

## IOT Based Accident Detection and Vehicle Tracking System Using GPS and GSM Module

Ahay Khattar<sup>1</sup>, Pratim Sarkar<sup>2</sup>, J.Selvin Paul Peter<sup>3\*</sup>

<sup>1,2</sup> Student, Department of CSE, SRMIST, Tamil Nadu – 603203

<sup>3</sup> Assistant Professor, Department of CSE, SRMIST, Tamil Nadu – 603203

<sup>1</sup> ahaykhattar2016@gmail.com, <sup>2</sup> pratims619@gmail.com, <sup>3</sup> selvinpj@srmist.edu.in

### Abstract

*With the increase in technology and motor vehicle production the number of road accident has increased. The survival rate after accident is very low as proper emergency facilities are not available. Our project would help in detecting an accident and determine its location and the location is dispatched to rescue team and emergency contacts of the rider. The existing models are not reliable as they use vehicle distance between two vehicle provided by certain sensors and does not show concern about speed. Very slow emergency facility can also be a drawback that can be solved by our model.*

**Keywords:** IOT, Accident detection, GSM, GPS sensor.

### 1. Introduction

With the advancement in the automobile industry, the accidents and other hazards are also increasing due to huge number of traffic. Our lives are under high risk. In our country, with the lack of emergency rescue service, many people loose their life because of accident.

Our project will help solving this problem by ensuring immediate emergency service after an accident. Our system uses GPS module to detect the accident spot and uses the GSM module to pass the message to rescue team and relatives. Since, it is a real time application and it would save valuable lives.

Our project helps in detecting and tracing an accident. The mechanism is installed on the car. When the car is running normally i.e. no accident has yet occurred then no information is sent to emergency team. In the occurrence of an accident, the vehicle changes its orientation and produces a different spectrum of waves and consequently increasing the frequency. MEMS sensor identifies the abnormality within the car. The controller receives data from a large number of sensor, then sends the alert message to recoverygroup and the emergency contacts which are preconfigured along with the location where the accident has occurred, this is done through GPS module. Te System identifies the closest hospital and provide guidance through IOT.

## 2. Literature Survey

In the present scenario, we are unable to identify the place of the accident and data related to the death of the individual. There is intensive research going on for tracking vehicles within the dark and clumsy areas where the network reception is poor. In literature, a plethora of approaches are being looked into to that deals with security and safety through monitoring the automobile at real time and exact positioning and knowledge using a plethora of technologies. [1]

A remarkable study of using GPS, GSM and GIS has been supplied in [2,3]. Generally, the mechanism to supply the simultaneous and concurrent time geographical positioning of the vehicle using GPS receiver and transmit the information using GSM via configurable software, this is often done by the command center which is working as a control unit, that is handled by an optical cable and also-joined wirelessly through TCP/IP protocols. [3]

The supervising center dispenses the information to the client in an easy to understandable format, in the same time records the history of travel and displays information about the concurrent positioning on an electronic map through GIS system [2]. We could also include a GPS receiver at the terminal of the vehicle which has GPS receiver which prints information about positioning through GPS satellites and transmit via GSM and to control and command center for reading. [4]

## 3. Proposed System

In this paper we intend to integrate software and hardware blocks to develop a working model for IOT Based Vehicle accident Detection and Rescue system. Our coding is done in Arduino IDE. The tinygps++ header file is used for the coding part. We used embedded C language. GPS module is used to detect accident location. The GSM module send's message to the nearest hospital and the driver's relative.

We used Arduino as the microcontroller. The accelerometer sensor is used to detect the speed of the car. When the acceleration and de-acceleration of the car goes beyond its range, the accelerometer senses it. It immediately sends information to the microcontroller and it awakes the GPS module. The GPS module detects the accident spot and GSM module sends text message of the Google map location. An ambulance is directed to the spot for rescue.

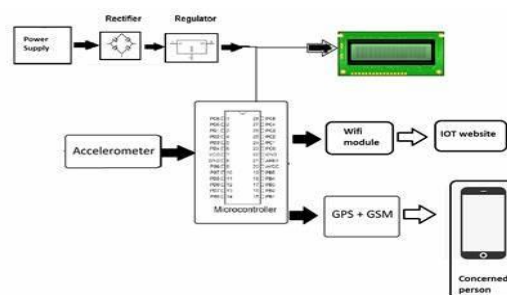


Figure 1. Architectural Diagram

## 4. Implementation

The information from the sensor is obtained by the microcontroller and processed. We used Arduino Uno and it is based on Atmega328p microcontroller. The CPU is Microchip AVR (8-bit) and RAM type is SRAM. The microcontroller obtains all the information from the MEMS sensor and acts accordingly.



**Figure 2. Micro-controller**

It has storage and processing capability which helps it to integrate with the sensors with minimum load during running. It has higher on-chip integration for minimum circuit configuration. Its main function is to detect the location of accident and get its direction on google maps. Its information gets coupled to the microcontroller and is fed to GSM module for sending message.



**Figure 3. GPS Module**

Since, various networks have various frequency range, thus GSM module can work at various carrier frequency ranges. The range of GSM is generally from 900MHz to 2 to 8 GHz. The use of 4G sim for transmission of message requires 2-8 GHz range of frequency. The duration of is 270.833 and 4.615ms. The mobile station is carried by the subscriber and therefore the radio transmission link with the mobile station is controlled by the subsystem.



**Figure 4. GSM Module**



**Figure 5. Message Alert to the families and emergency service**

After the occurrence of an accident the above message is sent to the registered mobile no. of the relatives of the driver. This message includes the correct google location of the accident spot.

## 5. Conclusion

Our proposed system uses Arduino uno for detecting accident spot and send message to relatives and rescue system. It uses the IOT and it revolutionizes the way in which our model interacts and helps in controlling traffic. We use GPS module to identify exact spot of accident and GSM module to dispatch messages to the emergency contacts. We believe that the way of system interaction can be revolutionized by IOT and various applications of traffic control can be responded. Our system can be combined with vehicle airbag system to prevent vehicle riders to hit inside objects like steering wheel and window. One more addition can be done to attach a camera to the system that would click photo of spot of accident for more precise location of the system and also help in claiming the insurance and suggest the cause of the accident.

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## Authors



**Abhay Khattar**, is a B. Tech. Computer Science and Engineering student from SRM Institute of Science and Technology. I am currently in 8th semester. I have scored 95% in class 10th and 93.4% in class 12th. I have done internships in the field of Internet of Things. I have a keen interest in Data Science, Big Data Analytics and Cybersecurity.



**Pratim Sarkar**, is a B. Tech. Computer Science and Engineering student from SRM Institute of Science and Technology. I am currently in 8th semester. I have scored 95% in class 10th and 93.2% in class 12th. I have done internships in the field of Web Development. I have a keen interest in Software Development.



**Dr. J Selvin Paul Peter**, is an Assistant Professor in the department of Computer Science and Engineering at SRM Institute of Science and Technology, Kattankulathur. His area of interest is Cloud Computing and Internet of Things (IoT). He has vast experience in academia and Industry. He has published journals and papers and presented in various international and national conferences. He is an active member of professional bodies such as Institution of Engineers and Indian Science Congress Association (ISCA).