CONGESTION HANDLING ORGANISATION USING CYBERSAFE

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ABSTRACT

In current scenario, vehicle industries has grown immensely with the rapid demand and interests for purchasing different automobiles in metropolitan cities like Delhi, Bangalore, Chennai, Kolkata. Due to the rising congestion issues all over India with the rise in congestion and traffic level in Delhi and Bangalore provided a lot of time waste and accidents due to panic can chaos caused inside people. Thus, it is necessary to take a step in solving this issue which requires efficient thinking to develop the solution for this problem. Internet of things have been rising its applications in different domains and with the implementation of IOT many problems are solved rapidly, giving us the full advantage of developing an efficient model to control this traffic congestion. Traffic can be controlled by either using traffic light or traffic police. The traditional traffic light methods are failing due to the rise of cross-sectioned roads and rise in the no of vehicles on limited roads. A smart system is required so that, it sense the congestion level in areas and provide the best solution to reduce the congestion without involving any human. Creating congestion less roads and moreover, providing conventional methods. Each traffic signal has a fixed duration that cannot be varied based on the traffic density on each lane. This smart traffic light system cab be replaced with the traditional system where the lights will sense the congestion level and act rapidly to avoid it. Moreover it will be an advantage if the system will provide the utilization of the roads which are not used in terms to reduce the congestion and ease the flow of vehicles by cutting out the queue length at signal.

Keyword: - *Internet of Things (IoT), Traffic, Congestion, Traffic signal, Automobiles.*

1. Introduction

Internet of things is an interrelation of simultaneous direct or indirect devices used to capture any movement, observation and various objects. IOT also harness the data sharing and transforming ability successfully over a networked connection without involving any human interaction. This can also be stated as a direct benefit for us provided by the integration of IOT. IOT is also stated as a collection of working or embedded objects having sensors or software with processing ability that can connect with other devices over the internet to transfer data or communication. observation and various objects. IOT also harness the data sharing and transforming ability successfully over a networked connection without involving any human interaction. This can also be stated as a direct benefit for us provided by the integration of IOT. IOT is also stated as a collection of working or embedded objects having sensors or software with processing ability that can connect with other devices over the internet to transfer data or communication.

IOT comprises smart devices with respective softwares which have web inability within its ecosystem. Smart devices possess the ability to collect various forms of data using sensors and processors and act according to the data collected.

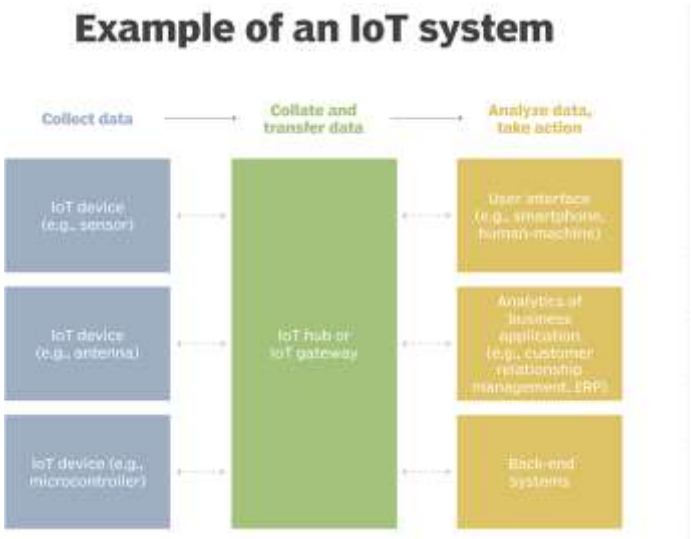

Fig -1: IoT System

1.1 Architecture

IoT architecture consists of three tiers or layers: (a) Deviceor things (b) The edge gateway (c) The cloud.
Device or things are wireless enabled sensors or actuators or any other proprietary protocols, connecting to any Edge gateway. This gateway layer provides pre-processing towards the Edge gateway provided and moreover handles the data security which already had a connection with cloud. Edge gateway can also give similar view for devices for the easy management. Lastly, our cloud layer has IOT microservices architecture application which is stored using coded data storage system. Cloud tier handles messaging, and system scheduling that handles communication that emerge in all tiers.

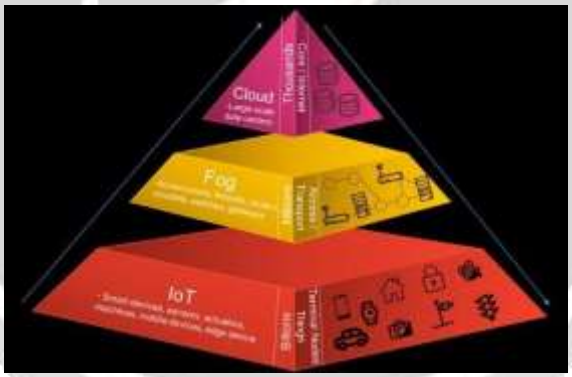

Fig -2: Architecture of IoT

1.1.1 Current Situation

In the current method, the traffic signals are of static or fixed duration vehicles, have to wait at the signal unnecessarily sometimes. Let us elaborate the situation as there are two lanes one with peak density of traffic and vice versa of peak traffic. Processing scheduled timings of each lane is predefined according to lanes. Now, vehicles of peak traffic has to wait even at the free traffic thus, creates congestion but also chaos among people.

1.1.2 Opportunity

Regulating smart traffic system where the timings will be directly proportional to the vehicle congestion in respective lanes with the implementation of IOT to improve the traffic system and to manipulate the traffic signals accordingly.

2. Related Works

The author Dr. Vikram Bali, Ms. Sonali Mathur et.al. [1] Developed system works in the method to find the proper work of Infrared, display viewing, radar modulation of the congestion management. These all help in working on the congestion large productive manner. The system proposed made use of new thinking like the new technique that make a difference as compared to the available solutions. It comprises of RFI-D tag, tag tool scanner along with ArdUNO also joining all this for correctly functioned of the model. The tag will take theinput and save data after achieving data from the tag and notify it to mainserver which make use cloud technology. The technique make prominent all automobiles will reach the final location without possessing trouble in blockage problem.

Finally, this make secure outcome guarantee the valuable time and making of working on a fine efficient town.
A certain writer Hua Wei et.al described that at whereverfour roadway section, there will be two variation in way of of track:enter and exit path. The enter path is a way where automobiles will make a way to the cross-section roadway. The exit path works in making a way for exit of automobiles out of the criss-cross section. Figure 3 shows a intersection which has fourentering path and exit path [2]. The southern entry path is shown in this figure as the path or in northwards where automobiles going towards the southern way is noticed. The end outcome of congestion management looks to ease efficient along with proper running automobiles in junction.

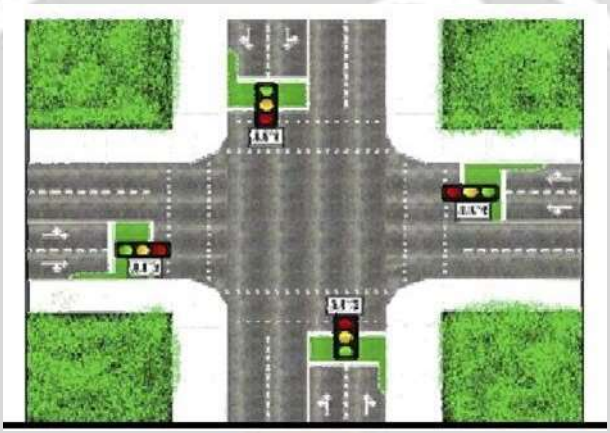

Fig -3: A junction with quadruple entry and exit path

Sabeen Javaid er.al proposed efficient congestion controlling system to work on automobiles at road criss-cross, by getting information through sensors, and RFI-Ds which located and added adjacent on pathways [3]. It will detect information at the first level and store in available storage server and finds figure of automobiles so as make managing congestion according to the figure of automobiles. It will also help people to have idea on the numeral of vehicle in the so as to be sure for particular roadway through analysis. Normal methods did not work in controlling current congestion properly. Looking at all these methods forcongestion management systems, a proper method was proposed in ensuring the proper movement of vehicles withoutwaiting in the singals.

A specific author Anam Firdous, Indu, Vandana Niranjandesigned to work on the congestion signals found on the number of vehicles in that particular [4]. The Arduino Uno take input data from the IR dectectors. Arduino will find the population of vehicles based on the information received from the detectors, according to automobiles waiting in the laneto ensure it will control the method in which congestion signals slowdown of display lights are used for showing in the display. Every pole has three, top is green then comes orange and then red one. The infra detectors detect automobiles according the sense of the way reflected through the detectors and actuators. These sensors are placed adjacent to the roadway and to ensure congestion managing properly and effectively.

Sundaram Mahalingam, S.Arockiaraj gave explanation that Precedence of crowding display wants making to be be managed according to number of automobiles staying as to equal way. The proposed system and method to develop a density based amber light system for automobiles. The caution light changes on its own by recognizing the number of vehicles. This procedure is demonstrated which uses IR detector along with Arduino. IR detector helps to calculate the population in specified lane. Infrared detector will not work in some of the regular light and has some limitations. Amber illumination does not work in proper way[5]. In upcoming days, it may be replaced with good detectors for the noticing. IR detectors may be used every each lane in well-known manner to detect traffic density accurately. These sensors always control the blockage on that specific lane. These sensors are attached to the

Arduino for the survey of the congestion of wheels. Based on these sensors, regulators detect the congestion and direct the congestion structure accordingly. Managing of traffic light depends on figure of automobiles obtainable in the lane.

T.E some fun et.al proposed the normal caution light which has pre-defined method and function in making a way to make the display "go time" for vehicles at intersection by not considering the density of automobiles. This gave us an idea gave a solution display in the amber signal. This system uses IR sensors to count and to calculate the congestion density in each lane. Detectors are connected to display with a connection with MC. The micro-controller (MC) used is the Ard Mega along for 2560 chip for some of analysis of congestion. The system was developed to control unwarranted traffic. Consequence obtained that blockage control with infrared radar along with a Ard Mega 2560 construct a good product and the time scale took to be in charge of unwanted finish at a cross was reduced specially by sixty percent time.[6]

The 68% inhabitants of the world would live in the city or metropolitan areas by 2050. In order to rectify the problems in conventional traffic we use this technique [7]. It was developed Mahalingam et al.

The information is feed to Wireless Network (WSN) nodes. They have implemented a automation to interchange information between WNS nodes and central monitoring systems (CMS). They track the vehicles at higher speeds and they reduce vehicle waiting time.

A modifying neuro-fuzzy interface system (ANFIS) is exploit to handle the traffic signals. Rules are abruptly generated by ANFIS according to the given input output dataset. The smart cities are planned by implementing this method.

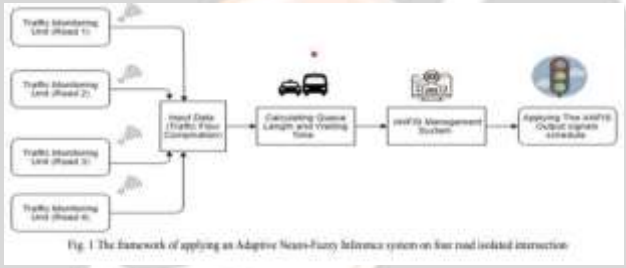

Fig -4: Flow diagram of adaptive Neuro-fuzzy Inference system

To save lives, in the emergency times, ambulance plays an important role due to heavy traffic in all the places. There are chances of losing these lives. So, this method is implemented in which the signals are sent to the microcontrollers, these signals are sent to the microcontroller by the sensors. [10] This microcontroller can therefore be used for controlling the speed on the vehicles. In the proposed system they have used IR sensors to measure the traffic density. According to logic 0 and 1, microcontroller changes the radiance time of the green LED.

Information is exchanged between the devices for controlling instruction to each other through the Internet and other communication Medium. The following equation is used to calculate the overall IoT information [11].

$$IoT = \text{Real} - \text{time physical information} + \text{appliances} + \text{Networking media} \quad (1)$$

With the increased population the number of vehicles has also increased, so there is a need of smart traffic management system.

There are four cameras at each traffic junction in all four sides they all have red lights facing the road. In this use MATLAB library for image and video processing and C++ compilers are used for results. [12] Consider there are four sides namely S1, S2, S3 and S4 and respective camcorder installed namely C1, C2, C3, C4 collected the live information from the camcorder and does similar extracting each information.

There is a lap which has a current and then convert the input AC voltage (227/220V) to DC voltage (5V). [8] Two sway DC Lance at 12 Volt this is allowed voltage input concluding is to be positioned to come up with energy for the lamp. For Microcomputer electronic circuit, we use STMicroelectronics STM32F103C8T6 microcomputer with Cortex-M3 32-bit ARM core [8].

3. Analysis of Figure

Big Figures Analytics in Congestion Handling.Each of the faults of figure processing in the conventional congestion handling can be overcome with the help of big figures. This has the below characteristic.

3.1

Congestion Handling Organization execute with big figure analysis can hold vast description of compound and diverse figure.

Big figure has intent on three questions: figure storage, figure analysis and figure management. The Hadoop implement is born with the capability to handle huge amount of figure. Figure is stored in various nodes. A huge task is separated into small function, and be completed in Map Reduce structure. At the similar time, its solidity and fault liberality is necessary. Hive as a figure storehouse can save big figure in HDFS, its HQL sentence is converted into Map Reduce function, and be implemented on different nodes. HBase as a database can stock and control the figure in vertical mode. Sqoop can transform figure between RDMS and Hadoop. Guluch is a extremely accessible, highly dependable system, it can gather huge logs, and aggregate, transfer them.

3.2

Big figure can better the organisation of shipment industry.

Shipment industry, including many feature of tasks, need to control enormous amounts of figure. It has more unconfined models of implementation and a significant deal of apparatus. If a small coincidence occurs, the complete organization will move towards an ineffective condition. On execution huge figure automation, the statistics organization can procedure the figure and discover the coincidence in good measure, abruptly control it, or describe to the administration staff and question them to decide. Big figure has a fine forecast capacity, can lower the expectation of false distress and unconsciousness congestion event. Congestion direction is a major part of brilliant transit structure. By issuing advise statistics for passenger, it can specify congestion circumstances of following path, permit passengers to select the correct passenger road and upgrade congestion circumstance in the town. In the feature of upgrading transfer organisation, refining the dimensions of the path webbing, modifying congestion order, big figure automation has certain supremacy.

3.3

Big figure can upgrade the security stage of congestion.

The real-time filtering abilities of big figure can exactly probe congestion coincidence, its forecast capability can functionally forecast the experience of congestion. Using frequency wave observation structure, recorded observation structure and mobile observation structure, one can generate a functional reliability representation to upgrade the protection of automobiles. When reliability failing arise and if crisis redeem is required, with its exhaustive refining, resolution-construction and quick reaction capacity, big figure can considerably upgrade the capability of crisis release and deduct morality and valuables losing.

4. Design and Methodology

The congestion structure is planned in such a plan that ultrasonic sensors are placed at definite distance from the traffic light the sensor sends and transfer the data. The general architecture of the system. Initially the horizontal distance of the road is known and if the reader shows the same distance as the empty road this means non-appearance of any vehicles. If the distance is less than the initial distance, then it means the existence of vehicles in that lane. In our model there are two sensors are positioned in two lanes respectively and one of the sensor is in third lane.

If there are no vehicles the sensor reads and shows the horizontal separation of the road which is the default value. If there is existence of any vehicles, a sensor returned the distance less than the initial value. In the roads having multiple sensors placed in the parallel manner. The sensor that reads distance less than, the default marks a presence of vehicles. More the number of sensors reading the data horizontally more the traffic present in the lane.

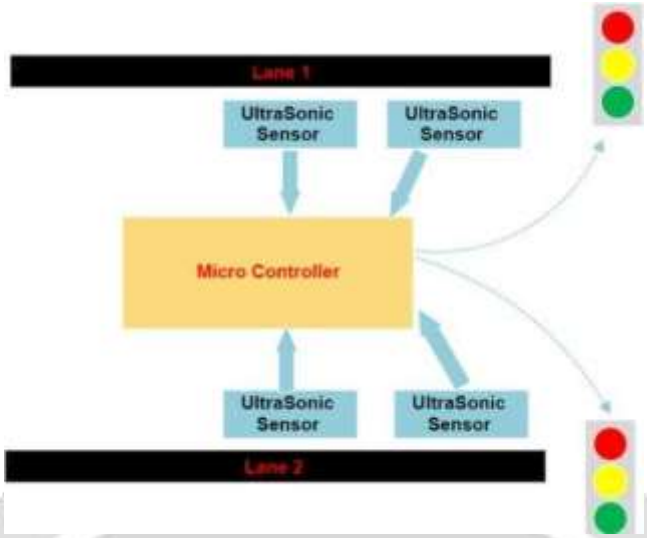

Fig -5: General Architecture of the Structure

The Microcontroller takes the command, from the ultrasonic sensor and further procedure the data and figures out the density of vehicles on each path, and it makes sure that lane is to be given green signal or, go sign for a longer time depending on density of automobiles. Now if the traffic in all the lanes is equally distributed there is a default cycle that anyway follows.

Now another case to be considered is when any one of the path has no vehicle, then that particular lane is given less duration for the green signal, or the go signal and provides that duration to the other road to avoid traffic. Figure 3.2 shows the design of Arduino mega 2560 with ultrasonic sensor. Fig.3.2 Design of Arduino mega 2560 with ultrasonic sensor.

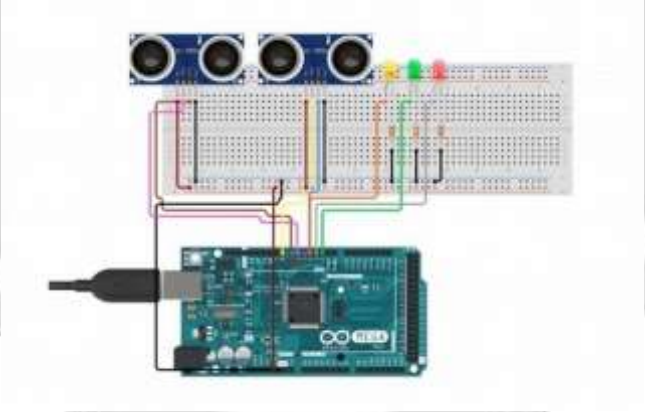

Fig -6: Design of Arduino mega 2560 with ultrasonic sensor

The project deals with controlling or managing the traffic in cities and how to handle traffic in a smarter way. It can even be controlled by Human in case of any emergency or, breakdown of the circuit. All the data is being transfer by the ultrasonic and is being prepared by the microcontroller unit. All the waves transmitted will be received from the ultrasonic sensor and then we use the speed of the wave to compute the distance of the barrier (vehicles are barriers in our case). The distance of the barrier is calculated by the following formula:-

Distance travelled = (time taken * 0.034) / 2

But here we see that the time taken by the wave is twice because the wave after hitting the obstacle reflects back and follows the same path but in adjacent direction. The figure 3.3 shows the flowchart of how the system works, it also checks if all the sensors are working and helps in taking appropriate decisions for managing the congestion.

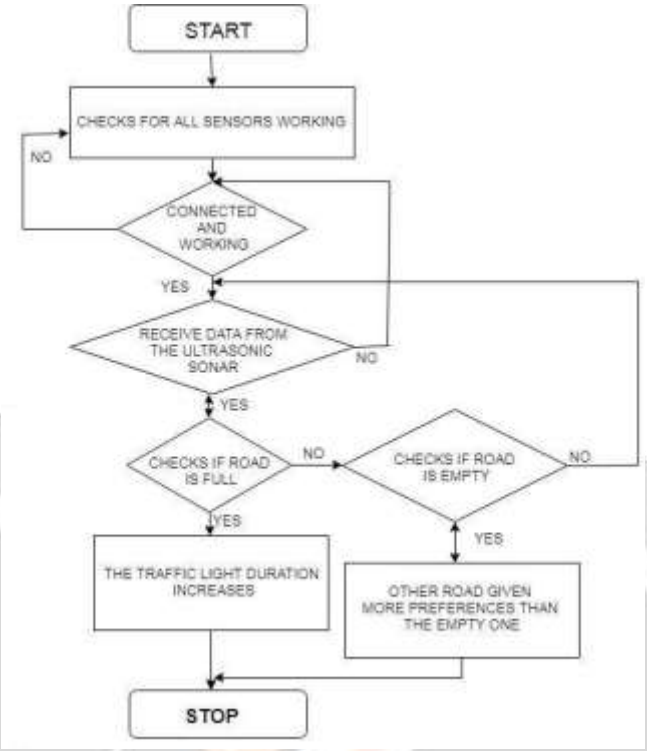

Fig -7: Flowchart representing the principle of working

4. CONCLUSIONS

The study concludes that the current method of managing traffic at any of the junction or a signal is of fixed duration where the stop time and go time of the signal are fixed irrespective its traffic density. We can implement a smart or intelligent traffic signal, where the wait time and go time of the signal depends on the density of the traffic on each lanes. We can use appropriate sensors to read the density of the vehicles and process these data to make the traffic signal dynamic.

Our project methodology directs to overcome congestion produced by ineffective congestion handling organization that are old-fashioned and service on arranged kickoff. These conventional organizations have a lot of timings regardless of the actual mass in congestion on a particular path there by causing huge red light obstruct. The organization we propose secure congestion lights acknowledge to real time worth of congestion, thereby permitting proper handling of time and capital. We are hoping to do research and improvement on our current project in the future.

The efficient caution light system for unwarranted stoppage of automobiles can be proven soon to the society by decreasing the pollution and wastage of energy. It in turn also helps us to develop a smart city.

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