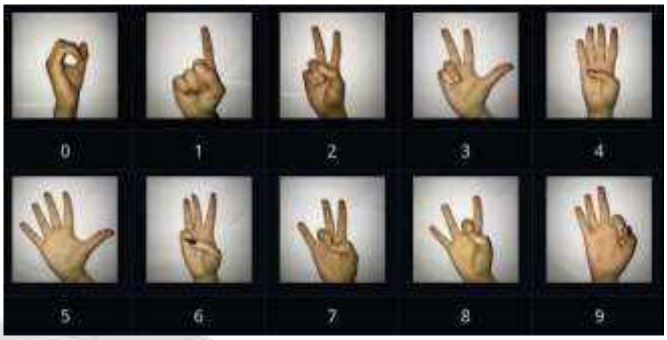


Fig -3: Numbers of ASL

4. PROPOSED METHODOLOGY

The schematic representation of SLR is given below in Fig 4. It includes,

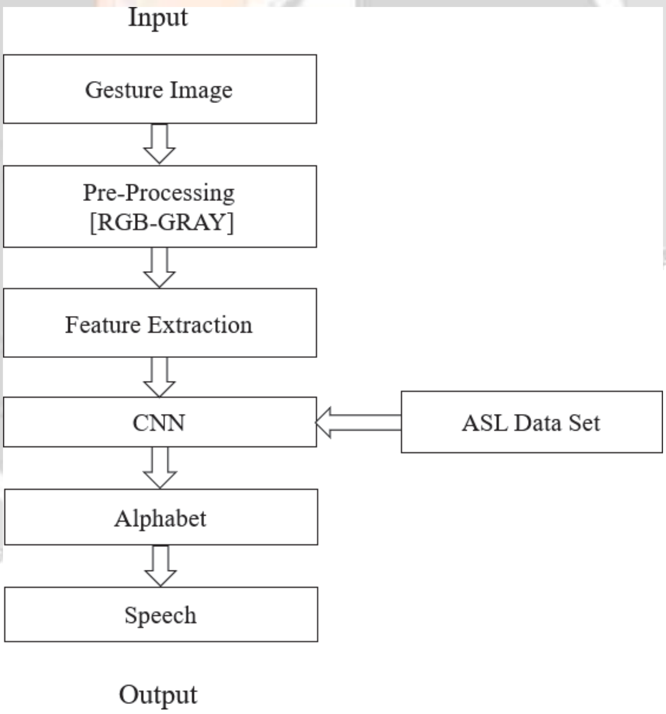


Fig -4: Proposed Methodology of SLR

A. Gesture Image

We acquire the image using a camera, any type of camera works. The captured images are in the RGB color format.

RGB Color Format:

RGB represents Red, green, and blue in the RGB color system. Many image-processing techniques use RGB color model as a prerequisite. RGB is a device dependent model. Different systems generate various values. We can normalize the RGB values to remove distortions brought on by light and shadows.

B. Pre-Processing

Data pre-processing is a crucial part in developing a Machine Learning Model. Here as our data is in RGB format, so the dimension of our data will be in 3D. Although it's okay to train our model with 3-dimension data, it will be quite computationally expensive for the model to train on. So, we will transform the image from RGB to Grayscale. A grayscale image is nothing but a black & white image, this reduces our images to 1D thus making it easier for our model to train. The conversion can be done using OpenCV library's function,

```
cv2.cvtColor(image, cv2.COLOR_RGB2GRAY)
```

C. Feature Extraction

Here, while we collect our data initially, we collect Hand landmarks. Hand landmarks are the specific points or landmarks detected on a human hand by computer vision algorithms like **OpenCV** or **MediaPipe.** The landmarks are necessary for hand gesture recognition, hand pose estimation, and other applications related to hand tracking.
MediaPipe provides a more advanced and accurate hand landmark detection module called **MediaPipe Hands,** which uses a deep learning model to detect and track 21 hand landmarks on each hand. The landmarks include the tip and base of each finger, the center of the palm, and the wrist. The library we are using to collect Hand Landmarks is **CVZone.** CVZone is a computer vision package that makes it easy to process the image and AI functions. At the core it uses OpenCV and Mediapipe libraries. The hand landmarks in our sample is shown in Fig 5. You can utilize the hand detection module using the below code.,

```
from cvzone.HandTrackingModule import HandDetector
detector = HandDetector(maxHands=1)
```

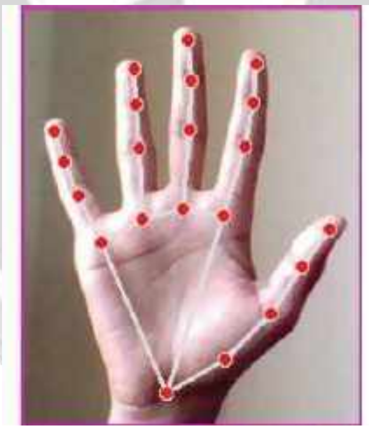


Fig -5: Hand landmarks in an Image.

D. Training the Model (CNN)

The final step is to train our model. In this system we are utilizing a web-based model training called Teachable Machine by Google. Since training a model with large dataset needs huge computation power turning towards a cloud-based service is essential. It has a nice user-friendly UI; Before training the model, we upload the collected samples and label the classes. It provides ability to fine tune our model by changing parameters. We have updated the parameter values of learning rate to 0.0001, epochs to 100 and batch size to 16. The teachable machine uses transfer learning methodology. It builds our model on pre-trained models like MobileNetV2. MobileNetV2 is a CNN based model of classification that provides easy deployment on mobile devices.

5. RESULTS

This section shows the results obtained.

Fig -6: Predicting letter C with 92.88% accuracy

Fig-7: Predicting number 0 with 100% accuracy

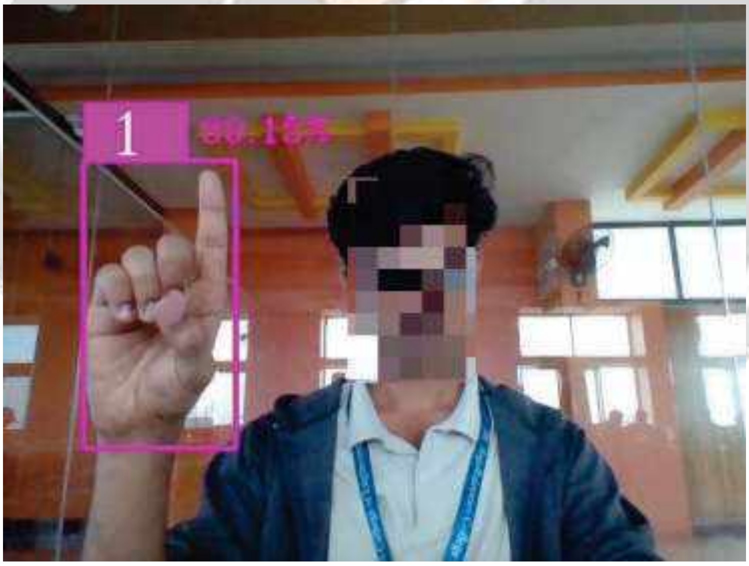


Fig -8: Predicting number 1 with 89.15% accuracy

6. CONCLUSION

In this paper, A SLR system based on Computer Vision (CV) is designed. The system can translate user input in American Sign Language into the corresponding text by using the CNN neural network to extract characteristics from the ASL data and then giving that information into the MobileNetV2 classifier. For the hearing-impaired groups, experiments assess sign language translation accuracy of 90.45% and recognition accuracy of 93.46% to meet basic demands. There, the procedure entails applying a smoothing algorithm to the image, removing noise and other unimportant data.

7. REFERENCES

[1]. Kamal kour preet, Dr. Lini " recognition of sign language using image processing, International Journals of Research in Computer Science and Software Engineering, Vol. 7,

[2]. Mamta Juneja , Parvinder Singh Sandhu," Performance Evaluation of Edge Detection Techniques for Images in Spatial Domain", International Journal of Computer Theory and Engineering, Vol. 1, Issue 5, 2009.

[3]. Zhi-hua Chen, Jung-Tae Kim, Jianning Liang, Jing Zhang and Yu-Bo Yuan "Real-Time Hand Gesture Recognition Using Finger Segmentation", The Scientific World Journal, Volume 2014, Article ID 267872, 9

[4]. Sawant Pramada, Deshpande Saylee, Nale Pranita, Nerkar Samiksha, Mrs.Archana S, Vaidya "Intelligent Sign Language Recognition Using Image Processing", IOSR Journal of Engineering, Vol. 3, Issue 2, 2013.

[5]. Neelam K. Gilorkar, Manisha M. Ingle, "Real Time Detection And Recognition Of Indian And American Sign Language Using Sift", International Journal of Electronics and Communication Engineering & Technology, Vol. 5, Issue 5, 2014.

[6]. Lv Lei, Zhang Jinling, Zhu Yingjie, A static gesture recognition method based on data gloves, Journal of Computer-Aided Design & Computer Graphics, No.12 Dec. 2015

[7]. M. F. Tolba and A. S. Elons, "Recent developments in sign language recognition systems," 2013 8th International Conference on Computer Engineering & Systems (ICCES), Cairo, Egypt, 2013,

[8]. S. Kido, Y. Hirano and N. Hashimoto, "Detection and classification of lung abnormalities by use of convolutional neural network (CNN) and regions with CNN features (R-CNN)," 2018 International Workshop on Advanced Image Technology (IWAIT), Chiang Mai, Thailand, 2018,

[9]. M. Lee and J. Bae, "Deep Learning Based Real-Time Recognition of Dynamic Finger Gestures Using a Data Glove," in IEEE Access, vol. 8, pp., 2020,

[10] T. Ayshee, S. Raka, Q. Hasib, Md. Hossian, R. Rahman, "Fuzzy Rule-Based Hand Gesture Recognition for Bangali Characters", in IEEE International Advanced Computing Conference, 2014.

[11] B. Bauer,H. Hienz "Relevant features for video-based continuous sign language recognition", IEEE International Conference on Automatic Face and Gesture Recognition, 2002.

HUMAN FACIAL ACTIVITY RECOGNITION

R Rajkumar[1], Hrithik K A[2], K Shivukumar[3], Keerthan R[4], Kesari Nandan K S[5]

[1] *Assistant Professor, CSE, Rajarajeswari College of Engineering, Bangalore, India*
[2] *Student, Computer Science Department, RRCE, Karnataka, India*
[3] *Student, Computer Science Department, RRCE, Karnataka, India*
[4] *Student, Computer Science Department, RRCE, Karnataka, India*
[5] *Student, Computer Science Department, RRCE, Karnataka, India*

ABSTRACT

In various real-life scenarios, human detection and activity recognition (HDAR) in videos is crucial. This study focuses on detecting humans in aerial video sequences captured by a moving camera mounted on an aerial platform, which encounters dynamic events such as changing altitudes, illumination shifts, camera jitter, and variations in viewpoints, object sizes, and colors. The UCF-ARG aerial dataset, unlike conventional datasets with frames taken by a static ground camera featuring medium or large human regions, presents a greater challenge due to the significant distances between humans and the camera in the frames. Human detection methods described in existing literature often experience performance degradation when video frames are affected by noise, blur, illumination changes, and similar factors. To overcome these limitations, the object detection techniques used in this research were trained on the COCO dataset and assessed on the publicly accessible UCF-ARG dataset. The detectors were compared based on detection accuracy, and five human actions (digging, waving, throwing, walking, and running). Experimental results revealed that EfficientDetD7 outperformed other detectors with an average accuracy of 92.9% in detecting all activities and various conditions, including blurring, Gaussian noise addition, lightening, and darkening. Furthermore, deep pretrained convolutional neural networks (CNNs) like ResNet and EfficientNet were employed to extract valuable features from the detected and cropped human patches. Long ShortTerm Memory (LSTM) utilized the extracted spatial features to account for temporal relations between features for human activity recognition (HAR). Experimental findings showed that the EfficientNetB7-LSTM surpassed existing HAR methods in terms of average accuracy (80%) and average F1 score (80%). The result is a robust HAR system that combines EfficientDetD7, EfficientNetB7, and LSTM for human detection and activity categorization.

INDEX TERMS - *Aerial captured video, convolutional neural network, human activity recognition, human detection, long short-term memory, transfer learning.*

1. INTRODUCTION

A computer job for human detection has been developed for at least two decades. Search and rescue, law enforcement, pedestrian detection for traffic management and automated driving assistance, fall detection, and many more tasks, such as the ensuing decision-making, have all benefited from the use of this technology. Unmanned aerial vehicles (UAVs) are frequently used to deploy the technology because of its flexibility, increased tracking range, and capacity to capture photos and videos in circumstances when doing so would be impossible for cameras on the ground. Because of this, it appears that the use of human detecting technologies by UAVs will fundamentally alter in the future. a discussion on human activity. Although the concept of HAR. The problems that come with the UCF-ARG aerial dataset that was used in this paper have not been addressed by other datasets that have been employed in HAR applications. Frames from static ground cameras that were used to acquire traditional datasets reveal humans in medium-sized or big portions of these frames. Therefore, current research only suggests methods to identify humans when their size or scale is medium to large. To localise humans that are small in scale, that is, whena the distance between the humans and the camera is less than a certain distance, we still need to research how reliable current human detection techniques in aerial surveillance are. Furthermore, a moving (i.e., not stationary) aerial camera, such as one on a UAV, was used to capture the frames. Realtime human detection in video sequences taken from the air has undoubtedly not been without difficulties. For instance, the size of a human that is seen on aerial footage that has been captured can change depending on the UAV's height. The system is challenged by the natural variation in human size that must be detected. Dynamic events such changes in illumination and significant amounts of motion blur brought on by camera jitter are other issues that might occur during the acquisition of aerial recorded footage. To create a highly reliable classification algorithm that can tell apart humans, all of these issues must be solved.

1.1 DATASET OVERVIEW

Machines can now detect a variety of things using deep learning (DL) thanks to convolutional neural networks (CNNs). YOLOv5, R-CNN, Fast R-CNN, Faster R-CNN, Mask R-CNN, R-FCN, SqueezeDet, EfficientDet, MobileNetV2, RetinaNet, ShuffleNet, and PeleeNet are some of the most popular algorithms for these tasks. A detection method must be able to produce favourable performance metrics at fast inference rates. These levels of performance are reported in a number of articles that discuss human detection algorithms. These methods include body detection, head detection, shoulder detection, and a plethora of others. However, in many situations, detecting only characteristics of objects connected to humans is insufficient. Since there may be obstructions in the camera's field of view, human detection algorithms must still be able to identify them accurately. Over the past few decades, developments in machine learning (ML) have altered the course of many different industries. Numerous applications, including computer vision and natural language processing, have significantly improved as a result of the use of neural networks in machine learning (ML. For example, we moved from the straightforward problem of identifying persons in movies shot from above to the focus of our research, which is human activity. Since there may be obstructions in the camera's field of view, human detection algorithms must still be able to identify them accurately. Over the past few decades, developments in machine learning (ML) have altered the course of many different industries.

1.1 HUMAN DETECTION

Various applications, including PC vision and regular language handling, have fundamentally worked on because of the utilization of brain networks in AI (ML). Analysts have begun exploring different avenues regarding producing somewhat more up to date methods to complete positions of expanding intricacy as the use of ML for the discovery of static items has arrived at close ideal degrees of exactness and accuracy. For instance, we moved from the clear issue of distinguishing people in motion pictures shot from above to the focal point of our examination, which is human action. to assemble movement related information on individuals to remember them. By consolidating different sensor types, mixture sensors can all the more likely gather information highlights. By doing this, we can gather tactile information from the genuine climate, for example, from digital physical-social frameworks. Cell phones with worked in attractive sensors may effectively decide the area of their clients. Be that as it may, depending exclusively on sensor-determined information could be troublesome on the grounds that equipment could be costly and security concerns could forestall the arrival of a ton of information. Moreover, it could take a ton of space explicit information to remove the right elements from sensor-determined information that a ML model can use to process and gain from. Cell phone sensors bring about a high-layered and loud consistent succession of perceptions. consolidating part outrageous learning with order. It has been shown that machine (HK-ELM) models can group exercises and learn qualities. To coordinate physically made highlights and gained highlights from a H-ELM, they utilized a component combination approach. At last, utilizing multimodal HAR methods, we can all the while perceive human action utilizing sensor-based information as well as vision-based information [3]. This is done so free data from one methodology can assist the other mode with conquering its cutoff points. The present state of the art DL calculations, especially CNNs and intermittent brain organizations (RNNs), can consequently decipher and gain from crude information assembled from sensors and video information from cameras.

2.METHODOLOGY

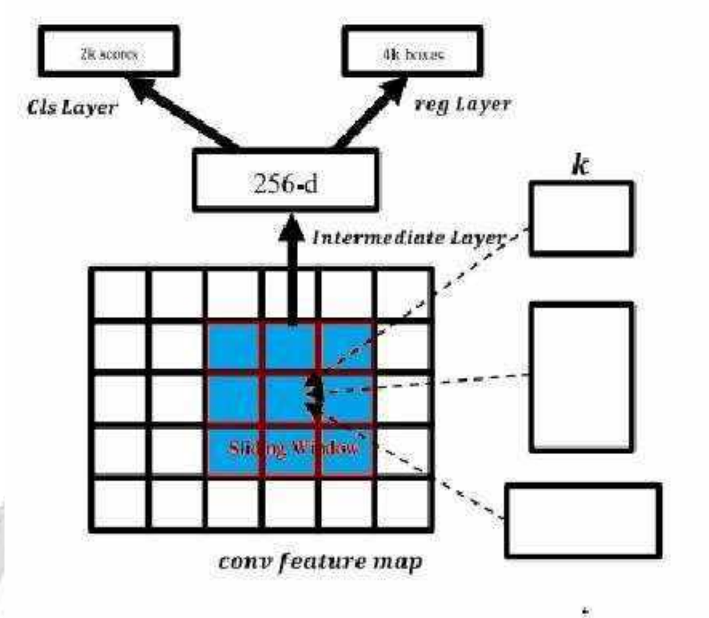


Chart -1 Regional Proposal Network (RPN)

In this research, various object detectors such as YOLOv4, faster R-CNN, and EfficientDetD7 were pre-trained on the COCO dataset comprising 91 types of objects. The task of human detection. On the UCF-ARG dataset, we used these human detectors with learned parameters without finetuning. In other words, one of our goals was to assess and compare the effectiveness of these item detectors for human detection in difficult aerial movies.

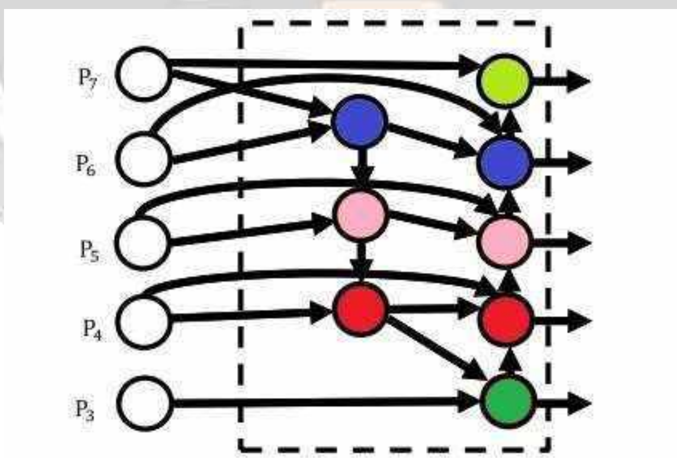


Fig -1 The BiFPN features aggregation method

2.1 RESNET

The ResNet framework, also known as the residual learning framework, is an extremely deep network that produces very good generalisation without overfitting [1]. Different numbers of layers, such as 50, 101, and 152, can be used in ResNet. During the training step, a supervised learning model feeds a ResNet CNN with large-scale tagged datasets such as ImageNet. With reference to the layer inputs, the ResNet layers are reformulated as learning residual functions.

The ROIs of humans cut from aerial video frames were enlarged to 224 224 pixels and used to ResNet50 to extract 2048 features in this work. ResNet50's top layers were deleted. The LSTM was then implemented to make use of the sequence of features retrieved from the sequence of ROIs clipped from the video sequence.

2.2 LONG SHORT-TERM MEMORY FOR CLASSIFICATION OF TIME SERIES

To catch transient relationships, a Repetitive Brain Organization (RNN) was utilized for grouping demonstrating. The LSTM is a type of RNN that has been displayed to dial back inclination disappearing. Figure 6 portrays a LSTM with a memory cell that collects state data and is upheld by control entryways for long-range succession demonstrating.

A succession of elements got from returns for money invested of casings was applied to the LSTM that was used to supplant the top layers of pre-prepared CNNs in this work. Besides, LSTM was prepared and its boundaries were iteratively calibrated to fit the highlights extricated from returns on initial capital investment trimmed from UCFARG video outlines.

3. EFFICIENTNET

A few tests were done to decide the best LSTM construction and design for creating the best presentation measurements. Actuation works, the quantity of LSTM layers, the quantity of hubs in each layer, and the quantity of totally associated layers are all essential for the LSTM plan.

The best LSTM engineering in this paper contains the accompanying layers:

1) The GlobalMaxPool2D

2) 512 hub bidirectional_LSTM with tanh initiation and sigmoid intermittent actuation

3) 256 hub completely associated layers with ReLU initiation capability

4) Layers having five hubs that are completely associated

5) The Softmax initiation include

A few tests were likewise done to distinguish the best LSTM hyperparameters for creating the best presentation measurements.

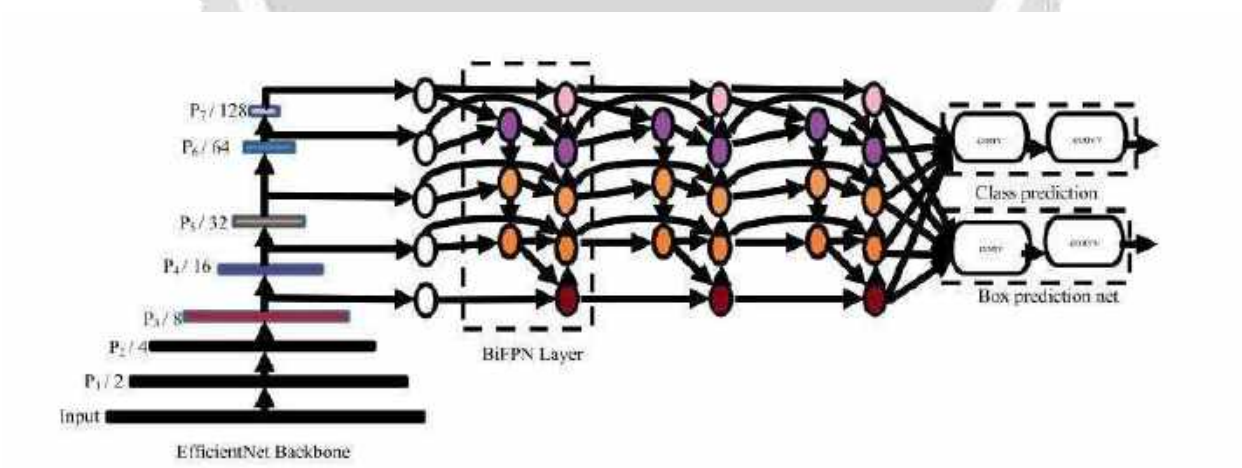


Chart -2 The EfficientDet object Detector's overall architecture

4. CONCLUSIONS

This paper's review centered around two errands: human location (HD) and human movement acknowledgment (HAR). The proposed HDAR framework was assessed utilizing the openly available UCF-ARG elevated dataset. A moving camera mounted to an elevated stage was utilized to catch ethereal video groupings in this video dataset. This dataset has very troublesome substance with dynamic occasions like evolving heights, lighting changes, camera jitter, and varieties in sees, thing sizes, and tones. A few human item locators pre-prepared on the COCO dataset, including Consequences be damned, quicker R-CNN, and EfficientDet, were assessed to decide the best indicator fit for identifying and limiting people inside video outlines. A few examinations were done to look at the recently referenced human finders.

5. REFERENCES

[1]. Abhilash Nelson: “Computer Vision: Face Recognition Quick Starter in Python”, IEE, pp, 102-234, Jan 2023

[2] Rajeev D. Ratan: “Modern Computer Vision™ PyTorch, Tensorflow2 Keras & OpenCV4”, Dec 2022

[3] Emenwa Global:” Computer Vision In Python! Face Detection & Image Processing”, Nov 2022

[4] [4] Yohei Kawaguchi, Tetsuo Shoji, “Face Recognition-based Lecture Attendance System”, “3rd AERU…”, 2005.

CROP PREDICTION AND YEILD BASED ON ENVIRONMENTAL FACTORS

S Vijayanand[1], Samyuktha R[2], Sneha N V[3], Vishwas K[4]

[1]*Professor, Computer Science and Engineering, RRCE, Karnataka, India*

[2]*Student, Computer Science and Engineering, RRCE, Karnataka, India*

[3]*Student, Computer Science and Engineering, RRCE, Karnataka, India*

[4]*Student, Computer Science and Engineering, RRCE, Karnataka, India*

ABSTRACT

This project is an effort to reduce the losses occurs in Agriculture field due to Climate and Environmental changes which leads to inappropriate selection of crop to grow on land. Machine Learning (ML) is a significant methodology for accomplishing the reasonable and compelling answers for this disadvantage. In India farmers still follow the traditional technology which is adopted from their ancestors. But the problem is that in the earliest time climate was compatible with the predicted weather everything happened on time. But now most of the things have been changed due to global warming and many other factors. The leading annoyance with agribusiness in India is the shortage of rainfall in seasonal periods. Humidity is also requiredfor production, though it has been unreasonable, it also transforms as a weakness. Accurateness of harvest price forecasting strategies plays an important function in encouraging market characteristics such as direction and collection. Harvest Yield Prediction technique includes foreseeing yield of the harvest from reachable historical and possible data like climate parameter, soil parameter and yield prediction. There is application of machine learning algorithms andwe get best predicted results through a web application. This Project is an attempt of predicting the outcome of harvest supported the current data by using of RFA Random Forest Algorithm and Back Propagation. The expectation can make the farmer to foresee the yield of harvest before developing onto the agribusiness zone.

Keyword: - *Agriculture, crop recommendation, yield prediction, integrating feature.*

---

1. INTRODUCTION

Among the most crucial segments of the Indian economy is agribusiness. Agribusiness in India contributes 18% of the country's GDP and employs 50% of its labour force. Though it is India's most populous financial sector and plays a significant role in the nation's overall socioeconomic fabric, notable experiments have shown a progressive decline in the contribution made by agribusiness to the country's economy. These experiments may also be a conception of the money required for industrial growth to the country's dimensions.

Agriculture's financial contribution to India's GDP is steadily shrinking. Plant crop production is influenced by a variety of variables, including climatic, geographic, biological, political, and economic considerations. When there are multiple crops to be grown, it can be challenging for farmers, especially if they are unaware of market prices.

Using technology to raise awareness about farming has been a need in recent years. Food insecurity is brought on by seasonal climatic change that is detrimental to basic resources including soil, water, and air. A smart system that can address the issue of declining agricultural output is required in a situation where crop yield rates are continually falling short of fulfilling demand.

1.1 Problem Statement

Several climatic factors have an impact on agricultural production. The price of a crop, metrological characteristics, precipitation parameters, and soil parameters, for example. And everything is chaotic as an outcome of on-going climate change. Farmers in India still use the traditional methods they acquired knowledge from their ancestors. The issue is that everything happened on time earlier since the weather was extremely wholesome. However, most of the things today have changed as a result of market demand, global warming, and numerous other factors. We are able to alter our management and implementation capabilities thanks to the precise and comprehensive information on the crop and pricing across different states. Here, we use machine learning to analyse crop and yield data gathered by various states in addition to crop average price and location.

2. RELATED WORK

2.1 LSTM Based Crop Price Prediction System (2021)

The procedure is used to predict the expense of rare crops using elements such as the place and tentative sowing date. Two approaches were compared one is using machine learning algorithms and the second one is a hybrid sequential modelling approach. In this analysis aspects like Area gathered, the result of a crop, and time-series data of one-time cost of produce and crop season are taken into consideration. As the price of crops varies from location to location, a particular location of Pune has been selected for this study. Following datasets, one is having time-series data of crop, area, and crop production taken from data.gov.in and another time-series data of crop and past prices from agmarknet.gov.in are used. Both datasets are merged based on crop names, year, and month. The data was checked for any kind of correlation and the parameters that had less correlation were removed. Parameters viz. 'Crop Year', 'Crop', 'Area', 'Yield', 'month', 'Modal Price (Rs. /Quintal)' were considered for correlation .Library called Lazy Predict is used to fit the dataset with several algorithms like Random Forest Regressor, Decision Tree Regressor, KNN, MLP Regressor.

2.2 Cluster Prediction and Forecasting System using Supervised Machine Learning Algorithms (2021)

This method used in the system is the deceleration of the decision tree which is a way of minimizing machine learning. The parameters considered in the forecast are: - rainfall, wholesale price indicators (minimum support [MSP], farming costs, planting costs, etc.). Accurate forecasting of crop prices; is important in crop production management. Such forecasting will also help affiliated industries that rely on agriculture to find raw materials to strategize for their business. With the benefits of this app, farmers get an early forecast that allows them to maximize their profits and prevent major losses which will also increase the country's economy.

2.3 Crop Yield Analysis Using Machine Learning Algorithms (2020)

The primary preoccupation is to indicate the number of proceeds of specific conditions preserving in marbles certain factors. Agribusiness is not only a huge characteristic of the growing economizing of the countryside, but we require enduring. Forecasting and calculating crop harvest is not a straightforward assignment, as it trusts on several parameters such as moisture, ultra-violet (UV), pesticides, fertilizer, and the measurement and type of ground surrounded for that region. In this document, supplemental categories of Machine Learning (ML) algorithms are introduced to research and foreknow the yield of the harvest. These algorithms are, Support Vector Regression (SVR) and Linear Regression (LR), they are incredibly reasonable for validating the irregular parameters in anticipating the continuous variable estimation with 140 data promontories that were acquired. The parameters verified aloft are elementary differentiae instantly soft-soaping the expansion of the harvest. The error rate was measured with the usefulness of Mean Square Error (MSE) and Coefficient of Determination (R 2), where MSE gave out approximately 0.005 and R 2 gave around 0.85. An identical dataset has been used for comparison between the performances of the algorithms.

3. METHODOLOGY

Computer software that learns from experience and develops without explicit programming is known as a machine learning system. A machine learning programme accesses and makes use of data to learn for itself. In order to make wiser judgements in the future, we search for patterns in our observations, direct experience, or instructions as we learn. It all starts with observations or information, such examples, first-hand experience, or instructions. The computer must be capable to learn without human aid in order for it to learn autonomously and modify actions accordingly.

3.1 Use Case Diagram

A use case diagram, at its most basic level, explains a user's engagement via the system by illustrating how the user relates to the many applications that the user is associated with. Use case diagrams, in their most basic form, represent how customers engage with systems and the connections between them and the several applications in which they participate. Use case diagrams are visual representations of how a user interacts with the system. Even though a use case itself can elaborate in considerable detail on each possibility, a use case illustration can aid in giving a higher-level view of the apparatus. Case study diagrams are said to be the system's blueprints since they graphically and simply describe how the system works.

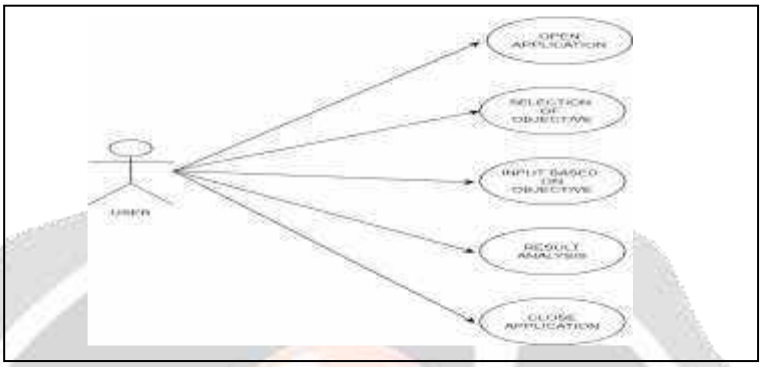


Fig-1: Use Case Diagram

3.2 UML Diagram

UML diagrams are graphical representations of the interaction between processes and in what order in a unified modelling language (UML). Each participant is represented in a table with a column for the messages they have sent and received. The project's sequence diagram is shown in the diagram below.

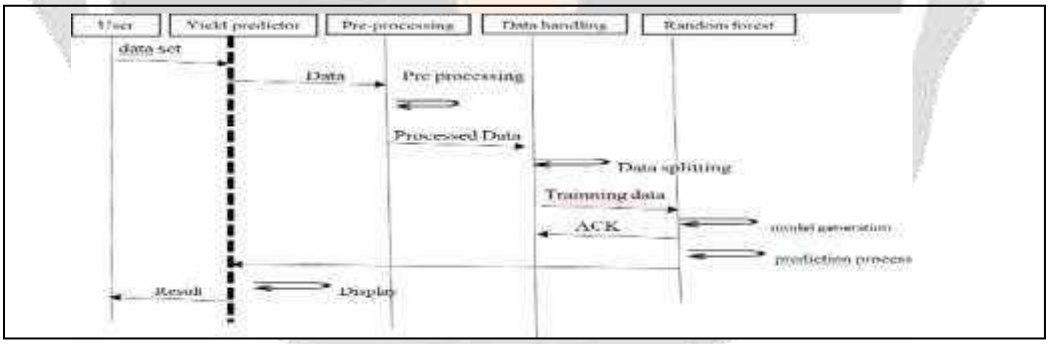


Fig-2: Sequence Diagram

3.3 System Architecture

The theoretical framework of a system's operation, appearance, and capabilities is called its architecture. The structure and behaviours of a system's characteristics are given architectural description in a way that makes analysis and reasoning easier. The parts and subsystems that is intended to implement system as a whole make up the system architecture. In the realm of architecture description languages, advancements have been made. The system architecture is described using formal languages known as architectural description languages. As you can see, our working model consists of many modules coupled by Python code in the diagram below.

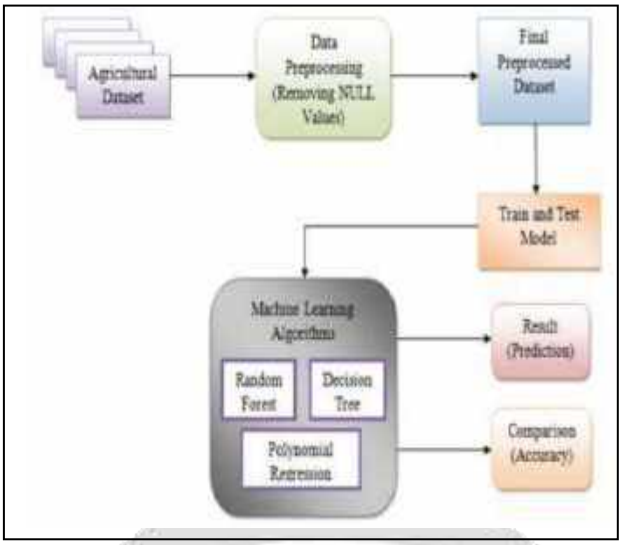


Fig-3: System Architecture

4. IMPLEMENTATION

In other words, random forest employs decision trees and ensemble classification models to combine the best attributes of both types of models. For better predictions, the RF model divides the training data that originates from weaker nodes together with the stronger nodes. A RF model may be used to resolve issues with classification and regression.

Our project's input is the gathered dataset. This dataset underwent pre-processing, which involves removing any unnecessary or empty data from the datasets. Data is put into the system after pre-processing, and a number of machine learning techniques are run to identify the best one. This project's goal is to present projections for crop, yield, and pricing. Finally, the model analyses the job in the backend and shows the outcome of the predictions according to the user input at the front end.

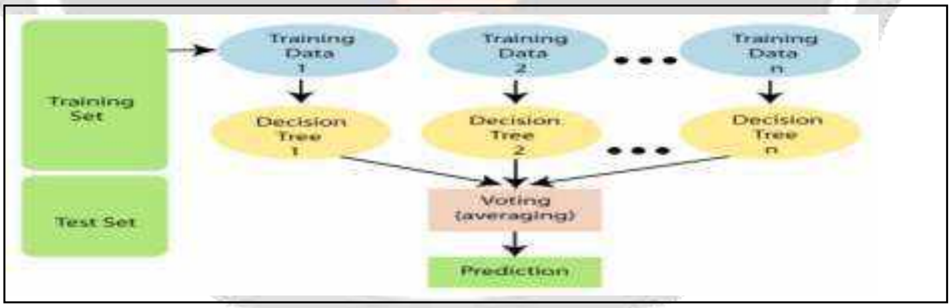


Fig-4: Random Forest Algorithm

Programming and deploying a technical specification or method resulting in the creation of a programme, software component, or other computer system. There are probably several observations for a particular interaction. If there are no defined interfaces methods, then the class additionally includes methods that implement the methods outlined in the interface. An interface-implementing class is basically its putting the interface into practise. Successful system implementation requires that related tasks be completed in the right order. As a way to prepare for an implementation project, it is crucial to have well-established techniques and expert assistance, yet implementation projects are frequently hampered a deficiency in resources, bad planning, and plenty of activities.

The project is being divided into four modules:

1. Price Prediction
2. Crop Prediction
3. Crop-Yield Prediction
4. Fertilizer Prediction

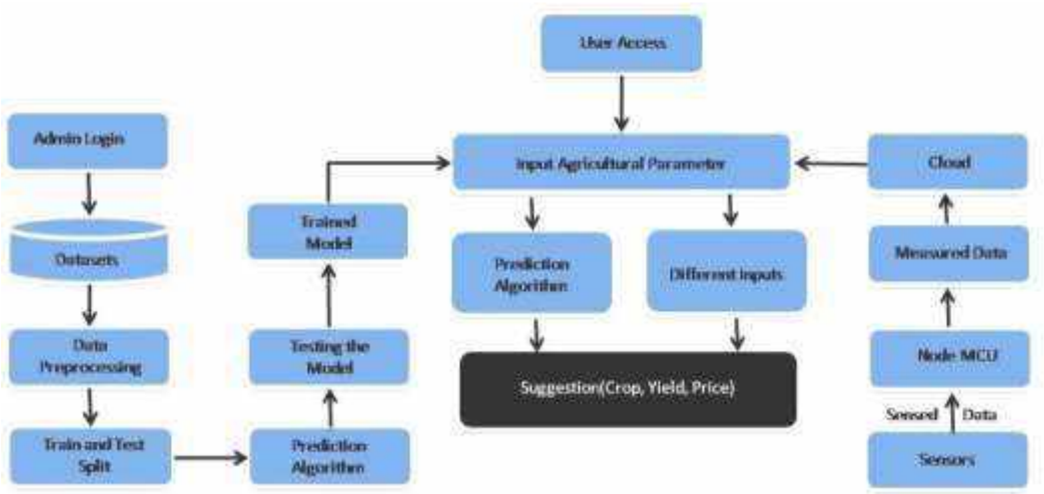


Fig-4: System Architecture

6. CONCLUSION

Through the aid of the RFA Random Forest and Back Propagation Algorithm, we have suggested a method for predicting the crop, crop yield, and crop price. This strategy lowers losses for farmers and raises yields to boost agribusiness. During this stage of the project, we read up on crop-yield and price prediction literature. This body of literature aids in our comprehension of the difficulties we encounter while identifying the price and yield from the pricing dataset. According to the literature and experimental findings, random forest and back propagation aid in crop-price identification and assist in removing the issues that we have identified in the dataset. Additionally, the accuracy rate of this algorithm is significantly higher than that of other algorithms. Farmers may better comprehend agricultural ecosystems by merging this with other departments like sericulture and other village-level development activities. The development of villages for the benefit of farmers can be improved by integrating this with other sectors, including sericulture.

7. FUTURE WORK

By including IOT sensors in the system design and employing node MCU to deliver data directly from the cloud to the input parameters rather than only relying on human input. It would be advantageous to enhance crop price prediction further, which would involve a variety of datasets, forecasting techniques, and implementation. GPS sensor implementation to get the position of the location and enter it straight from the API.

8. REFERENCES

[1] AbhishekSrivastsava, Dushmanta Kumar Das, Ravikumar, 2020 , "Monitoring of soil parameters and controlling of soil moisture through IOT based smart agriculture"

[2] FatinFarhanHaque , Ahmed Abdelgawad, VenkataPrashant, 2020, "Crop yield analysis usingmachine learning algorithm".

[3] Francisco Raimundo, Andre Gloria, 2021, "Prediction of weather forecast for smart agriculture supported by machine learning".

[4] SyedaIqra Hassan, MuhummadMansoorAlam, 2021, "A systematic review on monitoringand advanced control strategies in smart agriculture".

[5] Muhammad ShaidFarooq, ShamylaRiaz, 2020, "A Survey on the role of IOT in agriculture for the implementation of smart farming".

FOREST FIRE AND WILD ANIMALS DETECTION WITH TREE CUTTING

R. Balakrishna [1,] Devika H N[2], Nikitha G J[3], Prathibha M[4], Sapthami S N[5]

[1] Professor, CSE, Rajarajeswari College of Engineering, Karnataka, India
[2, 3,4,5] Student, CSE, Rajarajeswari College of Engineering, Karnataka, India

ABSTRACT

Abstract *A novel approach for forest fire detection using image processing technique is proposed. A rule-based color model for fire pixel classification is used. The proposed algorithm uses RGB and YCbCr color space. The advantage of using YCbCr color space is that it can separate the luminance from the chrominance more effectively than RGB color space. The performance of the proposed algorithm is tested on two sets of images, one of which contains fire; the other contains fire-like regions. Standard methods are used for calculating the performance of the algorithm. The proposed method has both higher detection rate and lower false alarm rate. Since, the algorithm is cheap in computation it can be used for real time forest fire detection. Checking of wild animal in their common environment is crucial. This proposed work develops an algorithm to detect the animals in wild life. Since there are many different animals manually identifying them can be a difficult task. This algorithm classifies animals based on their images so we can monitor them more efficiently. Animal detection and classification can help to prevent animal-vehicle accidents, trace animals and prevent theft. This can be achieved by applying effective deep learning algorithms. Deforestation is cutting trees of forests on a huge scale, often resulting in loss of habitat of millions of wild animals. About 30% of earths land is still covered with forests but due to deforestation we are losing them at the rate of about half the size of England per year. In forests, tree cutting activities are illegal but due to shortage of manpower and other resources, governments are not very successful in curbing this menace.*

Keyword: - *Forest fire and wild animal detection with tree cutting, Internet of things (IOT), Raspberry pi B+ and Convolutional Neural Networks.*

---

1. Introduction

Introduction In this project we present an automatic system for early smoke source detection through the real time processing of landscape images. The first part describes the segmentation technique we use to extract persistent dynamical envelopes of pixels into the images. We describe the temporal algorithm at the pixel level (filtering) and the spatial analysis to bring together connected pixels into the same envelopes (object labeling). The second part deals with the method we use to discriminate the various natural phenomena that may cause such envelopes. We describe the image sequence analysis we developed to discriminate distant smokes from other phenomena, by extracting the transitory and complex motions into little pre-processed envelopes. Monitoring animals in the wild without disturbing them is possible using camera trapping framework, which is a technique to study wildlife using automatically triggered cameras and produces great volumes of data. However, camera trapping collects images often result in low image quality and includes a lot of false positives (images without animals), which must be detection before the post processing step. This paper presents a two-channeled perceiving residual pyramid networks (TPRPN) for camera trap images objection. Our TPRPN model attends to generating high-resolution and high-quality results. In order to provide enough local information, we extract depth cue from the original images and use two-channeled perceiving model as input to training our networks. Finally, the proposed three-layer residual blocks learn to merge all the information and generate full size detection results. Besides, we construct a new high-quality dataset with the help of Wildlife Thailand's Community and e Mammal Organization. Experimental results on our dataset demonstrate that our method is superior to the existing object detection methods. Woods produce water supplies, biodiversity, pharmaceuticals, reused supplements for farming and surge counteractive action, and are key to the change towards a Green Economy with regards to reasonable improvement and destitution destruction. By far most of deforestation and illicit logging happens in some of the central African and Southeast Asian countries and also in the Amazon Basin's tropical forests. Ongoing investigations into the degree of unlawful logging gauge that illicit logging represents almost 50%90% in tropical nations and around 15%30% worldwide.

1.1 Objectives

To Detect Intrusion in the Field
Sensor Connected to raspberry pi is used to detect the motion. When Sensor inputs the data raspberry pi starts camera.
To Capture the image and Classifying Them Using Image Processing
Input from the camera is processed. Classification of image is done using Convolution Neural Network. Classifying weather, the animal is domestic or Wild Animal.
Taking Suitable action based on the intruder
After Image processing and classification. If Wild Animal is detected, processor turns an alarm and intimation alert to Farmer.
To send Notification to farmers and Forest Officials
An intimation alert is sent to farmer about animal presence. We Use Twilio Messenger to send intimation alert to farmer
To Detect Fire in forest and Intimate
Detect Fire Using Fire Sensor and intimate through Message to concerned Person

1.2 PROBLEM STATEMENT

- Animal Detection in boundaries is very vital
- It is critical to have a system to monitor animals' intrusion and report it to the forest offices
- Monitoring of fire in forest is at most important to save the environment and wild life

2. LITERATURE SURVEY

PAPER1: Content-based Retrieval and Real Time Detection from Video Sequences Acquired by Surveillance Systems.

In this paper, a surveillance system devoted to detect abandoned objects in unattended environments is presented to which image processing content-based retrieval capabilities have been added for making easier inspection task from operators. Video-based surveillance systems generally employ one or more cameras connected to a set of monitors. This kind of systems needs the presence of a human operator, who interprets the acquired information and controls the evolution of the events in a surveyed environment. During the last years efforts have been performed to develop systems supporting human operators in their surveillance task, in order to focus the attention of operators when unusual situations are detected. Image sequences databases are also managed by the proposed surveillance system in order to provide operators with the possibility of retrieving in a second time the interesting sequences that may contain useful information for discovering causes of an alarm.

PAPER2: Robust Real-Time Periodic Motion Detection

We describe new techniques to detect and analyze periodic motion as seen from both a static and a moving camera. By tracking objects of interest, we compute an object's self-similarity as it evolves in time. For periodic motion, the self-similarity measure is also periodic and we apply Time-Frequency analysis to detect and characterize the periodic motion. The periodicity is also analyzed robustly using the 2D lattice structures inherent in similarity matrices. A real-time system has been implemented to track and classify objects using periodicity. Examples of object classification (people, running dogs, vehicles), person counting, and nonstationary periodicity are provided.

PAPER 3: Study of Motion Detection Method for Smart Home

Motion detection surveillance technology give ease for time-consuming reviewing process that a normal video surveillance system offers. By using motion detection, it saves the monitoring time and cost. It has gained a lot of interests over the past few years. In this paper, a proposed motion detection surveillance system, through the study and evaluation of currently available different methods. The proposed system is efficient and convenient for both office and home uses as a smart home security system technology. In motion detection, there is process of detecting a change in various objects relative to its surroundings or change in surrounding relative to an object. There are many methods to obtain a motion detection using mechanical and electronic techniques. Infrared (Passive and active sensors), Optics (video and camera systems), Radio Frequency Energy (radar, microwave and tomographic motion detection), Sound (microphones and acoustic sensors), Vibration (triboelectric, seismic and inertia-switch sensors), Magnetism (magnetic sensors and magnetometers).

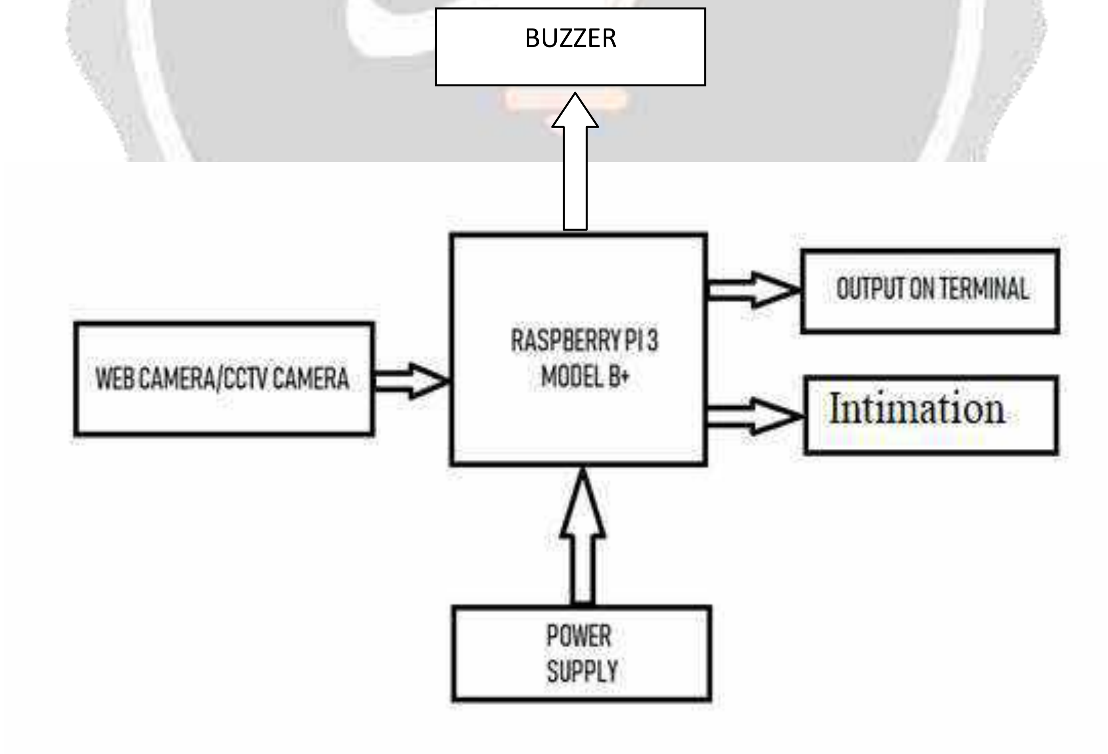
PAPER 4: Motion Detection for Security Surveillance

This paper deals with the design and Implementation of Smart surveillance monitoring system using Raspberry pi and CCTV camera. This design is a small portable monitoring system for home and college security. This system will monitor when motion detected, the Raspberry Pi will control the Raspberry Pi camera to take a picture and sent out image to the user according to the program written in python environment. The proposed home security system captures information and transmits it via a Raspberry towards pc. Raspberry pi operates and controls motion detectors and CCTV camera for remote sensing and surveillance, streams live record it for Future playback. Python software plays an important role in this project. Motion detection systems are a necessity in the modern times.

3. PROPOSED SYSTEM

- Proposed system vision-based detection technique is used to detect fire, smoke.
- To detect the animal repelling we proposed a new system with deep learning technology. It also intimates the forest officers regarding animal movement
- To overcome the problem, we conduct research so that forest fires can be quickly detected.
- Forest fires are one of the main environmental problems in the entire world.
- This paper presents a low cost WIFI network able to evaluate level of fire risk and the presence of a forest fire.
- Forest fires are one of the most common disasters occurring during the dry season.

3.1 SYSTEM ARCHITECTURE



3.2 COMPONENTS USED IN PROPOSED WORK

3.2.1 Raspberry pi 3 model B+

Fig -1 Raspberry pi 3 model b+

The Raspberry Pi 3 Model B+ contains a wide range of improvements and features that will benefit the designers, developers, and even engineers who are looking to integrate Pi systems into their products. Here are some of the new Pi's specs:
Quad core 64-bit processor clocked at 1.4GHz
1GB LPDDR2 SRAM
Dual-band 2.4GHz and 5GHz wireless LAN
Bluetooth 4.2 / BLE
Higher speed ethernet up to 300Mbps
Power-over-Ethernet capability (via a separate PoE HAT)

The table below shows the specs of the Raspberry Pi 3 B and the Raspberry Pi 3 B+

Spec	**Raspberry Pi 3 B**	**Raspberry Pi 3 B+**
CPU type/speed	ARM Cortex-A53 1.2GHz	ARM Cortex-A53 1.4GHz
RAM size	1GB SRAM	1GB SRAM
Integrated Wi-Fi	2.4GHz	2.4GHz and 5GHz
Ethernet speed	10/100 Mbps	300Mbps
PoE	No	Yes
Bluetooth	4.1	4.2

3.2.2 Boosts All Around

Thanks to the ever-increasing technological capabilities of electronics, this Raspberry Pi does not fall behind in any category, at least compared to other Pi computers. It either matches the old model's speed or significantly improves upon it. For example, the CPU has been clocked at 1.4GHz, which is 200MHz faster than the Pi 3 B, and the ethernet speed has been boosted from 100Mbps to 300Mbps.

Fig -2 The heart of the Raspberry Pi 3 Model B+

3.2.3 EMC Compliance

One feature included with the Raspberry Pi 3 Model B+ is a wireless dual-band LAN that comes with modular compliance certification. For those who are unaware, electronic products cannot be constructed and then released to the market without having some tests done to them (see CE and FCC), and many of these tests look for interference. Testing for interference (also known as EMC) can be incredibly costly and difficult to isolate, but, thanks to the WLAN's modular compliance certification, you can expect significantly lower EMC issues when integrating the Pi into a product.

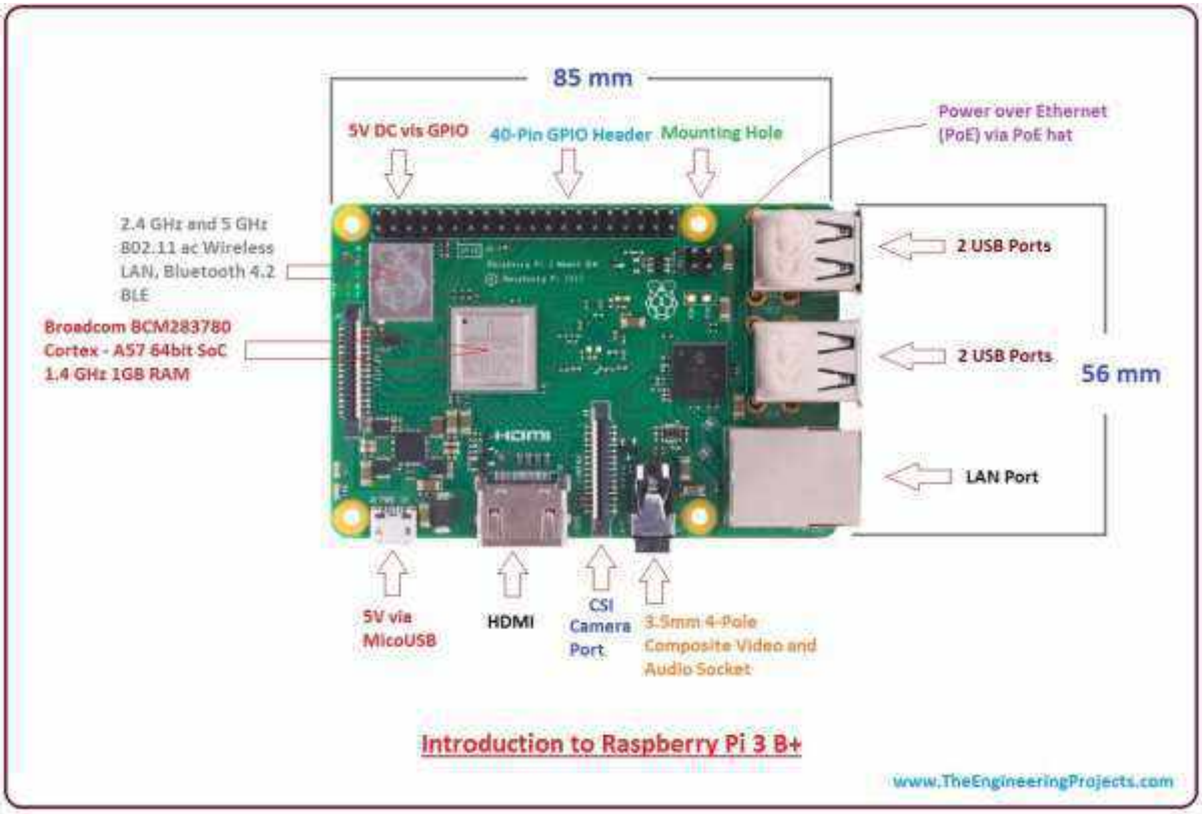
Fig -3 wireless dual-band LAN

3.2.4 Physical Features

While the mechanical layout of the Pi has not changed (GPIO location, drill holes, etc.), the PCB itself has clearly undergone some physical changes. The main processor is no longer housed in a plastic package. Instead, it has a metal package, which may be beneficial for those who want to keep the temperature of the Pi as low as possible (with the aid of a heat sink). The top side also shows fewer components, and a four-pin header (used for PoE) has been included in the top right of the PCB.

Fig -4 Comparison of the Raspberry 3 and 3 B+

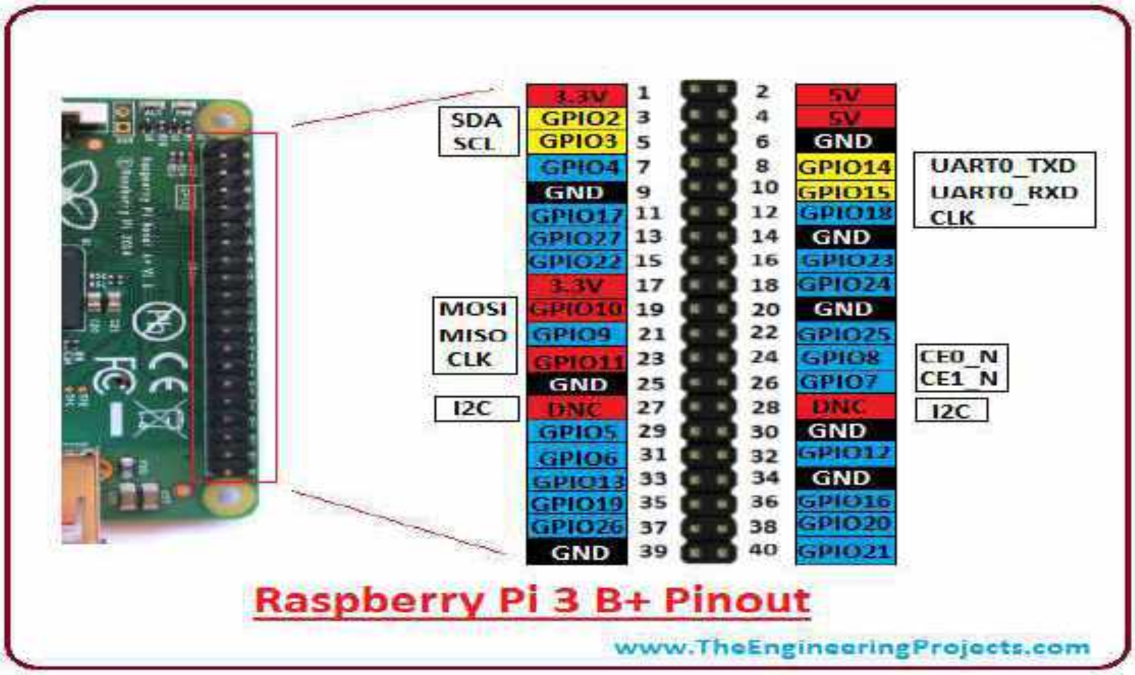
It is a small board computer, introduced by Raspberry Pi foundation in 14th March 2018 and is the most recent version of the Pi boards.
It is a modified form of its predecessor Raspberry Pi 3 B that was introduced in 2016 and came with CPU, GPU, USP ports and I/O pins. Both versions are almost same in terms of functionality and technical specifications; however, there are some exceptions in the B+ model as it comes with USB boot, network boot, and Power over Ethernet option that are not present in the B model.
Technology has been evolved over time with the purpose of making lives easy and convenient. This device was a major development in the technology that made computer learning too easy that anyone with little effort can make their feet wet with the process.



Introduction to Raspberry Pi 3 B+

3.2.5 RASPBERRY PI PIN DIAGRAM:-

Following figure shows the pinout of Raspberry Pi 3 B+



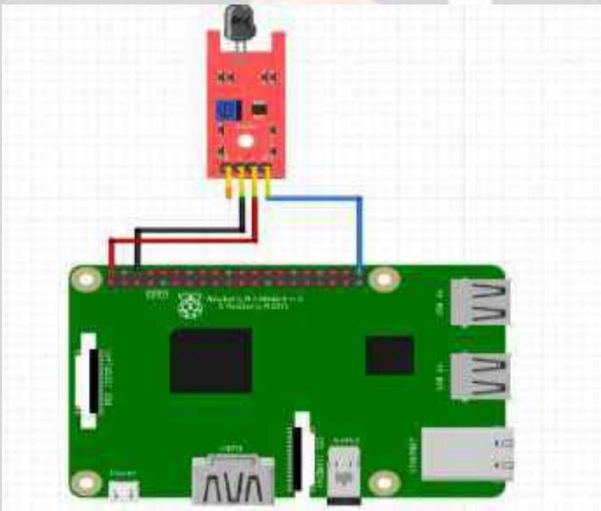
Raspberry Pi 3 B+ Pinout

40 Pin header is used to develop an external connection with the electronic device. This is the same as the previous versions, making it compatible with all the devices where older versions can be used.
Out of 40 pins, 26 are used as a digital I/O pin and 9 of the remaining 14 pins are termed as dedicated I/O pins which indicate they don't come with alternative function.
Pin 3 and 5 comes with an onboard pull up resistor which 1.8 kΩ and Pin 27 and 28 are dedicated to ID EEPROM. In B+ model the GPIO header is slightly repositioned to allow more space for the additional mounting hole. The devices that are compatible with the B model may work with the B+ version; however, they may not sit identically to the previous version.

3.2.6 Fire Sensor:

The Fire sensor is used to detect fire flames. The module makes use of Fire sensor and comparator to detect fire up to a range of 1 meter.

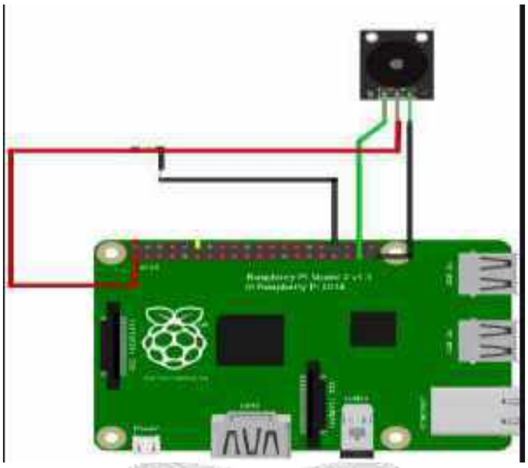
Feature:
Allows your robot to detect flames from up to 1 M away
Typical Maximum Range :1 m.
Calibration preset for range adjustment.
Indicator LED with 3 pin easy interface connector.
Input Voltage +5VDC



3.2.7 BUZZER:

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (*piezo* for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Two wires, red & black.
Polarity matters: black=ground
• Apply an oscillating voltage to make a noise
• The buzzer case supports the piezo element and has resonant cavity for sound



4. CONCLUSIONS

The system designed shown in the block diagram performs the detection and counting of the Wild Animals. The raspberry pi is used to make the system portable and affordable by both small scale and large-scale livestock producers. The Flowchart shows the flow of operation done to detect the particular livestock and count them accordingly that is shown in result. Here first the image is captured by using a camera and which is then converted to a grey scale image to make it feasible for comparison with the existing data set values. The existing systems like bar code scanners and manually counting of livestock is not beneficial as it consumes a lot of time and the error margin becomes high so to overcome such hurdles, we have designed a real time system that performs such a task with efficiency and is cost effective.

5. REFERENCES

[1] Govt. of India, Department of Animal Husbandry and Dairy (2000)

[2] Elena Striga and Carlo Sargassum, Content-based Retrieval and Real Time Detection from Video Sequences Acquired by Surveillance Systems (2001).

[3] Shafika and Suhaimi, Outdoor wildlife motion triggered camera (2015).

[4] Ross Cutler and Larry S. Davis, Robust Real-Time Periodic Motion Detection (2012).

[5] Mayur J. Charadva, Ramesh V. Sejpal, Dr. Nisha P. Sarwade, A Study of Motion Detection Method for Smart Home System (2014).

[6] Prof. Joshi Vilas, Mergal Bhauso, Borate Rohan, Motion Detection for Security Surveillance (2016).

PREDICTION OF TRAFFIC SIGNAL VIOLATION FROM VIDEO USING AI TECHNIQUES

Shashidhar V[1], Niranjan R[2], Sagar D[3], Raghavendra H K[4], Pushpak V Reddy[5]

[1] Asst. Professor, CSE, RajaRajeswari College of Engineering, Karnataka, India.
[2,3,4,5] *Student, CSE, RajaRajeswari College of Engineering, Karnataka, India.*

ABSTRACT

According to WHO, 1.35 million people die in traffic accidents each year. Technology is improving every year, Rapid growth in the number of new vehicles on the road contributes to severely congested roads and gives people licence to break traffic laws.

This causes a significant number of traffic accidents. Computer vision-based traffic violation-detection systems are a highly effective instrument for tracking and penalising traffic infractions. The proposed system was put into practise using YOLOV3 object detection to find traffic infractions such signal jump, vehicle speed, and vehicle count. The system is also accuracy optimised. Signal jump is determined by using the vehicle's location and the region of interest for the period of frames. Vehicle count detection accuracy was 97.67% for this implementation, and accuracy for vehicle count detection and an accuracy of 89.24% for speed violation detection.

Keyword: - *traffic violation ,signal jump , YOLOV3*

1. INTRODUCTION

Artificial intelligence (AI) has made considerable strides in recent years and is now a crucial tool in a number of applications. Predicting traffic signal breaches using AI algorithms is one such application. The desire to increase traffic safety and lessen the amount of collisions brought on by irresponsible driving has given this field of study more traction.

Traffic signal infractions are frequent on roadways all over the world and can have terrible repercussions. These infractions may be the result of a number of things, including ignorance, carelessness, or insufficient visibility. The use of sensors or physical inspection by traffic officials are the traditional ways for spotting traffic signal breaches, and both can be expensive and time-consuming. The possibility for using AI methods to forecast traffic signal violations could lead to a more effective and affordable solution.

Video footage shot by traffic cameras placed at crossings is used to forecast traffic signal violations using artificial intelligence techniques. These cameras record traffic in real-time and offer a wealth of data for the creation of prediction models. The camera material can be examined using AI methods like deep learning algorithms to find instances of traffic signal infractions. To increase the accuracy and generalizability of these algorithms, massive datasets of traffic footages will be taken for training.

There are lot of advantages to utilising AI algorithms to anticipate traffic signal violations. Authorities can take proactive steps to prevent accidents brought on by reckless driving by anticipating probable violations. Using AI approaches can also assist traffic officers work less and concentrate on other elements of their jobs by reducing their workload. Insights into the reasons of traffic signal breaches can also be gained through the creation of precise-predictive models, which can then be used to enhance infrastructure and regulations for road safety.

In conclusion, it is crucial to do research into the prediction of traffic signal breaches using AI methods since it has the potential to increase road safety and lessen accidents brought on by careless driving. For the purpose of identifying instances of traffic signal violations, deep learning algorithms and video material from traffic cameras may be used. The advantages of applying AI approaches in this field are extensive and can offer insightful information for enhancing infrastructure and policy related to road safety.

2. LITERATURE REVIEW

A cutting-edge technology in the Internet of Things is edge computing. It has several number of advantages that can be used for the greater good by streamlining various operations, such as enabling bottlenecks in the transfer and processing of data. Although there are important considerations to keep in mind to ensure the success of Edge computing, such as assigning more deep learning tasks to IoT. defining appropriate algorithms that can increase the computing power and bandwidth of each edge individually. The simulation produced highly encouraging results because it managed deep tasks while also optimising the use of edges' resources. Its advantages can be derived from a wide variety of aspects, including its use in CCTVs, self-driving cars, the construction of smart cities, etc. Data is transported and processed through a number of layers in this system.
Edge Computing is a well-known and innovative technology that enhances the offerings of contemporary smart cities. As it uses data from numerous devices, it can significantly improve data processing and analysis while also lessening the load on the cloud and network congestion.

In paper ,[1]To check for vehicle violations at zebra crossings, a ground-breaking piece of traffic control equipment has been developed. The five stages of the prototyping process include communication, quick planning, modelling, quick design, and prototyping itself. The complete prototype is built in such a way that when a sensor detects the front of the car, a camera is used to take a photo of it, and then speakers are used to produce a sound as a warning to the driver for breaking the law. As a result, this technology will make it possible to watch out for and monitor traffic violators. The CCTVs that are deployed at road cross sections are inadequate and not proportional to the amount of infractions occurring, thus the current technologies are insufficient to keep track of all those violations. Application Programme Interface (API), which can accurately read the digits and characters on the number plate and hence considerably aid in identifying infractions at every traffic cross section, has thus been developed as a novel technique to deal with this issue.

In Paper, [2] The primary focus of this essay is on reducing and monitoring traffic violations, and to do this, an advanced driver assistance system (ADAS) has been developed and is currently undergoing testing.
The system operates using a dual-model procedure that involves both the detection of individual traffic offences and the simultaneous visualisation of these violations using the Google Earth application. Given the various weather conditions, it will essentially perform the same duties as a data recorder and operate in every situation. Monitoring traffic as a component of an early warning system to stop traffic offences serves a broader good. Therefore, a new system like "Driver Assistance Systems," which can warn drivers before anything serious goes wrong, can be developed to address this issue. It can serve as a kind of early warning signal by providing precise visual information or an indication of incoming traffic so that the driver has ample time to respond appropriately.
Event Recorder is a system that can efficiently monitor, manage, and aid in understanding driver activity. It is used to help understand and interpret driving behaviour.

In paper, [3] One of the main issues of traffic management is traffic violations, and the current system has a glaring flaw in that it concentrates on just three signs: the speed limit, the wrong-way turn, and the stop sign. These are all reactive in character. In order to enable the driver to be aware of the impending risk and warn them properly in advance, a new technology is being developed. It is capable of detecting any traffic infraction and issuing verbal alerts to warn. Additionally, in order to prevent it from happening again, a data recorder will save a history of all traffic violations committed for later analysis. Positive test results for the prototype are still being awaited. The major goal is to prevent problems from occurring, which is where the SACAT system comes in.
It is a method that involves a data recorder and a computer-vision system for managing traffic offences. It considers a number of variables, including feedback on the behaviour of the driver and involvement in prior incidents, among others.
Although it is still in the early stages of development, the final product already shows great promise and has the potential to have a significant impact.

In paper, [4] Traffic infraction tracking has become more and more prevalent in many nations. Currently, the speed camera records the traffic flow, which SPSS software then processes for additional analysis.
A car slows down when it approaches a speed camera before speeding back up, indicating an underlying issue with the existing system. As a result, it avoids the requirement to maintain a constant speed.
Therefore, a system that uses speed probability density models to calculate the distribution of vehicle speeds has been developed. There is a traffic infraction system in place that looks into a number of things, including the speed of the vehicles, lane changes that are not permitted, traffic sign violations, and many other things. Studying the driver's behaviours is crucial at the same time.
The way a driver behaves while driving is directly related to the likelihood of an accident occurring. A proper traffic infraction monitoring system can significantly lower the occurrence of accidents.
The bulk of traffic accidents are observed to occur at road intersections, and this can be further investigated by using a variety of monitoring and measuring equipment.

3. PROPOSED METHODLGY

The suggested method for continuously identifying capless cyclists operates in two steps.The approach first locates a rider on a bicycle in the video outline .The approach then locates the lead cyclist, recognises the licence plate, and ascertains whether or not the rider is wearing a helmet.The methodology combines the information from subsequent frames to make a final forecast in order to decrease incorrect predictions.The square graph displays the many processes of the suggested system, such as background removal, feature extraction, and object classification using sample frames.To distinguish between moving and stationary objects, the system uses background subtraction on grayscale frames rather than training on complete frames, which would be computationally expensive.The methodology brings background modelling advancements.

a. Detection of motorcycle /Two-wheeler and Helmet

YOLO V3 uses CNN body to construct the vehicle and helmet models.and is keras-modeled. Utilise the Video Capture feature of the cv2 module to capture the video module. If models detection doesn't work, try taking video again to find the car.
In the event that it is successful, a helmet is recovered and counted. uses keras libraries to perform head localization to identify the head component. Starts taking images for plate detection if helmet cannot be detected.

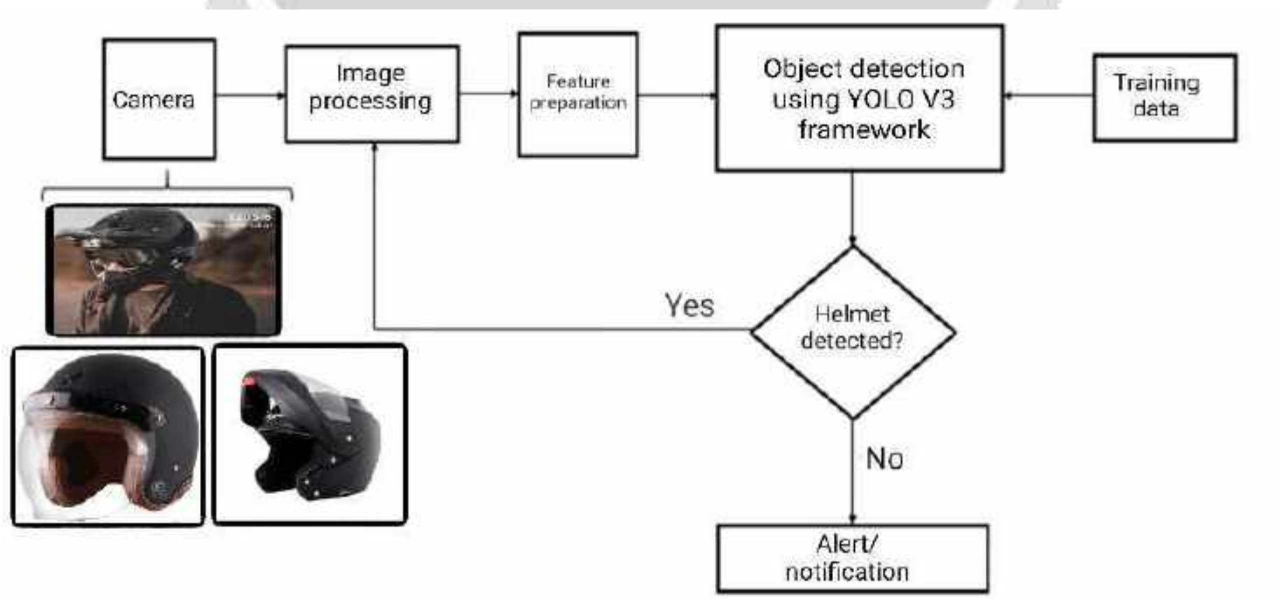


Fig : Block Diagram of Detection of motorcycle /Two-wheeler and Helmet

a. Multi-face detection/Object detection (Triple riding)

According to recent research, triple riding accounts for the majority of accidents and has the highest degree of violations. Our method assists in locating motorcycles with more than two riders. First, Convolutional Neural Networks and Cascade are used to identify the motorbike from the video or image.If the motorbike cannot be located, the search continues until one is found. It looks for numerous faces as well as the motorcycle. It provides a live data count of the number of discovered faces. If there are more than two faces or heads, this is known as multi-face detection or triple riding detection. As seen in Figure 3, if more than two faces are found indicating a violation of triple riding, the licence plate of the offending vehicle is recorded. First, Convolutional Neural Networks and Haar Cascade are used to identify the motorbike from the video or image.If the motorbike cannot be located, the search continues until one is found. It searches for numerous faces in addition to the motorbike.It provides a live data count of the number of discovered faces. If there are more than 2 faces or heads, this is known as multi-face detection or triple riding detection.Figure following demonstrates how the vehicle's licence plate is recorded if more two faces are found to indicate a violation of the rule against triple riding.

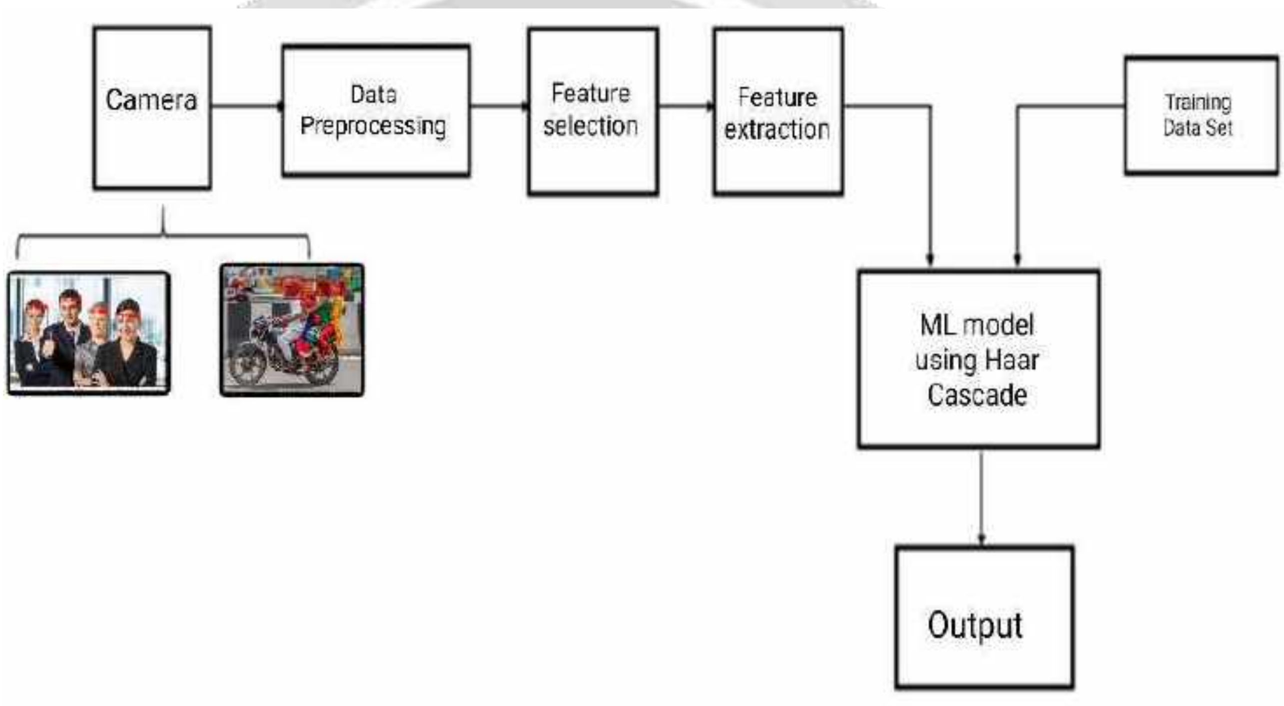


Fig : Block Diagram of Multi-face detection/Object detection (Triple riding)

c . No parking violation identification

In this module, the dataset that contains photos without parking signs is used to prepare the open cv2 model. The no parking sign is discernible from the video surveillance or photographs that are taken by the camera, If the parking board cannot be located, no regulations are applied, and the system ends. In contrast, when a parking board is absent, a nearby vehicle is encountered. As a result, the car and no parking sign are both present, indicating that the car is parked in a no parking area.Additionally, the number plate detection module extracts the characters from the number plate in order to inform the vehicle owner that there have been no parking violations, as is briefly described below.An SMS alerts the recipient of the message at last.The system ends if a vehicle or car is not found near the no parking sign because there was no violation discovered.

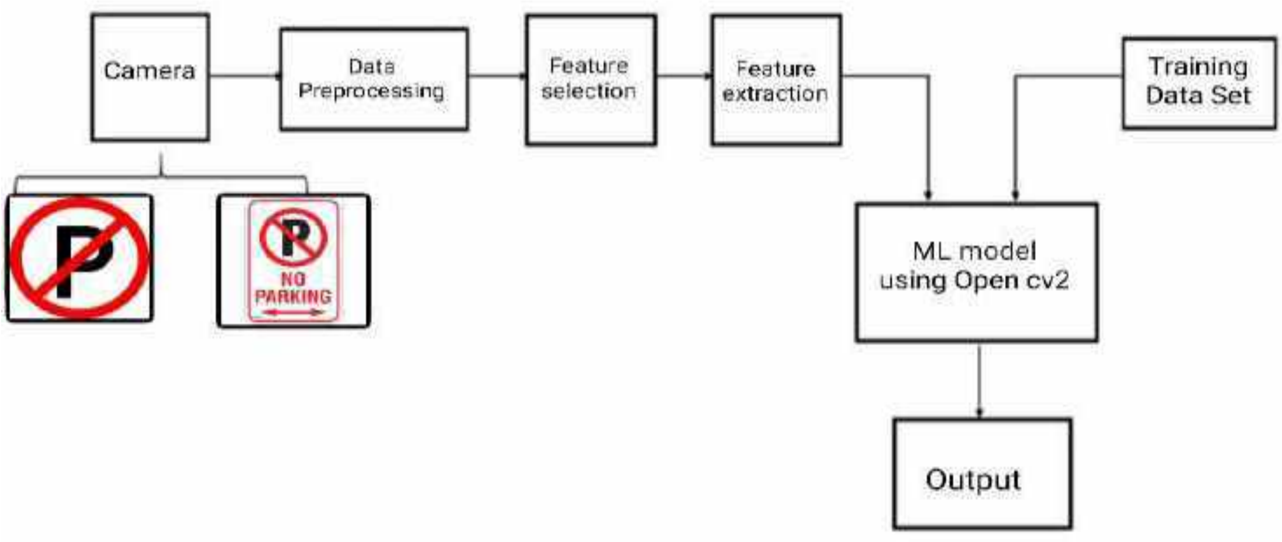


Fig : Block Diagram of No parking violation identification

d Vehicle Registration Number Extraction

The following executional phases comprise the suggested technique for extracting car registration numbers: (A) taking an image out of the video. (b) Detecting licence plates has the following subsections: (i) converting the image to binary; and (ii) transforming the image to grayscale. Character in the picture segmentation, character in the image identification,(e) A message notification sent to the registered mobile number via Telegram.

In the suggested system, a camera is mounted on the main road or at the traffic lights to capture an image frame. The violation is detected using an automatic image processing and identification system, which in a matter of seconds recognises the infraction and then studies the licence plate. A present size (416 × 416) is applied to the image frames. The next step is to find the area surrounding the licence plate across the full image. The "Canny Detector" tool is used to determine the edges of the licence plate. The image is then transformed to binary, starting by determining the image's intensity. If the image intensity is high, we will increase the extracted range's intensity; otherwise, we will decrease it. For the purpose of detecting the borders of the number plate, we further transform it to a grayscale image.

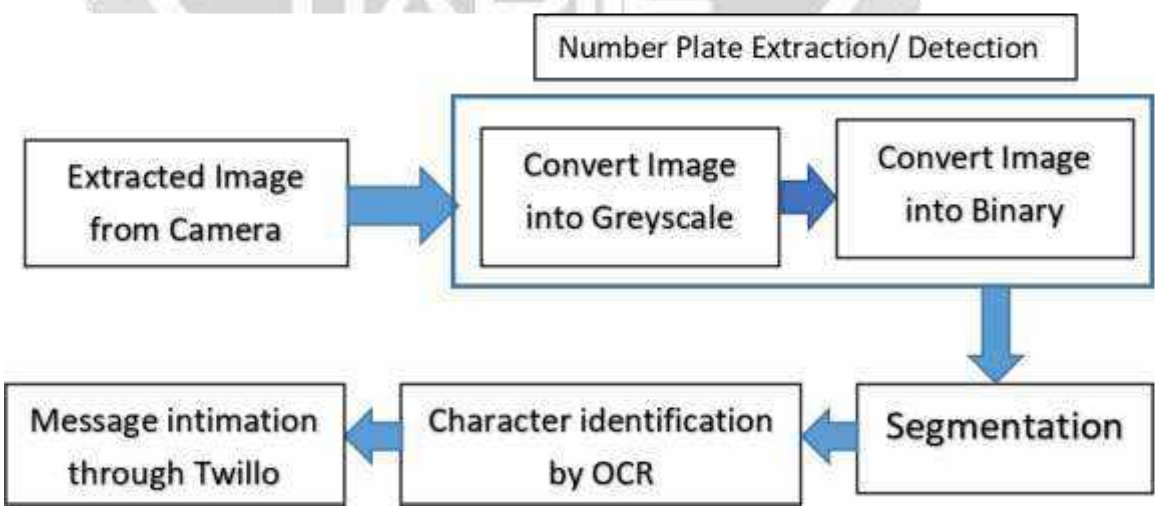


Fig: Block Diagram of Vehicle Registration Number Extraction

4. SYSTEM IMPLEMENTATION

Utilisation is the confirmation of the application or execution of a plan of action, idea, model, estimation, or system. Use in this sense refers to a declaration of a computer, programming, or other PC process through programming and programming action.

For a specific insurance or standard, there could be various executions.

a . Data Collection

The dual processor in the sharp camera allows it to operate honourably in applications like design coordination, optical character affirmation, and data organise code continually. The overall design provides important standard reduced scale images that are critical to the operation of the persistent eye after estimate. The data would then have the opportunity to be moved to other devices precisely when the astute camera is connected over FTP or Ethernet hard disc. We are using a web camera to demonstrate this project.

b PYTHON OPEN CV

OpenCV is a PC vision library that was first created by Intel and is currently maintained by Willow Garage. Under the open source BSD licence, it is secure to use. This library is cross-platform. It focuses mostly on how the picture is being prepared. These commercially updated schedules will be used to speed the system up if the library finds the Integrated Performance Primitives. OpenCV isn't a piece of software that processes and runs on images. You must compose the script. Microsoft's Visual Studio Express Edition is available for free download. It's a fantastic IDE. You must download Visual C++ 2010 Express.
OpenCV is not an executable file that you can copy and it will immediately begin to function. It is made up entirely of code, library files, and DLL files. When you build your own code to access OpenCV's features, you "link" to these library records.

Fig : OpenCV

Python

Python is a robust programming language that is simple to learn. Its object-oriented programming methodology is straightforward but efficient, and it includes good high-level data structures. Python is a fantastic language for scripting and quick application development in many domains on most platforms because to its clean syntax, dynamic typing, and nature of being an interpreted language. New functions and data types written in C or C++ (or other languages callable from C) can simply be added to the Python interpreter. Python is a good choice as an addition language for flexible software.

c.OBJECT DETECTION

The process of finding actual item events in still photos or videos, such as cars, bicycles, TVs, flowers, and people, is known as article detection. It considers the acknowledgment, containment, and recognition of many objects inside an image, which considerably improves our understanding of the picture as a whole. It is frequently utilised in devices such propelled driver assistance systems (ADAS), safety, surveillance, and picture recovery.

Article Detection should be possible by means of various ways:

- Detection of objects based on their characteristics
- Detection of objects by viola Jones
- SVM HOG identification features
- Advanced Object Learning Identification

Fig : object detection

Applications of Detecting the Object

Facial Recognition:

Fig : Facial Recognition

The "DeepFace" face recognition system was developed by a Facebook group of professionals who successfully identify human faces in high-resolution images. In Google Photos, Google makes use of its proprietary facial recognition technology, which separates all the images based on the subject. The ears, nose, mouth, and brows are only some of the components of the faces that are associated with facial recognition.

TENSORFLOW

Google's open source machine learning platform, Tensorflow, allows users to programme data flow across a wide variety of activities. The edges of the figure speak to the multi-dimensional points of information (tensors) within them, while the hubs allude to numerical functions.

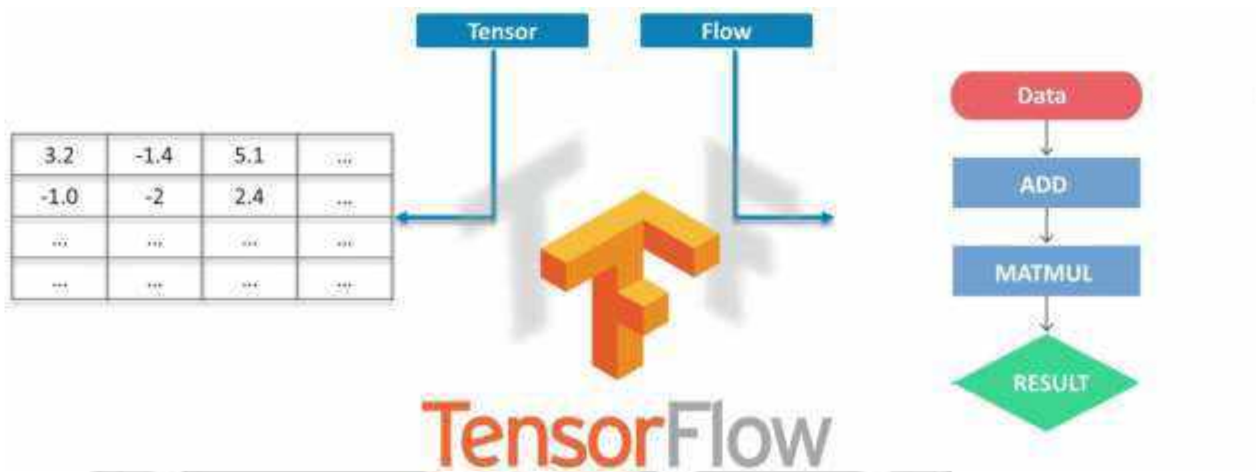


Fig : Tensor Flow

Tensors are nothing more than multidimensional clusters, which are just 2-dimensional tables expanded to hold more information. The many advantages of Tensorflow make it appropriate for profound learning. By burning through anytime, how do we interpret how we may use Tensorflow to accomplish object detection?

What does YOLO mean, and why is it useful?

Districts are mostly used by the R-CNN set of techniques we discovered in Part 1 to limit the articles inside the image. The technology only looks at the portions of the images that have a higher likelihood of carrying an article rather than the entire image.

However, the YOLO system (You Only Look Once) handles object recognition in a different manner. It predicts the bounce box arrangements and class probabilities for these containers by considering the entire scene in a single example. The biggest benefit of using YOLO is its exceptional speed; it can handle 45 cases per second and is extremely rapid. YOLO also understands the depiction of summarised objects.

d.OCR

OCR (optical character recognition) is the use of technology to identify content characters that have been printed or transcribed inside high-resolution images of physical archives, such a filtered paper record. The fundamental process of OCR entails examining the information contained in an archive and translating the characters into information-handling code. OCR is occasionally also referred to as content accrediting.

OCR systems convert physical documents into content that can be read by machines using a combination of hardware and software. When duplicating or understanding content, equipment like an optical scanner or a specific circuit board is used, while programming typically handles advanced preparation. Programming can also use artificial intelligence (AI) to develop more advanced methods of intelligent character recognition (ICR), such as the ability to recognise different writing dialects or styles.

OCR is most frequently used to convert printed versions of important or legitimate documents into PDFs. Customers can edit, configure, and search the document once it has been placed in this fine copy as though it had been created using a word processor.

How optical character recognition works:

Using a scanner to process a record's physical format is the first stage in OCR. OCR software converts the archive into a two-shading, or high contrast, form once all pages have been replicated. The analysed image or bitmap is divided into light and dark areas, with the dark areas being identified as characters that should be perceived and the light areas being identified as foundation.

The dull areas are then further processed to find alphabetical characters or numeric digits. While OCR projects' methodologies can change, they typically involve concentrating on one character, word, or square of content at a time. Following that, characters are recognised using one of two calculations:

As an illustration, Examples of content in various text styles and layouts are promoted by OCR programmes, which are subsequently utilised to analyse and perceive characters in the filtered report.Highlights recognition OCR software utilises guidelines regarding the highlights of a specific letter or number to read characters in the examined record. Highlights may include the a character's estimated number of calculated lines, crossed lines, or bends. For example, a capital "A" could be stored as two corner-to-corner lines that converge into a flat line in the middle. When a character is recognised, it is converted into an ASCII code that computer systems can use to handle further controls. Before saving the file for later, clients should fix basic errors, amend, and make sure complex formats were handled correctly.

5. RESULTS

In this study, a programme is being created to track down motorbike riders who disobey the rules on helmet use. The programme basically consists of three components: identification of the motorcycle, identification of the helmet, and recognition of the licence plate of riders who are not wearing helmets. The most important criteria are to use HOG to confirm that the image is of a motorbike and CNN to check whether the rider is wearing a helmet. Tesseract OCR is used to identify the motorcycle's licence plate if the rider is marked without a helmet. With a classification accuracy of 93% for motorcycles and non-motorcycles, 85% for helmets and no-helmets, and 51% for licence plate identification, the overall classification accuracy is around 76%. increasing the gathering of training data collection and image quality will increase the accuracy.

This chapter covers the outcomes of the project's execution. To determine whether all the objectives have been achieved, these outcomes are further compared with the given requirements. Additionally, the obtained results are rigorously examined to look for any malfunctions in the project's various parts.

Below are the findings of the sophisticated traffic video surveillance system:

1. An overall accuracy of roughly 72% is achieved by combining the 93% accuracy of the violation detection with the 51% accuracy of the licence plate identification.

Because the hardware configuration of the camera being used, and the cameras used in Raspberry Pi modules have very limited configurations, has a significant impact on the accuracy of number plate detection of the vehicle breaking traffic rules.

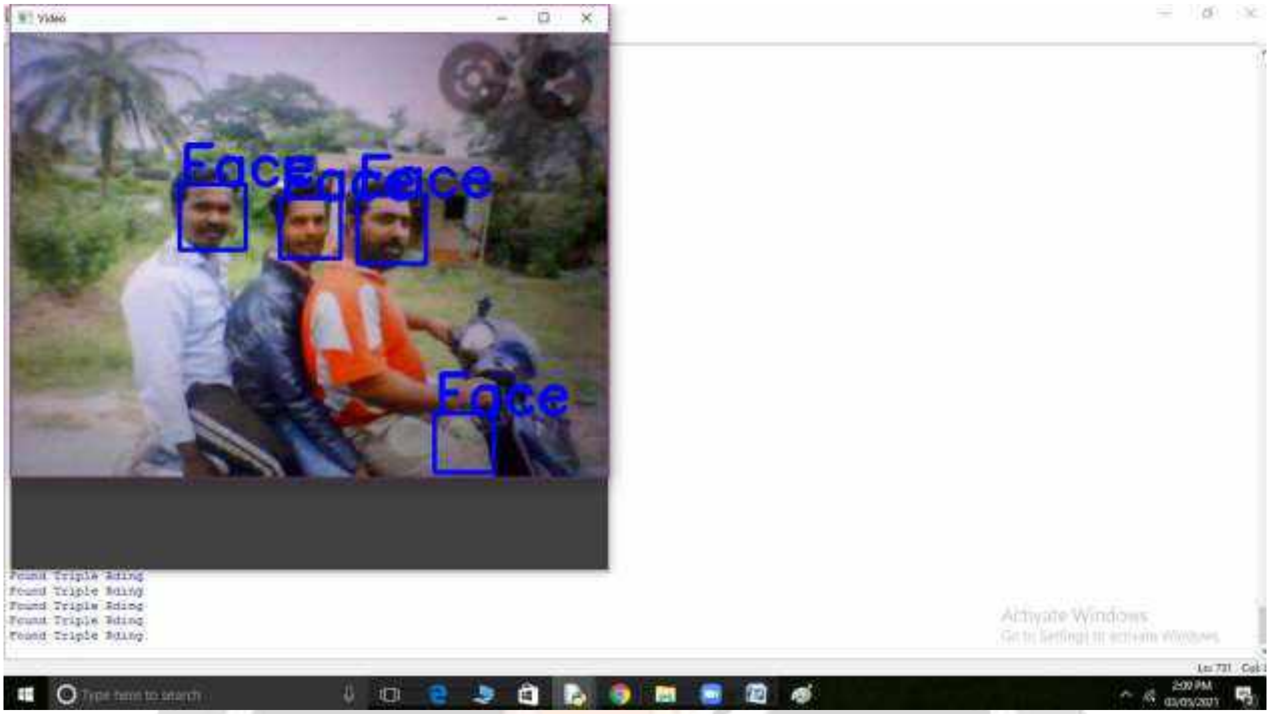


Fig : Triple Riding

Fig : No Helmet

The Snapshot of triple riding violation detection using the Haar-Cascade method is shown in Fig. . If there are more than 2 heads identified in this, it indicates that triple riding was discovered.

The image of signal jump violation detection is shown in Fig. . In this, if the signal light is flashing red and a car violates the law, the car that was caught signal-jumping is displayed.

In our project, an IoT gadget called a Raspberry Pi 3B+ is used to recognise licence plates. However, there are many products on the market that are more potent than the R-Pi 3. Nvidia Jetson Kit is one of the IoT devices with a lot of power.

6. CONCLUSION

As the number of vehicles on the road and traffic regulations depend on the various areas of the road and timings, it can be difficult to detect traffic violations in video surveillance. The YOLOv3 method is suggested in this paper as being suitable for detecting traffic violations. The findings demonstrate that it is possible to archive the detection of several traffic offences from a single input source. The system's vehicle count detection accuracy is 97.67%, and its vehicle speed detection accuracy is 89.24%. When there is a huge volume of traffic, the detection time is shorter. Thus, the volume of traffic affects how quickly the system operates.
.

7. FUTURE WORK

By using virtual traffic police and automating the process of traffic rule violation detection, this initiative aims to lessen the strain of traffic police. Even though we made every effort to make the project as efficient as we could, there are still some improvements that can be made. The following are potential future improvements that could be made to this project:

- Finding further traffic infractions of other kinds.
- More rapid computation for finding violations.
- Greater precision in number plate recognition and traffic violation detection.
- Using increasingly sophisticated IoT hardware to build a stronger and more sophisticated system.

8. REFERENCES

[1] X. He et al., "A Driving Waming Method based on YOLOV3 and Neural Network", IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI), Zhengzhou, China, 2019.

[2] H. Qu et al., "A Pedestrian Detection Method Based on YOLOV3 Model and Image Enhanced by Retinex," 11th International Congress on Image and Signal Processing, Bio Medical Engineering and Informatics (CISP-BMEI), Beijing, China, 2018.

[3] J. Won et al., "An Improved YOLOv3-based Neural Network for De- identification Technology," 34th Intemational Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC), Korea, 2019.

[4] P. Tumas et al., "Automated Image Annotation based on YOLOv3", IEEE 6th Workshop on Advances in Information, Electronic and Electrical Engineering (AIEEE), Vilnius, 2018.

[5] Krishna et al., "Automated traffic monitoring system using computer vision" 2016.

Facial Emotion Recognition Using Convolutional Neural Network

Mareddy Christofar[1], Bangaru Aditya[2], K Yashwanth Chowdary[3], Augustine[4]

[1] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India
[2] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India
[3] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India
[4] Student, CSE, RajaRajeswari College of Engineering, Karnataka, India

ABSTRACT

Facial emotion recognition is an integral part of psychology, forensics and social media. In all these fields, a high degree of reliability of classification is imperative. Currently human judgement is used in these fields but humans are not always accurate. Therefore, there is a need for a reliable and quick way of identifying human emotions.

The recent advances in machine learning and pattern recognition has offered several algorithms to recognize human emotions. One such algorithms is the Convolutional Neural Network (CNN). The CNN is capable of high-speed image processing with excellent reliability. In this project one such CNN is used to recognize facial emotions. It is seen that with proper training this method can yield very high accuracy of classification.

Keyword - *Facial Emotion Recognition Convolutional Neural Network, Key word3, and Key word4etc….*

1. INTRODUCTION

THERE are a total of seven human emotions which can be identified from facial expressions. They are anger, fear, disgust happiness , sadness, surprise and contempt. Recognition of such emotions is valuable in several fields and is currently done manually. But human judgement can be flawed in many cases. Errors can occur due to various factors like insufficient knowledge of facial expressions and their meaning, biased judgement, stress and the monotonous nature of the work. Such misinterpretations can have very severe results depending on the field. Therefore, it is necessary to come up with an automated solution to this problem with
minimal errors, high speed and reproducible results.

Facial emotion recognition has long been a topic of study in machine learning and deep learning. Several machine learning algorithms such as Support Vector Machines (SVM) [1], Naïve Bayes and Maximum entropy have been applied to detect human facial emotions. Deep learning algorithms such as Artificial Neural Networks (ANN) and Convolutional Neural Networks (CNN) [2] have also been used in the field of facial emotion recognition. In this project the Convolutional Neural Network has been used in order to perform facial emotion recognition.

Convolutional Neural Networks offer various advantages over an Artificial neural network for image processing applications. The CNN is a partially-connected network where each neuron is connected to only a subset of neurons from the previous layer. This subset of neurons is from a small region in the image. The key advantage in this approach is that since every neuron is connected to a small region from the previous layer, the spatial properties of the image are often maintained. This enables the network to easily identify patterns in an image. The second important advantage of a CNN over an ANN is that the number of training parameters for the CNN is much lesser due to the fact that each neuron has fewer connections with the previous layer this greatly improves training and classification speed and also combats the problem of over fitting.

In this project the CNN is used to analyze the complex facial expressions, analyze key patterns which correspond to the seven facial emotions, perform statistical analysis and determine the facial emotion which has the highest probability. An eighth class called Neutral is used in this project in order to handle scenarios where the facial emotion cannot be identified with a good degree of certainty.

1.1 OBJECTIVES

- The goal of facial expression recognition (FER) algorithms is to extract the discriminative and distinguishing features of a face.
- Multiple methods have been devised which helps in identifying face and facial expression.
- The various facial expressions are popularly identified on the basis of their geometric features, appearance features and hybrid features.

1.2 PROBLEM STATEMENT

Face and Emotion recognition can be performed using different features, such as face speech, and even text. Among these features, facial expressions are one of the most popular , if not the most popular, due to a number of reasons; they are visible, they contain many useful features for emotion recognition, and it is easier to collect a large dataset of faces (other means for human recognition) Recently, with the use of deep learning and especially convolution neural networks (CNNs), many features can be extracted and learned for a decent facial expression recognition system. It is, however, noteworthy that in the case of facial expressions, much of the clues come from a few parts of the face, e.g. the mouth and eyes, whereas other parts, such as ears and hair, play little part in the output.

2. LITERATURE SURVEY

Rajesh Kumar G A, Ravi Kant Kumar, Goutam Sanyal [1] contributed on ―Facial Emotion Analysis using Deep Convolution Neural Network‖, 2017. They proposed that, human emotions are mental states of feelings that arise spontaneously rather than through conscious effort and are accompanied by physiological changes in facial muscles which implies expressions on face. Some of critical emotions are happy, sad, anger, disgust, fear, surprise etc. Facial expressions play a key role in nonverbal communication which appears due to internal feelings of a person that reflects on the faces. In order to computer modelling of human‘s emotion, a plenty of research has been accomplished. But still it is far behind from human vision system. In this system, they are providing better approach to predict human emotions (Frames by Frames) using deep Convolution Neural Network (CNN) and how emotion intensity changes on a face from low level to high level of emotion. In this algorithm, FERC-2013 database has been applied for training. The assessment through the proposed experiment confers quite good result and obtained accuracy may give encouragement to the researchers for future model of computer-based emotion recognition system.

Viola, Paul, and Michael Jones [2], researched on, ―Rapid object detection using a boosted cascade of simple features‖, 2001. They worked on the machine learning approach for visual object detection which is capable of processing images extremely rapidly and achieving high detection rates. It is distinguished by three key contributions. The first is the introduction of a new image representation called the ―Integral image‖ which allows the features used by our detector to be computed very quickly. The second is a learning algorithm, based on AdaBoost, which selects a small number of critical visual features from a larger set and yields extremely efficient classifiers. The third contribution is a method for combining increasingly more complex classifiers in a
―cascade‖ which allows background regions of the image to be quickly discarded while spending more computation on promising object-like regions. The cascade can be viewed as an object specific focus-of-attention mechanism which unlike previous approaches provides statistical guarantees that discarded regions are unlikely to contain the object of interest, In the domain of face detection the system yields detection rates comparable to the best previous systems. Used in real-time applications, the detector runs at 15 frames per second without resorting to image differencing or skin color detection.

Lienhart, Rainer, and Jochen Maydt [3] gave the work, "An extended set of Haar-like features for rapid object detection‖, 2002. Recently Viola et al. have introduced a rapid object detection scheme based on a boosted cascade of simple feature classifiers. In this study they introduced a novel set of rotated Haar-like features. These novel features significantly enrich the simple features and can also be calculated efficiently. With these new rotated features, the sample face detector shows off on average a 10% lower false alarm rate at a given hit rate. They also present a novel post optimization procedure for a given boosted cascade improvingon average the false alarm rate further by 12.5%.

3. PROPOSED SYSTEM

Face and Emotion recognition can be performed using different features, such as face speech, and even text. Among these features, facial expressions are one of the most popular, if not the most popular, due to a number of reasons; they are visible, they contain many useful features for emotion recognition, and it is easier to collect a large dataset of faces (other means for human recognition) Recently, with the use of deep learning and especially convolution neural networks (CNNs) , many features can be extracted and learned for a decent facial expression recognition system .It is, however noteworthy that in the case of facial expressions, much of the clues come from a few parts of the face, e.g. the mouth and eyes, whereas other parts, such as ears and hair, play little part in the output.

This means that ideally, the machine learning framework should focus only on the important parts of the face, and less sensitive to other face regions. In this work we propose a deep learning-based framework for facial expression recognition, which takes the above observation into account, and uses attention mechanism to focus on the salient part of the face. We show that by using attentional convolutional network, even a network with few layers (less than 10 layers) is able to achieve very high accuracy rate. More specifically, this paper presents the following contributions:

- We propose an approach based on an attentional convolutional network, which can focus on feature-rich parts of the face, and yet, outperform remarkable recent works in accuracy.

- In addition, we use the visualization technique proposed in to highlight the face image 'smost salient regions.

3.1 METHODOLOGY

A methodology involves a series of consecutive stages in the project management process. It is a step-by-step sequence to design, develop and deliver a product or service. It focuses on achieving the succession in the implementation process and benefits. In IT and software development, this methodology type is called —Waterfall'- one portion of work follows after another in linear sequence

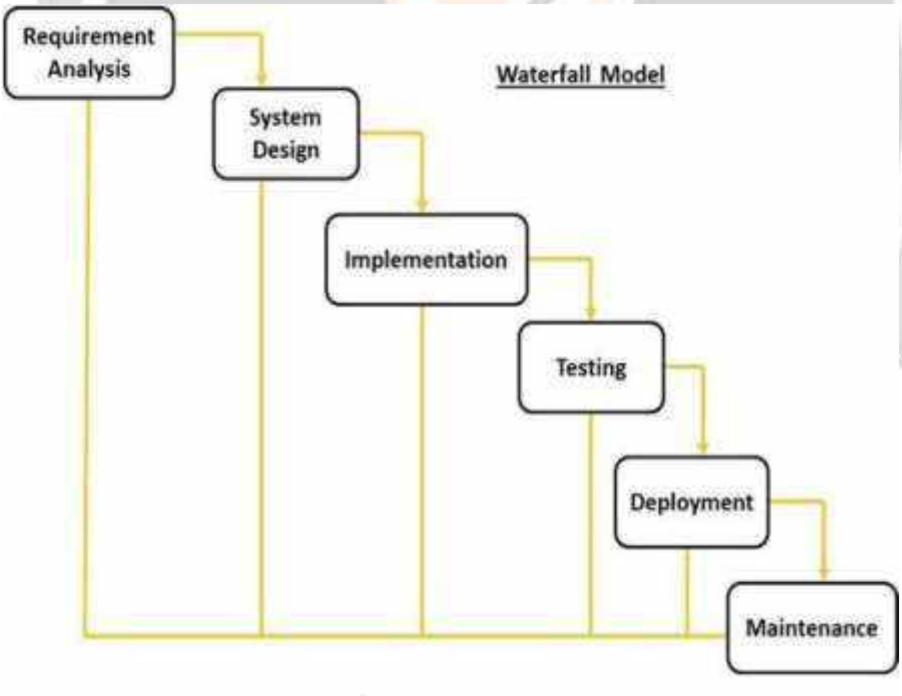


Fig -1: METHODOLOGY

FEASIBILITY STUDY**:**

In case the system proposal is acceptable to the management, the next phase is to examine the feasibility of the system. The feasibility study is basically the test of the proposed system in the light of its workability, meeting user's requirements, effective use of resources. These are categorized as technical, operational, economical and schedule feasibility. The main goal of feasibility study is not to solve the problem but to achieve the scope. The result is a feasibility report submitted to the management. This may be accepted or rejected. The system cycle proceeds only if the management accepts it.

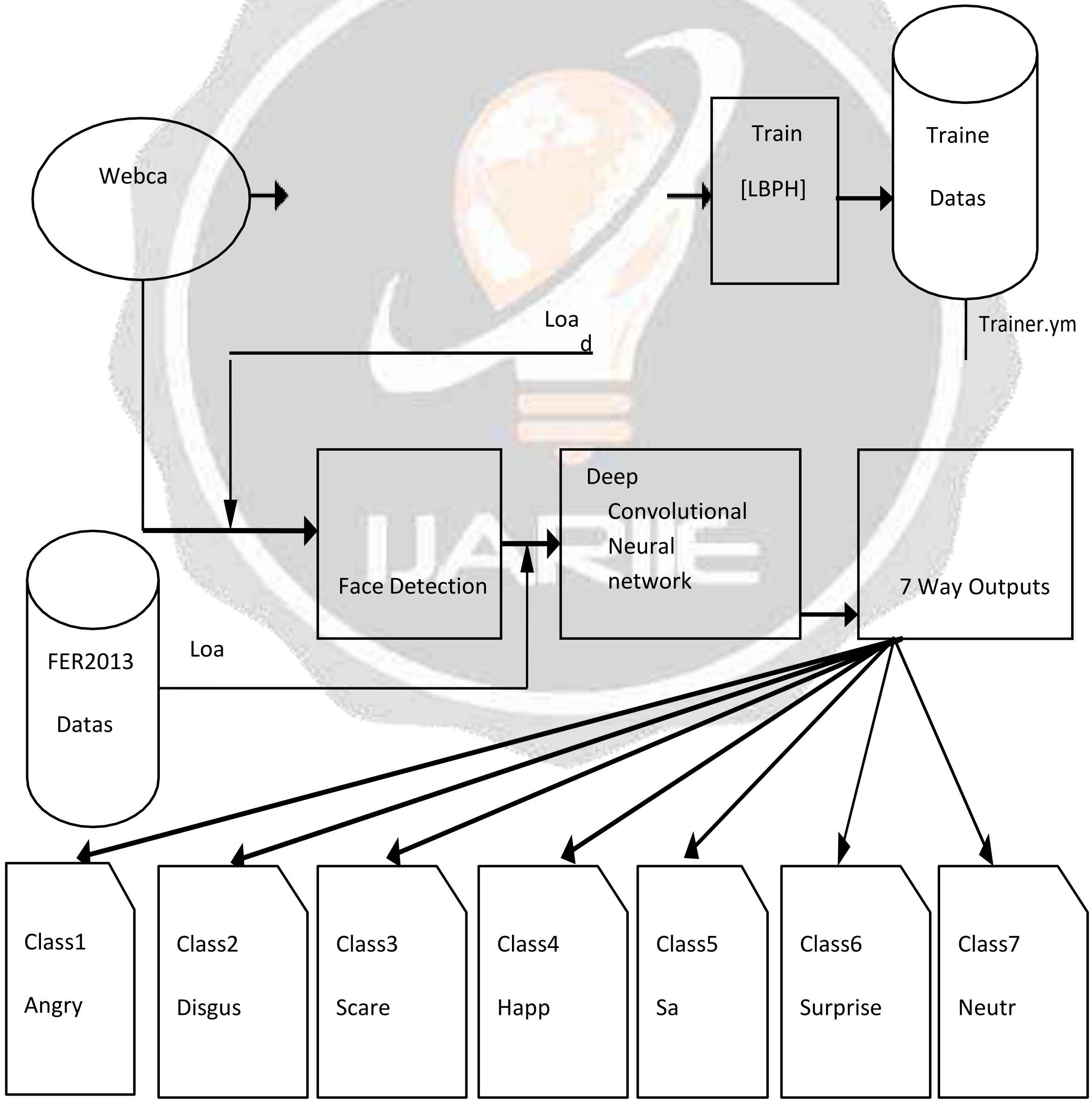
MODEL ADOPTED :-WATERFALL MODEL

The simplest process model is the Waterfall Model, which states that the phases are organized in a linear order. The model was originally proposed by Royce through variation of the model have evolved depending on the nature of activities and flow of control between them. In this model, a project begins with feasibility analysis. Upon successfully demonstrating the feasibility of the project, the requirement analysis and project planning begins. The design starts after the requirement analysis is complete and coding begins after the design is complete.

MODULES DESCRIPTION:-

1. Face capturing module
2. Preprocessing module
3. Training module
4. Face Detection module
5. Expression recognition module

3.2 SYSTEM ARCHITECTURE :



4. CONCLUSION

To summarize, in this project a highly accurate Convolutional Neural Network to recognize emotions from facial expressions was built. The LBP cascade classifier available in OpenCV was used to detect faces in images. A CNN network was trained using the detected faces to identify a total of eight emotions. The concept of batch normalization was used in the network to regularize the weights and improvestability. Virtual sampling was used to improve class representation of those classes with insufficient data. The trained CNN was tested on unknown data from the same dataset used for training. The performance on test data was analyzed.

Three applications were developed using the trained CNN. The first application detected the emotions of faces from a webcam feed. The second application detected emotions of faces in a video. The third application detected the emotions offaces on screen.
The performance of the CNN on real-time applications was analyzed. Further avenues for improving the performance of the network for real time applications was explored and documented.

5. REFERENCES

[1] C. J. C. Burges, "A Tutorial on Support Vector Machines for Pattern Recognition", *Data Mining and Knowledge Discovery*, vol. 2, no. 2, pp. 121-167, 1998

[2] A. Mollahosseini, D. Chan, and M. H. Mahoor, "Going deeper in facial expression recognition using deep neural networks," in 2016 *IEEE Winter Conference on Applications of Computer Vision (WACV)*, pp. 1–10, IEEE, 2016.

[3] T. Kanade, J. F. Cohn and Y. Tian, "Comprehensive database for facial expression analysis", *Proc. 4th IEEE International Conf. on Automatic Face and Gesture Recognition (FG'00)*, Grenoble, France, 2000, pp. 46-53

[4] P. Lucey, J. F. Cohn, T. Kanade, J. Saragih, Z. Ambadar and I. Matthews, "The Extended Cohn-Kanade Dataset (CK+): A complete expression dataset for action unit and emotion-specified expression", *Proc. 3rd International Workshop on CVPR for Human Communicative Behavior Analysis (CVPR4HB 2010)*, San Francisco, USA, 2010, pp. 94-101

[5] T. Ahonen, A. Hadid, and M.Pietika¨inen, "Face Description with Local Binary Patterns: Application to Face Recognition," *IEEE Trans. Pattern Analysis and Machine Intelligence*, vol. 28, no. 12, pp. 2037-2041, 2006.

[6] J. F. Cohn, Z. Ambadar, and P. Ekman. Observer-based measurement of facial expression with the facial action coding system. *The handbook of emotion elicitation and assessment*, pp 203–221, 2007.

[7] P. Ekman and W. V. Friesen. Facial action coding system. 1977

[8] S. E. Kahou, C. Pal, X. Bouthillier, P. Froumenty, C. Gülçehre, R. Memisevic, P. Vincent, A. Courville, Y. Bengio, R. C. Ferrari, et al. "Combining modality specific deep neural networks for emotion recognition in video.", *Proc. 15th ACM on International conference on multimodal interaction*, pp 543–550. ACM, 2013.

Online Smart Voting System Using Biometrics Based Facial and Fingerprint Detection on Image Processing And CNN

Shashidhar V, Lakshmidevi NG[1], Harshitha P[2], Rashmi BM [3], Ruchitha V[4]

[1]*Assistant Professor, Computer Science Department, Raja Rajeswari College of Engineering, Karnataka, India*

[2,3,4]*Computer Science Department, Raja Rajeswari College of Engineering, Karnataka, India*

ABSTRACT

Abstract A biometric technology that is gaining popularity in many applications, such as online voting systems, is facial recognition. With this technology, facial features of a person are analyzed and compared with those in a database using algorithms. The goal of using facial recognition in online voting systems is to increase voting process security and accuracy. When we vote online, a facial recognition technology records their facial characteristics and compares them to a database of registered voters. By ensuring that only legitimate voters are permitted to cast ballots, this technology lowers the possibility of fraud. By identifying voters' faces, the system can also spot and stop attempts to rig the voting process. To improve the security and accuracy of the voting process, online smart voting systems can incorporate fingerprint detection, a popular biometric authentication technique. Utilizing a database for comparison during the voting process, fingerprint data from authorized voters is collected in order to implement fingerprint detection. A voter's fingerprint is taken when they cast a ballot, and authenticate their identify, it is compared to the fingerprints stored in the database. If the voter's fingerprint matches one of the fingerprints in the database, they are judged qualified to vote, and their vote can be recorded. The use of fingerprint detection can help stop fraud and unauthorized access to the voting while preserving the privacy of the voters.

Keyword: - *Facial recognition, Fingerprint matching, Har Cascade algorithm, etc.….*

---

1. Introduction

In India, currently we are having two kinds of voting mechanisms first the secret Ballet paper and the second one is Electronic Voting Machines (EVM), but the process of voting has some demerits and drawbacks, that is, why is the present ongoing system not so much safe & secure. In our chosen study of the system, we are proposing three levels of verification which is very effective in reducing the false voting scenarios. The first includes the unique id generate at the of registration which would be given to the voter. After which, in the second level of security when given id to the Election Commission Officer where it would be cross-checked by the officer and now the new tier of verification through which the voter needs to go, will greatly enhance the security, here we would be matching the current facial features of voter with the one present in database, this would reduce the chances of false casting of voting and make the system safer and accurate. In this paper, we will discuss the one algorithm used in the field of facial recognition. We have also measured the accuracy of this algorithm by practically implementing it and evaluating it on the test set.

1.1 Face Detection

A biometric technology that is gaining popularity in many applications, such as online voting systems, is facial recognition. With this technology, facial features of a person are analyzed and compared with those in a database using algorithms. The goal of using facial recognition in online voting systems is to increase voting process security and accuracy. When we vote online, a facial recognition technology records their facial characteristics and compares them to a database of registered voters. By ensuring that only legitimate voters are permitted to cast ballots, this technology lowers the possibility of fraud. By identifying voters' faces, the system can also spot and stop attempts to rig the voting process. To improve the security and accuracy of the voting process, online smart voting systems can incorporate fingerprint detection, a popular biometric authentication technique. Utilizing a database for comparison during the voting process, fingerprint data from authorized voters is collected in order to implement fingerprint detection.

1.2 Fingerprint Detection

A voter's fingerprint is taken when they cast a ballot, and authenticate their identify, it is compared to the fingerprints stored in the database. If the voter's fingerprint matches one of the fingerprints in the database, they are judged qualified to vote, and their vote can be recorded. The use of fingerprint detection can help stop fraud and unauthorized access to the voting while preserving the privacy of the voters

2. Literature Survey

The automatic matching of attributes in images that correspond to the same physical position on an object as seen from two randomly selected angles is shown in this paper as a dependable method. High accuracy feature matching across different points of view. Unlike traditional stereo matching techniques, our solution does not require any prior knowledge of the individual camera positions and orientations. In fact, we're curious to learn this information from picture feature matches in our code. It is possible to distinguish features between two or more images using affine texture invariants. Since our feature characterisation is invariant to linear transformations of the image data, such as rotation, stretch, and skew, our solution specifically addresses the issue of window impacts. The feature matching method used [1]. Face Recognition Using a Convolutional Neural Network with Pose and Illumination Variation Face identification is still a difficult problem. The major issue is figuring out how to enhance recognition performance when it is impacted by a variety of non-linear variables, such as variations in illumination, positions, facial expressions, occlusions, etc. The face identification problem is addressed in this research with a strong 4-layer Convolutional Neural Network (CNN) architecture that can handle facial images with occlusions, poses, facial expressions, and variable illumination. The suggested CNN technique beats other solutions, according to experimental results, reaching 99.5% recognition accuracy on the AR database. The accuracy of the test on the 35 subjects in the FERET database is 85.13%, which is in the same performance range as the top score [2]. A hybrid faces detection method for real-time mobile device deployment: There are several face identification algorithms in the literature, but only a few numbers of them can operate in real-time without the aid of a dedicated hardware engine. This study offers a timely and reliable solution for mobile platforms, which frequently have less processing power and memory than PC systems. This strategy combines the shortcomings of our two prior real-time mobile platform implementations. The second implementation, which is found to be resilient to different facial positions or orientations, receives an online or on-the-fly light source calibration from the first approach [3].

3. Design and Implementation

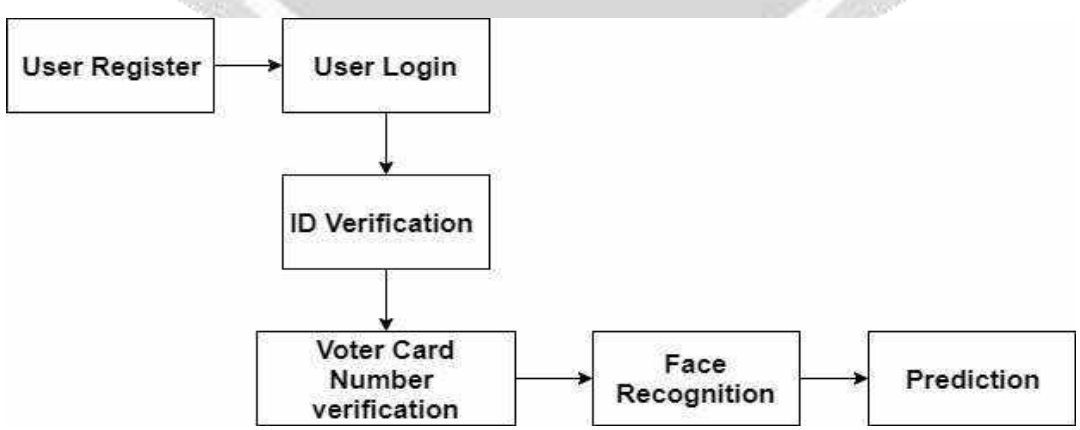


Figure 1: Architecture Diagram

A. Registration

The act of setting up a new account to take the online voting process is known as registration for online voting. Providing information like name, address, and voter identification information, it also necessitates choosing a special username and password.

Usually, a secure website or application created to enable voting is used for the registration procedure. A person can log in and see their voting options after creating an account and signing up.

Because it helps to authenticate each voter's identity and guard against fraud or unauthorised access to the voting options, registration is a crucial step in the online voting process.

B. Login Id Verification

When voting online, the term "login" usually refers to the procedure used to confirm a voter's identity before allowing them to cast their ballot. This is accomplished by requesting a special login, password, or other form of additional authentication from the voter that is connected to their voter registration data. To further guarantee the authenticity of the voting process, many online voting systems additionally incorporate extra security measures like encryption, digital signatures, and multifactor authentication**.**

C. Face Recognition Verification

Face identification and verification, a biometric authentication uses a person's facial features to validate their identity, is used for online voting. It comprises comparing a person's unique facial characteristics to a photograph or video of their face that has already been recorded and stored using computer algorithms.

1. Har cascade algorithm. (For face recognition)

An AI programmed called Har Cascade that can detect objects in pictures and movies incorporates highlights from the work of Paul Viola and Michael Jones. In 2001, a Boosted Cascade of Simple Features was employed in Speedy Object Detection. A course work is constructed using a large number of both positive and negative images in an AI-based framework. Then, it is applied to recognize objects in various images. Four stages make up the total: Feature Selection Har.

Har course classifier depends upon Viola Jones recognizing verification include which is set up in given a few information faces and non-faces and setting up a classifier which sees a face.

The steps for using the Har Cascade algorithm in an online smart voting system:

- **Collect Training Data**: Collect a set of images of voters' faces, with positive and negative examples. Positive examples show faces of authorized voters, while negative examples show faces of non-authorized voters or objects that are not faces.
- **Train the Classifier**: Make use of the training data set to train the classifier. The Har Cascade programme learns to recognise elements in the photos that distinguish between authorised and unauthorised voters using machine learning techniques.
- **Detect Faces**: Once the classifier has been trained, it can be used to detect faces in new images. The algorithm scans the image for features that match the learned patterns and then outputs the location of any detected faces.
- **Validate Voter**: A database of registered voters is then used to compare the discovered faces. If a match is discovered, the voter is regarded as qualified to cast a ballot. The voter is not permitted to cast a ballot if there is no match.
- **Record the Vote**: Once the voter is validated, their vote can be recorded.

It's crucial to remember that the Har Cascade method has flaws and is susceptible to detecting errors. To prevent false positives or false negatives, it is crucial to have a backup authentication system.

2. Face Detection

The primary Viola and Jones facial recognition algorithm is updated every 15 frames. A lot of programmers and scholars have enhanced the original methodologies over the past few years in order to modify them for the numerous real-time applications. By only applying the face detection method to the segmented region after background subtraction, the computational complexity is kept to a minimum. Our face detection approach is created using a wavelet transform. Subsets of wavelet coefficients serve as the object's shape representation. Utilising integral images, the Har features have been calculated. The variance difference between the black and white parts was calculated to provide the rectangle feature values. Utilised are methods like the integral image and the squared integral image.

3. Dataset Creation

Registering every voter would be the first step towards using an automated method to keep the data. The people who deserve recognition must have the necessary education. Therefore, all necessary individuals' faces should be extracted from the various photographs using the first stage of face detection. Then, a dataset of these faces should be created as a 152x152 grayscale image. The variety of images that contain x are given as input at this stage, assuming that x is a part of the unit. Faces are first sought out in the input photographs during the face detection stage, after converted to grayscale images. After conversion, a unique ID is assigned to each file to help with identification.

4. Face Recognition

At the moment, a dataset contains every member's face in every situation. NumPy arrays were created after all of these photos had been trained. The trained classifier is used to label the test dataset when it has been saved. The input image will be the one that contains each component. It starts by identifying each face using a face identification algorithm. Face detection is followed by grayscale picture conversion. The trained classifier is used to recognise the face. Voter identity tags will be given to each recognised face.

D. Fingerprint image matching using CNN

Online voting uses the fingerprint matching biometric authentication method, which uses a person's unique fingerprint to confirm their identity. It is important to photograph and closely inspect a person's fingertip pattern that resembles one has already been captured on camera and stored in a database.

By ensuring that only registered voters may participate in the voting process, fraud is less likely to occur. In order to use fingerprint matching in online voting, voters may be required to register their fingerprint with the voting system in advance by scanning their fingertip with a fingerprint scanner or the camera on their device. The technology will compare the voter's fingerprint to the pre-registered voter database to authenticate their identification.

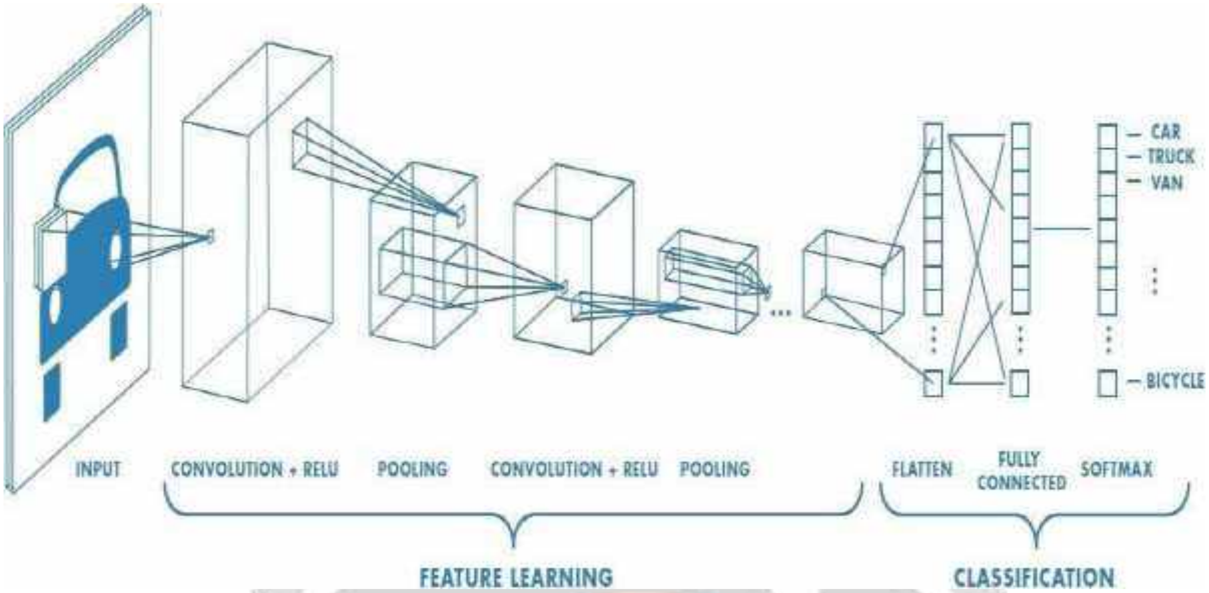


Figure 2: Fingerprint image matching using CNN

The gap between human and machine skills is now significantly less thanks to artificial intelligence. To get exceptional outcomes, both experts and novices concentrate on a variety of aspects of the subject. One of several of these disciplines is computer vision. Giving computers the ability to see and comprehend the world similarly to humans is the aim of this field. The developments in Computer Vision with Deep Learning have been established and refined over time, primarily throughout the period of one particular method.

The steps for implementing fingerprint detection in an online smart voting system:

- **Create Fingerprint Database**: Obtain a set of the fingerprints of authorised voters to use as reference. A fingerprint scanner or a mobile device with an inbuilt fingerprint sensor can be used for this.
- **Create Fingerprint Database**: Put the gathered fingerprints in a database so that they can be compared while voting.
- **Capture Voter's Fingerprint**: When a voter attempts to vote, their fingerprint is captured using a fingerprint scanner or a mobile device with a built-in fingerprint sensor.
- **Compare Fingerprint**: The voter's identity is then confirmed by comparing the collected fingerprint to those in the database. The voter is deemed qualified to cast a ballot if their fingerprint matches one in the database.
- **Record the Vote**: Once the voter is validated, their vote can be recorded.

E. Voting

Voting is a fundamental right in democratic societies, as it allows individuals to have a say in who represents them in government or other decision-making bodies. It is often considered to be a cornerstone of democratic governance, as it allows for the peaceful transfer of power and the representation of diverse interests and perspectives.

There are several ways to cast a ballot, including online, by mail, and in person at polling places. The specific rules and procedures for voting may be governed by various laws and standards, depending on the country or jurisdiction, with the aim of preserving the fairness and integrity of the electoral process.

5. RESULT

a. Voting table desk

Figure 3: Face authentication and voting

b. Enter OTP

Figure 4: Verifies the OTP

c. Voting

Figure 5: User is allowed to cast their vote

5. CONCLUSIONS

By adding this feature, we might enhance the usability, security, and lack of vote fraud of our current voting system. Face recognition is used more reliable and safe way of authentication. One algorithm—the Har cascade—is discussed in this article. We also evaluated the participants' performance depending on how well be able to identify faces in the images. In our training set, we used 2316 pictures. To stress the training set's peculiarities even more, the photographs were enhanced. There were 4 more samples for every image in the enhance set. The batch has 9264 photos in all, or 2316*4.

6. REFERENCES

[1] A. Baumberg, “Reliable feature matching across widely separated views”, in CVPR, 2000

[2] F. Song, D. Zhang, J. Wang, H. Liu, and Q. Tao, "A parameterized direct LDA and its application to face recognition," Neurocomputing, Vol.71, 2007.

[3] H. Bay, T. Tuytelaars, L. Van Gool, “SURF: speeded up robust features”, in ECCV, 2006

[4] KashifHussainMemon, Dileep Kumar and Syed Muhammad Usman, “Next Generation A Secure EVoting System Based On Biometric Fingerprint Method”, 2011.