EMBEDDED SYSTEM BASED EFFICIENT ACCIDENT DETECTION IN VANET

[1]A.Arul Prasath, [2]S.Vijay, [3]S.Praveen Kumar, [4]P.Mukunthan, [5]S. Kirthivasan
[1]Assistant professor of CSE, Dhirajlal Gandhi College of Technology, Salem, Tamil Nadu, 636309
[2] IV year department of CSE, Dhirajlal Gandhi College of Technology, Salem, Tamil Nadu, 636309
[3] IV year department of CSE, Dhirajlal Gandhi College of Technology, Salem, Tamil Nadu, 636309
[4] IV year department of CSE, Dhirajlal Gandhi College of Technology, Salem, Tamil Nadu, 636309
[5]IV year department of CSE, Dhirajlal Gandhi College of Technology, Salem, Tamil Nadu, 636309

Contact E-mail: praveensrini75@gmail.com

***Abstract* – In the current ever-growing traffic, security is one of the biggest reason during traveling time. It is designed to send out an alert message in case the vehicle has met with an accident. Our design of the system uses a vibration sensor to detect the abrupt vibrations from the occurrence of an accident. This accident detection and messaging system is composed of a GPS receiver, a microcontroller and a GSM modem. This enables the monitoring of the vehicle and in the event of an accident; it can immediately be intimated to the nearby hospital.**

***Keywords:* Accident Detection, GPS, GSM, Location finding, SMS.**

I. INTRODUCTION

The high demand of vehicles has also increased the traffic and the road accidents. Life of the people is under high risk. This is because of the best emergency facilities not available in our country. An automatic alert system is used for vehicle accidents is introduced in this paper. The system which can detect the accidents in less time and sends the information by message to hospital within a few seconds covering geographical coordinates, the time in which a vehicle accident had occurred. The alert message is sent to the nearby hospital in a short time so that the hospital will inform to the ambulances which are near to that location, which will help in saving the valuable lives. When the accident occurs the alert message is sent automatically to the hospital. The message is sent with the help of GSM module and the location of the accident is detected with the help of the GPS module. The accident can be detected with the help of vibration sensor and send through RF sensor.

II. OBJECTIVE

The objectives of this project are to design the circuit that can improve safety of vehicle, to develop a smart safety for complete rider. This embedded system consist of communication module, which enable the drive the driver to stop the vehicle in abnormal condition. If meet any accident it will intimate to nearby hospital of the location was by SMS.

III. LITTERATURE SURVEY

Intelligent Accident Detection and Alert System for Emergency Medical Assistance

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 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 and vibration sensor, through wireless. The Android application in the mobile phone will sent text message to the nearest medical center and friends. Application also shares the exact location of the accident that can save the time

The motor vehicle population is growing at a faster rate than the economic and population growth. Accidents and the death rate due to road accidents, especially two wheelers are also increasing at an alarming rate. Most of the accident deaths that happens are due to the lack of immediate medical assistance, on the roads like express highways. A facility for providing immediate medical assistance to the accident area can reduce the fatality to a greater extend. Thus comes the idea of an alert system that senses the accident and its seriousness to alert the nearby medical center for providing ambulance or medical aid to the accident area.

Automated Accident Alert

The advent of technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. Our will provide an optimum solution to this drawback. According to the paper when an accident occurs the sensor will detect the values and send to the controller. Once the threshold crosses it will send the alert message to control station or rescue team via RF module. So the rescue team (ambulance vehicle) can immediately trace the location necessary action will be taken.

The high demand for automobiles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. An automatic alert device for vehicle accidents is introduced in this paper. This system will automatically detect the accident within a limited time and the message which includes the basic information like vehicle id and location details including latitude and longitude. This alert message will transmit near to rescue team immediately.

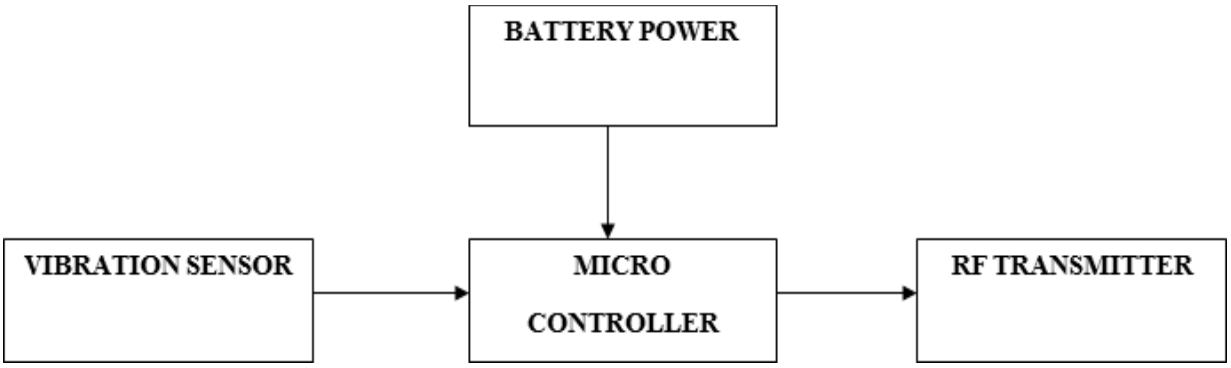
When the accident occurs the alert message sent automatically to the hospital and to the ambulance. The message is sent through the RF module and the location of the accident is detected with the help of the GPS module. The accident detected precisely with the help of vibration sensor.

IV. EXISTING SYSTEM

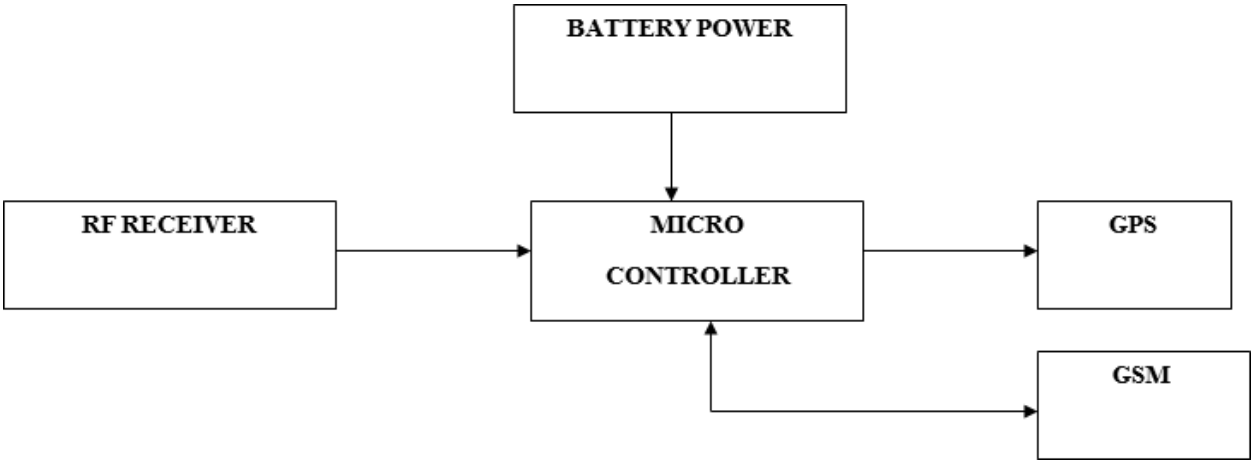
- Toll tax payment is manual system, in which the owner drives in to toll plaza where his/her details such as person's identification and car number are collected.
- These details are digitally entered and permission is given to pass the toll gate.
- Usually the accidents are intimated to the respective disciplines by the people present at the scene or the victim itself. Hence there have been studies which would denote how the accidents could be informed by any means of automation.

V. SYSTEM ARCHITECTURE

RF Transmitter



RF Receiver



This module contains sensors and a transmitter. Microcontroller contains sensors which are vibrate sensor, GPS, GSM, battery power. Vibrate sensor is utilized for crash location. A RF transmitter which can transmit information from any controller or standard Encode IC has been utilized. The RF transmitter transmits information from the microcontroller on the moving vehicle and through ambulance. It will receive by RF receiver through IC.

VI. METHODS

Power supply:

The electrical power is almost used everywhere, and is transmitted and distributed in the form of ac supply because of less economical but all the electronic devices and circuits, use only dc power supply . Dry cells and batteries can be used for the purpose. Almost all electronic equipment and circuit that converts ac supply into dc power supply. In the circuit one part will help to converts ac into dc is called DC power supply.

Micro controller (PIC16F877A):

Peripheral Interface Controller (PIC) is microcontroller it is developed by Microchip, PIC microcontroller is fast and easy to implement program. When we compare with other microcontrollers like pic16f877a. It is ease to write programming and easy to interfacing with other peripherals PIC became successful microcontroller. A microcontroller is an integrated chip which consists of RAM, ROM, CPU, TIMERS, and COUNTERS and also PIC is a microcontroller which also consists of RAM, ROM, CPU, timers, counter, ADC, DAC.

Vibration sensor:

A signals from an accelerometer, it will use to detect a severe accident. According to this project when a vehicle meets with an accident immediately a Vibration sensor will detect it and the detected signal will sends it to PIC microcontroller through the help of RF sensor and the receiver send message to hospital.

GPS:

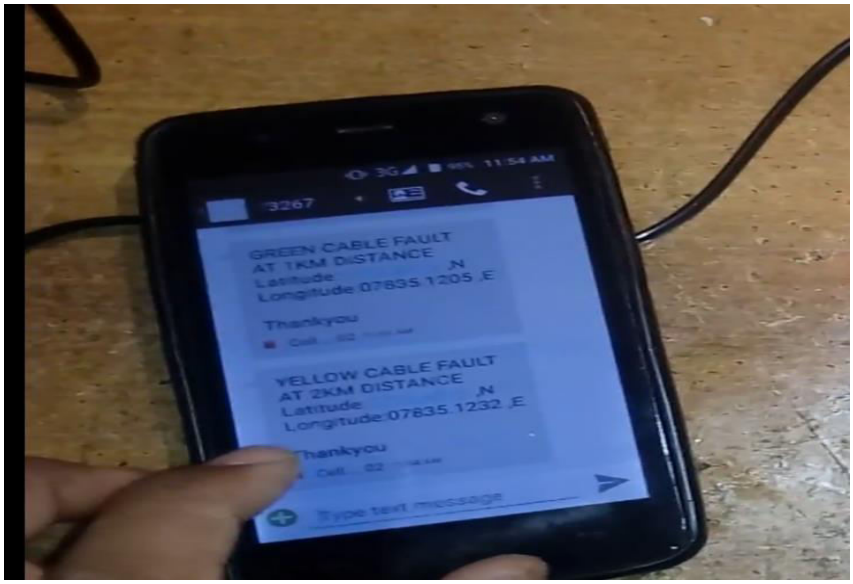
GPS is used for both tracking and navigation on vehicles. Tracking systems will help to track the vehicles without the intervention of the driver where, as navigation system will helps the driver to reach the correct destination. The navigation system will use to convenient, display for the driver which is not used as a tracking system. When the rider met with an accident through GPS location can be tracked.

GSM:

There are various type of GSM module are available in the market. SIMCOM developed different frequencies module they are 800MHz, 850MHz, 900MHz, 1800MHz, and 1900MHz. We select SIM900a module for the proposed work. It is compact easy plug in module.

VII. RESULT

The exact accident location is detected by using microcontroller .It detect the latitude and longitude using GPS and SMS is send to the hospital using GSM. The SMS can be viewed in mobile phone. By using this exact location of the accident it is easy for the ambulance to save the person immediately.



VIII. CONCLUSION

Thus by having this prototype in place we can address an unexplored area of security and safety and thereby contribute towards reducing the death toll numbers which are caused due to road accidents. Our prototype would help accelerate the response from the concerned team thereby resulting in a quicker addressing to the victims of the accidents.

REFERENCES

[1] Kattukkaran, N., George, A., & Haridas, T. P. M. "Intelligent accident detection and alert system for emergency medical assistance". International Conference on Computer Communication and Informatics.year.2017.
[2] Shanmugasundaram, G., Anil, A., Deepak, S., & Ahmed, F. "Smart accident alert and toll pay system". Fourth International Conference on Signal Processing, Communication and Networking. Year, 2017.
[3] Dhanya, S., Ameenudeen, P. E., Vasudev, A., Benny, A., & Joy, S. "Automated Accident Alert". International Conference on Emerging Trends and Innovations in Engineering and Technological Research. Year, 2018.
[4] Chen, L.-B., Su, K.-Y., Mo, Y.-C., Chang, W.-J., Hu, W.-W., Tang, J.-J., & Yu, C.-T. "An Implementation of Deep Learning based IoV System for Traffic Accident Collisions Detection with an Emergency Alert Mechanism". IEEE 8th International Conference on Consumer Electronics - Berlin. Year, 2018.
[5] Devi, B., Bavatharini, S. S., Samyuktha, G., Shobica, S., & Sonia, E. "Voice Alert for Accident Avoidance on Merging Lanes, Blind Curves and T Junctions". Second International Conference on Electronics, Communication and Aerospace Technology.year.2018.
[6] Kodali, R. K., & Sahu, S. "MQTT based vehicle accident detection and alert system". 3rd International Conference on Applied and Theoretical Computing and Communication Technology. Year, 2017.
[7] Sherif, H. M., Shedid, M. A., & Senbel, S. A. "Real time traffic accident detection system using wireless sensor network". 6th International Conference of Soft Computing and Pattern Recognition. Year, 2014.
[8] [asheer, F. B., Alias, J. J., Favas, C. M., Navas, V., Farhan, N. K., & Raghu, C. V. "Design of accident detection and alert system for motor cycles". 2013 IEEE Global Humanitarian Technology Conference: year,2013.
[9] Ksiksi, A., Al Shehhi, S., & Ramzan, R. "Intelligent Traffic Alert System for Smart Cities". 2015 IEEE International Conference on Smart. Year, 2015.

AUTHORS(S) BIOGRAPHY

Mr. A. Arul Prasath, Assistant Professor in the Department of CSE in Dhirajlal Gandhi college of Technology, Salem. He has completed his Master of Engineering.

Mr. S. Vijay, pursuing final year in Bachelor of Engineering in the department of CSE in Dhirajlal Gandhi college of Technology, Salem. His area of interest is Networking and Hardware.

Mr. S. Praveen Kumar, final year student in the Bachelor of Engineering in the department of CSE in Dhirajlal Gandhi college of Technology, Salem. His area of interest is Webpage Development.

Mr. P. Mukunthan, final year student in the Bachelor of Engineering in the department of CSE in Dhirajlal Gandhi college of Technology, Salem. His area of interest is Animation.

Mr. S. Kirthivasan, final year student in the Bachelor of Engineering in the department of CSE in Dhirajlal Gandhi college of Technology, Salem. His area of interest is Hardware Development.