



# International Journal of Innovative Research in Computer and Communication Engineering

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## IoT Based Vehicle Tracking and Accident Detection System

<sup>1</sup>E Krishna Priya, <sup>2</sup>P Manju, <sup>3</sup>V Mythra, <sup>4</sup>S Umamaheswari

<sup>1,2,3</sup> UG Scholar, Department of Computer Science and Engineering, Kumaraguru College Of Technology, Coimbatore, Tamilnadu, India.

<sup>4</sup>Assistant Professor , Department of Computer Science and Engineering, Kumaraguru College Of Technology, Coimbatore, Tamilnadu, India

**ABSTRACT:** The rapid growth of technology and infrastructure has made our lives easier. 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. The accident detection project will provide an optimum solution to this drawback. An accelerometer can be used in a car alarm application so that dangerous driving can be detected. It can be used as a crash or rollover detector of the vehicle during and after a crash. With signals from an ultrasonic sensor, a severe accident due to an obstacle can be recognized. When a vehicle meets with an accident or if a car rolls over, the accelerometer and ultrasonic sensor detects the signal and immediately sends it to microcontroller. Microcontroller sends the alert message through the GSM module including the location to police control room or a rescue team. So the emergency help team can immediately trace the location through the GPS module, after receiving the information. The location can also be viewed on Google maps. After conforming the location necessary action is taken. If the person meets with a small accident or if there is no serious threat to anyone's life, then the alert message can be terminated by the driver by a switch provided in order to avoid wasting the valuable time of the medical rescue team. This project is useful in detecting the accident precisely by means of both accelerometer and ultrasonic sensor. As a future implementation a wireless webcam can be added for capturing the images of the accident scene.

**KEYWORDS:** Microcontroller; GSM; GPS; Ultrasonic sensor; Accelerometer; Accident.

### I.INTRODUCTION

The high demand of 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 alarm device for vehicle accidents is introduced in here. The proposed design is a system which can detect accidents in significantly less time and sends the basic information to first aid centre within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team.

When the accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of accelerometer and ultrasonic sensor. The angle of the roll over of the car can also



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be known by accelerometer. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way.

## II.LITERATURE SURVEY

Kiran Sawant et al., created an accident alert system using GSM and GPS modem and Raspberry Pi. A piezoelectric sensor first senses the occurrence of an accident and gives its output to the microcontroller. The GPS detects the latitude and longitudinal position of a vehicle. The latitudes and longitude position of the vehicle is sent as message through the GSM. The static IP address of central emergency dispatch server is pre-saved in the EEPROM. Whenever an accident has occurred the position is detected and a message has been sent to the pre-saved static IP address[1].

Mrs Manasi Patil et al., described a better traffic management system using Raspberry pi and RFID technology. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. When an accident occurs the value of one of the sensor changes and a message to a predefined number (of the ambulance) is sent through GSM. The GPS module which is also interfaced with the controller also sends the location of the vehicle. When the message is received by the ambulance, a clear route has to be provided to the ambulance. The ambulance has a controller ARM which is interfaced with the RFID tag sends electromagnetic waves. When an ambulance reaches the traffic signal the RFID reader which is placed on the joints detect the electromagnetic waves of the tag. If the traffic signal is red, then the readers goes through the database in fraction of seconds and turn the red light green. And automatically in such condition the RFID on opposite joints turn the opposite signal red. This provides a clear route to the ambulance. [2].

V.Sagar Reddy et al., developed an accelerometer based System for driver safety. The system has the advantage of tracking or identifying vehicles location just by sending a SMS or email to the authorized person. The system is designed by using Raspberry Pi (ARM11) for fast access to accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. Images captured by the camera on the vehicle are emailed to the concerned person (for example the owner of the vehicle) along with the type of accident and the time of the accident. [3].

Sri Krishna Chaitanya Varma et al., proposed an Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. AT89C52 microcontroller is used in the system. When the system is switched on, LED is ON indicating that power is supplied to the circuit. When the IR sensors that are used sense any obstacle, they send interrupt to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information is sent to a mobile number as a message. This message is received using GSM modem present in the circuit. The message gives the information of longitude and latitude values. Using these values the position of the vehicle can be estimated[4].

Apurva Mane et al., described the methods for vehicle collision detection and remote alarm device using Arduino. Key features of this design include real-time vehicle monitoring by sending its information regarding position (longitude, latitude), time, angle to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft occurs. Also user/owner has an access to get real-time position of a vehicle in real time. Whenever accident occurs MEMS and vibration sensor detects and sends the signals to microcontroller, by using GPS particular locations where accident has occurred is found, then GSM sends message to authorized members. [5].

Prof.Mrs.Bhagya Lakshmi V et al., proposed a FPGA Based Vehicle Tracking and Accident Warning system using GPS. FPGA is mainly used to track position of any vehicle and send automated message to pre programmed number. The owner of vehicle, police to clear traffic, ambulance to save people can be informed by this device. FPGA controls and co-ordinate all parts used in system. With the help of accelerometer sensor, the exact position of the vehicle can be detected. It can also be predicted whether the vehicle is in normal position or upside down[6].



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## **III.SUMMARIZATION**

With the advent of science and technology in every walk of life the importance of vehicle safety has increased and the main priority is being given to reduce the accident detection time when an accident occurs, so that the wounded lives can be attended in lesser time by the rescue team. The Microcontroller along with ultrasonic sensor, accelerometer, GPS and GSM modules shorten the alarm time to a large extent and locate the site of accident accurately. Consequently, the time for searching the location is reduced and the person can be treated as soon as possible which will save many lives. This system will have broad application prospects as it integrates the positioning systems and the network of medical based services. In the existing accident detection systems there is the problem of false alarms or situations where immediate help is not necessary. In such cases the driver must be able to manually switch off the alert system and stop the sending of message.

## **IV.PROPOSED SYSTEM**

The aim of the system is to create a smart accident detection system using that detects the occurrence of an accident and sends a message to the traffic control authorities or emergency help centres in case of an accident so that immediate help can be provided. It also enables real-time tracking of vehicle's location via SMS. The system has a switch to enable driver to stop alert system in case of false alarms. This system acts as a black box to vehicles. The vehicle's location can be viewed using Google maps which is much more easier than location in terms of latitude and longitude.

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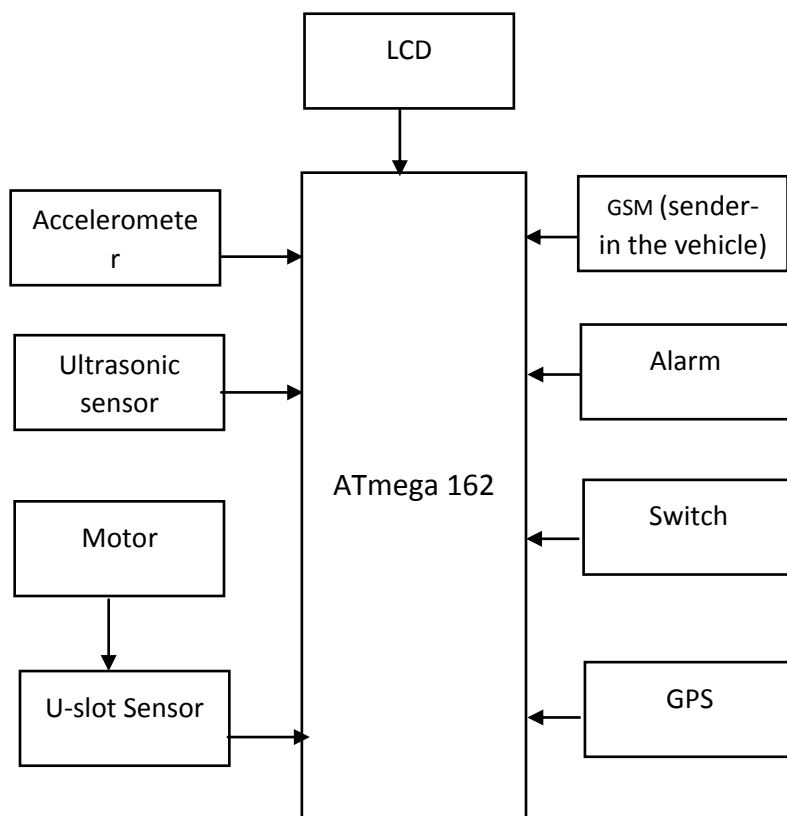
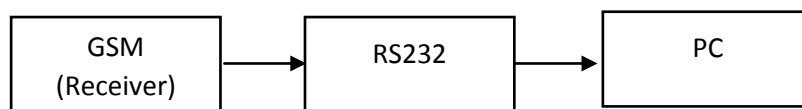


Fig.1.Architecture



The development environment for the system software is Windows 7 and Embedded C code is used. The Flow Chart of the system is shown in the figure 2. It shows the system is initialized on power ON. When the system is detected to be abnormal, it is confirmed that the accident has occurred. The vibration/acceleration of the vehicle is detected to confirm the cause of the accident. As soon as the accident is detected the buzzer (alarm) is ON. The switch is scanned first; if it is a



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minor accident then the switch is ON so that messaging is terminated. If it is a major accident, the switch remains OFF and the message is sent automatically to the rescue team.

## Accident Detection Module

All other components like the ultrasonic sensor, accelerometer and GPS and GSM modules are connected via Atmega 162 microcontroller. The code for the working of this system is written in C. The LCD screen displays short messages to keep track of the working of the system. The alarm is triggered when an accident is detected. Accelerometer is used to detect crash or rollover of the vehicle and sends signals when an accident occurs to the microcontroller. The ultrasonic sensor detects whether or not the accident occurred due to an obstacle.

## Location Detection Module

GPS - Global Positioning System Module is used in vehicles for both tracking and navigation. Tracking systems enable a base station to keep track of the vehicles without the intervention of the driver where, as navigation system helps the driver to reach the destination. Whether navigation system or tracking system, the architecture is more or less similar. When an accident occurred in any place then GPS system tracks the position of the vehicle and sends the information to the particular person through GSM by alerting the person through SMS or by a call. As an additional option, the location detection can be done using Google maps interface.

## SMS Module

GSM – Global System for Mobile Communication Module is used as a media which is used to alert emergency facilities from anywhere by sending an SMS message. It is also highly economic and less expensive; hence GSM is preferred most for this mode of communication.

## Alarm and Switch

A **buzzer** or **beeper** is a signaling device; it gives an audible warning when an accident occurs. If it is a false alarm or if the driver feels that he does not need immediate help, there is a switch in the system that he can use to stop the working of the system.



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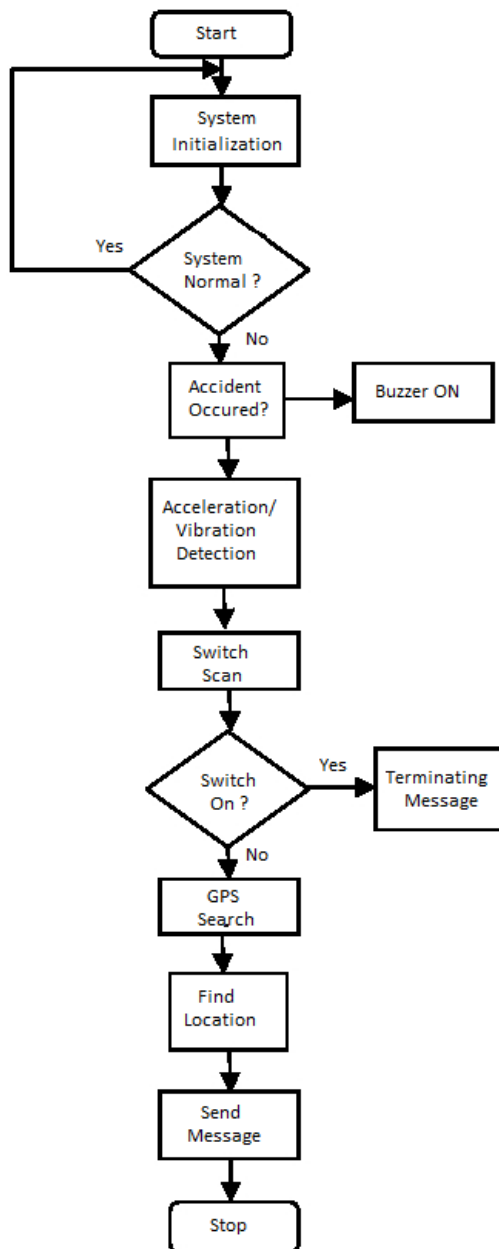


Fig.2.Process flow diagram



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## V.CONCLUSION

Hence the automatic alarm device for vehicle accidents has been implemented using AtMega162 microcontroller. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid centre within a few seconds covering geographical coordinates, the time in which a vehicle accident has occurred. The switch provides the driver a chance to cut off emergency help systems in case the system triggers a false alarm or if the accident is not very severe and immediate help is not required. The additional Google maps interface also makes the viewing of the location easier. Additional applications of this concept are Stolen Vehicle Recovery, Fleet Management, Asset Tracking, School bus tracking for safety of children and to keep tab on drivers.

## REFERENCES

- [1] Kiran Sawant, Imran Bhole, Prashant Kokane, Piraji Doiphode, Prof. Yogesh Thorat, "Accident Alert and Vehicle Tracking System", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 4, Issue 5, May 2016.
- [2] Mrs Manasi Patil, Aanchal Rawat, Prateek Singh, Srishtie Dixit, "Accident Detection and Ambulance Control using Intelligent Traffic Control System", International Journal of Engineering Trends and Technology (IJETT), Volume 34-Number 8, April 2016.
- [3] V.Sagar Reddy, Dr.L.Padma Sree, V. Naveen Kumar, "Design and Development of accelerometer based System for driver safety", International Journal of Science, Engineering and Technology Research (IJSETR), Volume 3, Issue 12, December 2014.
- [4] 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.
- [5] Apurva Mane, Jaideep Rana, "Vehicle Collision detection and Remote Alarm Device using Arduino", International Journal of Current Engineering and Technology, Vol.4, No.3, June 2014.
- [6] Prof.Mrs.Bhagya Lakshmi V, Prof.Savitha Hiremath, Prof.Sanjeev Mhamane, "FPGA Based Vehicle Tracking and Accident Warning using GPS", International Journal of Scientific & Engineering Research, Volume 5, Issue 2, February-2014.