

FOG COLLISION DETECTION SYSTEM

PRIYADHARSINI M ¹, POOJA S ², PRETHIKA P ³

¹ Under Graduate Student, Department of Computer Science and Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, India.

² Under Graduate Student, Department of Computer Science and Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, India.

³ Under Graduate Student, Department of Computer Science and Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, India.

ABSTRACT

Collision Detection system main aim is to prevent the accidents due to fog. Low-cost solutions are required to address the issue in such countries. The Internet of Things (IOT) have started to be utilized to detect and report roadside incidents. Most of the systems designed for this purpose include the use of the cloud to compute, manage, and store information. In any case, the centralization and distance of cloud resources can bring about an increased delay that raises serious concerns about its feasibility in emergency situations; In life-threatening situations, all delays should be minimized. In order to solve the delay problem, fog computing has become a middleware paradigm, which brings cloud-like resources closer to terminal devices. In view of this, the research proposed in this paper takes advantage of the advanced functions of smart phones and fog computing to propose and develop a low-cost and delay-perceivable accident detection and response system, which we call emergency response and disaster management system (ERDMS). Developed an Android application that uses smartphone sensors to detect events. When an accident is discovered, develop an action plan. Initially, nearby hospitals were located using the Global Positioning System (GPS). The emergency department of the hospital will be notified of the accident that led the ambulance to the scene of the accident. In addition, the victim's family was also informed about the accident.

Keywords: - Internet of Things, Emergency Response and Disaster Management System (ERDMS), Global Positioning System (GPS), Collision Detection system.

I. INTRODUCTION

Fog diminishes perceivability, limits contrast, contorts recognition and causes numerous auto collisions every year. Basically, it restricts your capacity to see different vehicles and items out and about, so you should be careful when driving in it. Fog is created by the suspension of extremely fine dampness beads noticeable all around. At the point when light hits these beads, it disperses and brings about lost differentiation and a thick white foundation. As these beads get more modest, haze gets thicker and makes for streets that are significantly more covered. Therefore, vehicle drivers can't see extremely a long way ahead, and fender benders become a much more noteworthy chance than typical. In this unique situation, innovation, particularly, that conveyed through advances in the Internet of things can assume a critical job. Effective emergency detection and response systems can play a basic function in diminishing the death toll following a road traffic accident. A mobile application is built up that accumulates the necessary information utilizing mobile sensors. The area data is gathered utilizing GPS. The gained information is sent to the closest fog nodes for additional handling as essential. On the off chance that an accident is distinguished, at that point a close by medical clinic is found, furthermore, an arrangement of the accident is formulated to give prompt help to the survivors of the accident. On the off chance that this system is embedded in each vehicle, at that point it is straightforward the number of vehicles is associated with a specific accident and how serious is it. So that the assistance from control room will be as indicated by the control room. The current board planned. Has both vehicle following and accident alert systems, which make it more significant and helpful.

1.1 Fog Detection

In this investigation, a few modest closeness sensors intended for presence discovery in structures or individual hardware were assessed for their possible use as fog detectors. The activity of these sensors depends on the backscatter of infrared (IR) light. Every sensor comprises of a producer and photodiode pair housed with related hardware in a little coordinated circuit (IC) bundle. For activity as a fog identifier, fog droplets will in a perfect world dissipate adequate light back to the photodiode to create a sign that can be utilized to show the presence of fog. Three sensors were remembered for this examination: The Maxim MAX30105, Vishay VCNL4020, and Vishay VCNL4200. For every sensor, a uniquely printed circuit board (PCB) was planned and manufactured. In keeping with a low-cost approach, an Arduino microcontroller was utilized for sensor control and information procurement. The sensors were assessed in the lab just as in the field where they were assembled with a monetarily accessible perceivability screen. The MAX30105 and VCNL4020 both experienced high foundation commotion and a restricted reaction within the sight of fog. The VCNL4200 demonstrated the best potential for use as a haze locator, with an in-mist reaction that was recognizable from the foundation and an adequacy that was all around connected with perceivability estimations. The sign to clamour proportion was additionally improved with the utilization of an outer IR producer. Changes in the foundation reaction of the sensor among daytime and evening time activity may muddle information understanding and will require further investigation.



Fig-1 Appearance of fog in highway

1.2 Driver's Visibility

The main objective of this paper is to reduce redundancy of votes it should support multiple environment. It can provide large volume of database of users. Vision can be debilitated by climate conditions, for example, fog. Fog is a thick fog of water beads lying near the outside of the ground that happens when the air temperature moves toward its dew point. Thick fog decreases perceivability to under 200 m. Photons of light episode on the water beads of mist

are ingested and dissipated. The impact of assimilation of light is a decrease in the luminance of an objective; the impact of dispersing is to make a cover over the objective that diminishes its differentiation against the foundation. Decreases in luminance and difference lead to diminished visual execution. This is basic for safe driving on the grounds that a decrease in location rate or an expansion in response time may prompt an increment in street car accident recurrence as well as seriousness. Diminished perceivability because of haze can twist separation prompts and this is one of the principle clarifications given for the social adjustments and high accident rate related with driving in fog.

1.3 Tracking Vehicles using sensor

Vehicle pursuit system primary purpose is to supply Security to all or any vehicles. Accident alert system primary purpose is to safeguarding people in accidents. This is often improved security system for vehicles. The foremost recent like GPS area unit deeply valuable currently a day, this framework empowers the man of affairs to observe and track his vehicle and see vehicle development This new innovation, prevalently known as vehicle pursuit Systems that created various marvels within the Security of the vehicle. This instrumentality is fitted on to the vehicle in such the way that it isn't obvious to somebody World Health Organization is within or outside of the vehicle. After it's used as associate concealed unit that persistently or by any hinder to the framework, sends the real info to the checking unit. In the event that a vehicle has met associate accident, vibration detector provides the electrical sign to microcontroller through sign conditioner. At that time GPS provides scope and meridian knowledge concerning Vehicle space to manage section through GSM. Inaudible detector provides the electrical sign to microcontroller through Signal conditioner. Inaudible detector is ready before the Vehicles in 3 positions and colleges the accessible vehicle or Obstacle. Humidness detector provides the electrical sign to Microcontroller through sign conditioner, and after it will Sense vasoconstrictive when they begin the dc motor.

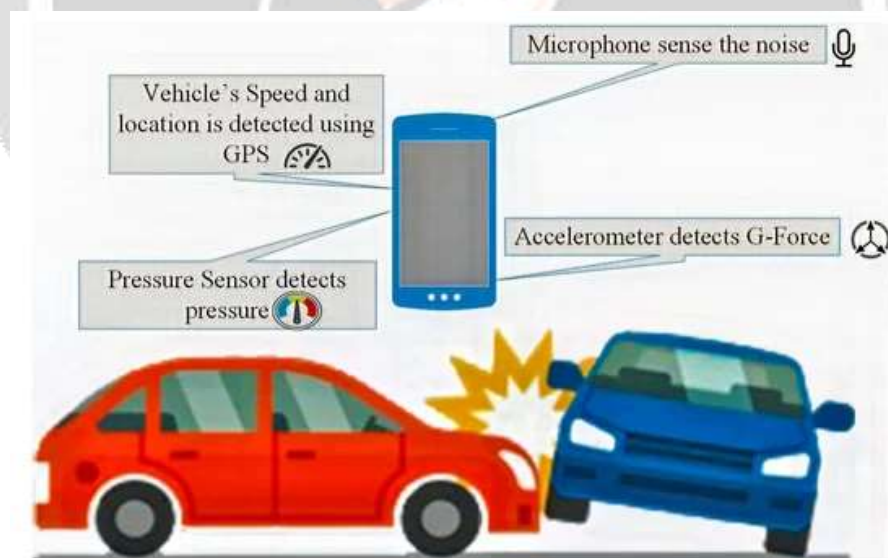


Fig-2 Tracking Vehicle

II. Workings of Accident Alert System

2.1 Global Positioning System (GPS)

GPS truncates worldwide situating system and this is utilized to identify the scope and longitude of the Specific position and it likewise shows the specific time. It identifies these qualities anyplace on the earth. In Our task it assumes fundamental job and it is the principle wellspring of the scope and longitude of the vehicle to Realize the

accident happened area, or in any event, for robbery following of the vehicle. This device gets the Organizes from the satellite for every single second. This gadget is the fundamental part of Vehicle following undertaking.

2.2 Global System for Mobile (GSM)

GSM abridges worldwide system for versatile correspondence, this is a subsequent age (2G) portable Network. This is broadly utilized in everywhere on the world for versatile correspondence. This GSM gadget Comprises of sim space in which a sim can be embedded which has a special number, this interesting number Is utilized for contact. This GSM gadget comprises a one-of-a-kind number called IMEDI number and this is Diverse for every single equipment pack. In our venture the gadget is utilized for communicating information. The Information from GPS is sent to given portable through this GSM itself.

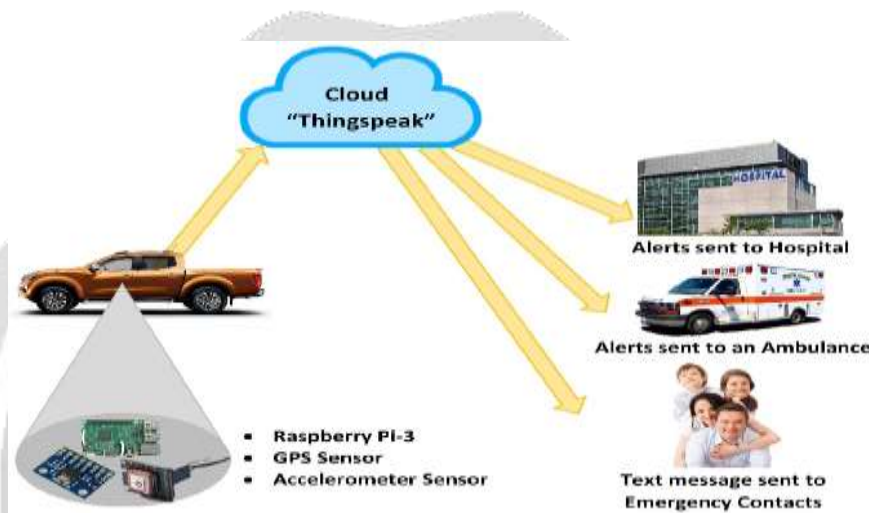


Fig-3 Sensors Detection

III. Server Control

3.1 Transmission of vehicle details to server

A GPS gadget mounted on vehicle catches the geographic area focuses (scope and longitude), azimuth from genuine north and speed of vehicle. Every one of these subtleties are clubbed together and communicated to the worker.

3.2 Detection of sky server

Server gets information from all the gadgets and keeps up an information base for following. This worker measures to gotten information from vehicle and returns a rundown of every close by vehicle and creates a caution if any vehicle is moving/going into closeness of this vehicle.

3.3 Collision Detection

Server is liable for handling the vehicle area information base and creating cautions for vehicles on the off chance that they are in nearness. Server continues following the wellbeing areas of vehicles and produces alarms for all vehicles with covering security zones when it finds any convergence in wellbeing zones of individual vehicles.

3.4 Vehicle receives response and alert from server

The got reaction from server contains a rundown of close by vehicles, which is utilized to stamp all close by gadgets for a visual presentation. A got ready from the server is changed over into an alert for the driver of the vehicle and furthermore showed on visual presentation

3.5 Vehicle detection

Vehicular impact discovery system is created to evade mishaps, in view of GPS innovation. Our crash discovery system catches the geographic area of vehicles and an eye in the sky worker measures this information and creates alert for impact cautioning. This system creates an alarm for all Close by vehicles which is useful in playing it safe and keeps up appropriate separation among vehicles in nearness by controlling vehicular speed. This system is helpful in uneven regions and thick fog influenced regions where perceivability is poor or short because of uneven landscape and thick mist.

A model of Collision identification system is made employing a server running as an eye fixed within the sky and a widget having GPS and might speak with server. telephone is taken into account to talk to a flexible vehicle having a widget Containing GPS for characteristic geographical region of the Vehicle and communicate and acquire info to and from employee by causation info fields concerning current standing of the widget. because the widget is moving it send space updates to employee. employee measures this info and acknowledges the Existence of covering successfulness zones and answers back the data concerning close gadgets and crash alerts if any covering is distinguished among security zones. The widget Then showcase markers on widget screen for every close vehicle to the current vehicle and a caution is conjured for alert concerning Collision notice and moreover showed on widget screen. As vehicle driver gets crash Warning, he has the chance to be cautious and create expected move to be within the protected zone.

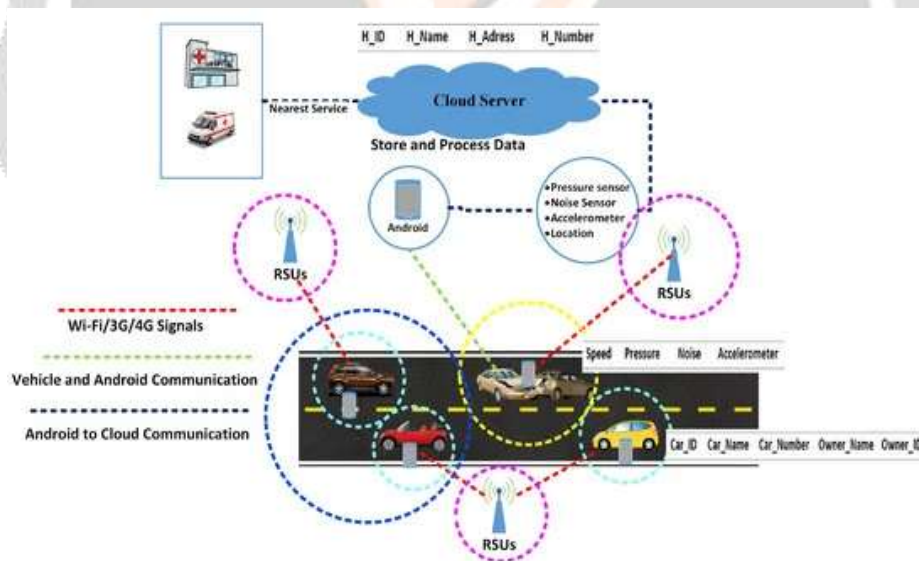


Fig-4 Vehicle Detection

3.6 Shock Sensors used in Alerting

The sensor used to recognize accident is shock sensor. This is single stage shock sensor; it recognizes any Hard effect followed up on it. The yield from sensor after effect will be +5v and associated with INT (pin 12) of processor. These sensors are fixed on all sides of the vehicle to recognize sway happened on it. These yields from sensors are send into OR door to recognize in any event one effect. It is coordinated in the circuit system by associating all the sensors to or entryway whose yield is associated with the INT pin of microcontroller. These

sensors are associated so that they Recognize power sway happening from any side of the vehicle. This is worried to the security of the framework of the human driving the vehicle so that whenever mishap is identified the paramedics can reach to the area when they can.

IV. LITERATURE SURVEY

The survey is on the influence of fog on road crashes [1] road accidents occurs due to many reasons and which one of main reason is the low visibility due to dense fog. The presence of fog will lead to an increase in road traffic accidents and also in occurrence of death. One of the commonly used method for road accident data in the present research is the data mining. there has been a New algorithm proposed in the recent studies for enhancing techniques in rating visibility. It has been said that some concerns must be developed in effective detection of fog and warning systems. And it is also mentioned that the reduction in the count of death occurrence and accidents will be expected in future on account of development of Advanced Driving Assistance Systems (ADAS). Advanced Driver Assistance Systems will make our roads safe and also, they can reduce collisions and ultimately save lives. Light Emitting Diodes is put forward as a substitute to road lighting in the inshore of motorways for serving the purpose of guide Lights. Instead of waiting for crashes or serious injuries to take place, it is been advisable to take some precautions.

This paper describes “Collision Detection System for Vehicles in Hilly and Dense Fog Affected Area to Generate Collision Alerts” [2], Mainly accidents occurs highly in hilly regions and fog affected regions. Here GPS based system is used to avoid accidents. This system will perpetually send the vehicles location to the eye in the sky server, which is used to analyse data from all the vehicles and it will also predict the collisions and send back alert to vehicles. By using this system, it will detect the collision and will help in controlling and avoiding the accidents. It also improve safety and by tracking vehicles it will reduces the accidents. GPS will work at all the time and also in all the weather conditions. So only GPS system has been used here. Three ways to use GPS tracking to avoid accidents are reduce hard braking, reduce hard acceleration and reduce the speeding. hence it has a greatest advantage in collision detection and avoid the accidents occurring at anywhere in any places Even with few mobile devices it has been utilized and tested. that will generate an alert signal if the vehicle crosses its safety zone.

The concept of “Aware Accident Detection and Response System Using Fog Computing” [3], has been said that the vehicles are fixed with accomplished technologies along with the roads allowed with the advanced support, which play a major role in identifying and notifying the road side incidents but only some of the less developed countries use such supportive technology rich vehicles rarely. And for detecting and reporting the road accidents IOT based systems have also been come into use The system planned for detecting involves the use of cloud for computing, managing and for storing the information. Here the research have proposed and attached the advantages of the supportive features device like smartphones and fog computing to process the awareness of accident detection and the system for reporting it And this has been termed has Emergency Response and Disaster Management System (ERDMS). Even the Android applications uses an sensor for detecting the accidents. And when an accidents have been detected, nearby hospitals will be located using GPS based system and the information is given to the hospital and there by an ambulance will be directed to the spot of an accident and even information’s will also be sent to the family members and the relatives in addition to inform. And all the computations will be performed by fog nodes located nearby. In further also they may plan to process the completion of ERDMS.

This paper [4] describes, “Road Safety System for Fog Using PLC”, Mainly the road accidents occurs due to the climatic conditions and mainly due to the fog there been a greater number of accidents which may cause in the occurrence of death, heavy injuries etc. Here a system has been developed using the PLC to reduce the road crash and accidents and prevent. That is the number of vehicles will be counted in such foggy areas that enter and that

vehicles would pass through all the sensors and when there is a lesser number of vehicles entered it is considered as wrong and an alert will be processed and the signal will be red. Then automatically the doors will be closed in order to stop other vehicles to enter inside. This may provide the avoidance of accidents and vehicle crashes. It is mentioned that road safety system is very well designed and develop in case of preventing the accidents. In future the actual systems would be enhanced using more fog sensors in highways where the fog is presented.

In this paper [5], they have described about the “vehicle tracking and accidents alert system”. Here this system is generated to decrease the chances of losing life’s when an accident occurs. By using an GPS system and GSM device it is used to track the vehicles when some incidents occur. The main purpose of vehicle tracking is to give security and protection to the vehicles whereas the main purpose of accident alert system is to save people from accidents. GPS is used nowadays because it works on all the climatic conditions. Here they have mentioned the when a vehicle is been tracked a message has to send to the GSM device and thus it will be activated. And it will also get activated when an accident occurs by using shock sensor that has been connected to the vehicles. when GSM get activated it takes the locations and sent the message to the particular number or device that is predefined in the program After the message has been sent to that predefined device, the GSM will get deactivated and whereas GPS will be activated. In future this system will be very much useful in day-to-day life to decrease the chances of losing life’s and save them from the incident.

This idea is based on “Accident Detection and Alert System” [6], Nowadays the rate of accidents is drastically increasing due too over speed, foggy weather conditions etc. So, in order to control and avoid the accident and vehicle from crashes an automatic alert system is proposed. Here when an accident occurs a message will be sent to the registered mobile number using GSM device. The accidents are detected by a vibration sensor which is used as a major part in this system. Nowadays GPS is used as a main system in identifying and notifying the particular accident spot. And then it also gives an information to nearby medical centres and the location is also shared. In future, by increasing the technologies even an alert system can be proposed even to stop the vehicle to overcome the accidents that occur.

This paper describes about the “Vehicle Navigation and Accident Identification in Foggy Weather Condition using GSM and GPS” [7], Regardless there are many technological innovations available nowadays in vehicle safety, there occurs many accidents due to several reasons namely over speed, drunk and bad weather conditions like snow fall, rainy and mainly because of bad foggy weather there occurs several accidents. In order to avoid accidents and protect the vehicles from crashes, Accident Detection System is introduced and it uses the system based on GPS and GSM device .Here the collision avoidance system is also proposed to operate the weather conditions using the humidity sensors. when the weather condition is bad an warn signal will be alerted to the driver. And in addition, ultrasonic sensors are also placed in all the directions of the vehicle in order to find the barriers that occurs. In case if any barrier occurs, an warn and alert signal will be given to the driver. When the accidents occur the location of that spot will be informed to nearby hospitals or medical Centre’s using the GPS system and GSM Device and the ambulance will be sent to that particular spot in order to save them from huge injuries and decrease the chances of losing lives. This idea is based to avoid early accidents which is caused by very bad weather conditions. In future many advanced technologies would be enhanced to avoid accidents and protect the vehicles from road crashes etc.

IV. CONCLUSION:

Finally, this Collision Detection System in Fog will alert the drivers and detect the vehicles and prevent collision of vehicles in dense fog. The survey provides various information to accomplish this Collision Detection System and suggested many ideas to do in this system. The alert system helps people to identify the location and immediately take necessary precautions before any severe occurrence. The following system can be still improved in various ways using various algorithms and techniques.

V. REFERENCE:

- [1] Amandeep Singh and Dr. Hemant Sood, "A Review on Influence of Fog on Road Crash", National Institute of Technical Teachers training & Research, Chandigarh, 2017.
- [2] Anil Kumar Gupta, Gaurav Wable and Tarun Batra, "Collision Detection System for Vehicles in Hilly and Dense Fog Affected Area to Generate Collision Alerts", Centre for Development of Advanced Computing, Pune, 2016.
- [3] Bilal Khalid Dar and Munam Ali Shah, "Delay-Aware Accident Detection and Response System Using Fog Computing", COMSATS University Islamabad, Pakistan, 2019.
- [4] PawanKumar Deoram Salve and Rushikesh Baban Antre, "Road Safety System for Fog Using PLC", SND COE & RC YEOLA, Maharashtra, 2019.
- [5] Kommineni Rakesh and Munshi Nurul Islam, "Vehicle Tracking and Accident Alert System", National Institute of Technology, Rourkela, 2014.
- [6] Kalyani and Monika, "Accident Detection and Alert System", 2019.
- [7] Iyyappan and Deepak, "Vehicle Navigation and Accident Identification in Foggy Weather Condition using GSM and GPS", Jain Engineering College, Vellore, 2015.