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## Accident Alert and Vehicle Tracking System

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**ABSTRACT:** Vehicle accidents are one of the most leading causes of fatality. The time between an accident occurrence and the emergency medical personnel are dispatched to the accident location is the important factor in the survival rates after an accident. By eliminating that time between an accident occurrence and the first responders are dispatched to the scene decreases mortality rates so that we can save lives. One approach to eliminate that delay between accident occurrence and first responder dispatch is to use An Accident Alert and Vehicle Tracking System, which sense when a traffic accident is likely to occur and immediately notify emergency occurred. In this paper, that system is described the main application of which is early accident detection. In this system, initially the GPS continuously takes input data from the satellite and stores the latitude and longitude values in ATmega16 microcontroller's buffer. If we have to track the vehicle, we need to send a message to GSM device, by which it gets activated. It also gets activated by detecting accident on the shock sensor connected to Raspberry Pi. Parallely deactivates GPS with the help of relay .Once GSM gets activated it takes the last received latitude and longitude positions values from the buffer and sends a message to a central emergency dispatch server which is predefined in the program. This system uses the things i.e. Raspberry Pi, Vibration Sensors, GPS and GSM modules to detect traffic accidents.

**KEYWORDS:** GPS Module, Raspberry Pi, Accelerometer ADXL 335.4

### I. INTRODUCTION

The high demand of vehicles 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 system for vehicle accidents is introduced in this paper. The proposed 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 central emergency dispatch server in a short time so that the emergency dispatch server will inform to the ambulances which are near to that location, which will help in saving the valuable lives. A 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 ambulance. When the accident occurs the alert message is sent automatically to the central emergency dispatch server. 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 vibration sensor. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way.

### II. RELATED WORK

Many of the authors explained the vehicle tracking in embedded system. One of them, Benjamin Coifman [1], explained a real-time computer vision system for vehicle tracking and traffic surveillance. R. Ramani, S. Valarmathy, Dr. N. Suthanthira Vanitha, S. Selvaraju, M. Thirupathi, R. Thangam [2] explained Vehicle Tracking and Locking System. Their paper proposed a novel method of vehicle tracking and locking systems used to track the stolen vehicle by using GPS and GSM technology.

Kunal Maurya, Mandeep Singh, Neelu Jain [3] explained the vehicle tracking system installed in a vehicle to enable the owner or a third party to track the vehicle's place. This design will continuously watch a moving Vehicle and report the status of the Vehicle on demand.

Chen Peijiang, Jiang Xuehua [4] explained the remote monitoring system based on SMS and GSM. System includes two parts that are the monitoring center and the remote monitoring station. The monitoring centers consist of



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a computer and communication module of GSM. The demonstration shows that the system can watch and control the remote communication between the monitoring center and the remote monitoring station.

V.Ramya, B. Palaniappan, K. Karthick [5] explained the system which provides vehicle cabin safety. This system monitors the level of the toxic gases such as CO, LPG and alcohol within the vehicle and provides alert information as alarm during the dangerous situations. The system sends SMS to the authorized person through the GSM. Detection of gases prevents further accidents.

Albert Alexe, R. Ezhilarasie [6] Explained system based on cloud computing infrastructure. In this system sensors are used to monitor the fuel level, driver conditions, and speed of the vehicle. All the data transferred to cloud server –using GSM enabled device. All the vehicles equipped with GPS antenna to locate the place. To avoid the drunk and drive, the alcohol sensor installed to monitor the driver status.

### III. PROPOSED ALGORITHM

- **Pseudo Algorithm :**

Initialization:

1. Lastlon=0, LastLat=0, LastAlt=0, DistTh=0
2. Get new GPS data:  
{Lon, Lat, alt, Speed, hdhop, status}
3. AddNewPoint(GPS data)
4. Go to step 2.

- **Display location on map:**

1. initialize latitude ,longitude to zero
2. initialize marker to null
3. if location is retrieved from server i.e. location = found
4. then show location on Google map API , else
5. fetch location from server

Whenever accident of the vehicle is occurred then the device sends message to given mobile Device.

- **Message for accident :**

“Accident alert  
Latitude: 2400.0090, N  
Longitude: 12100.0000, E  
Time: 12:00”

This system shows the location of vehicle on the LCD connected to it also just to make sure the working condition of the microcontroller.

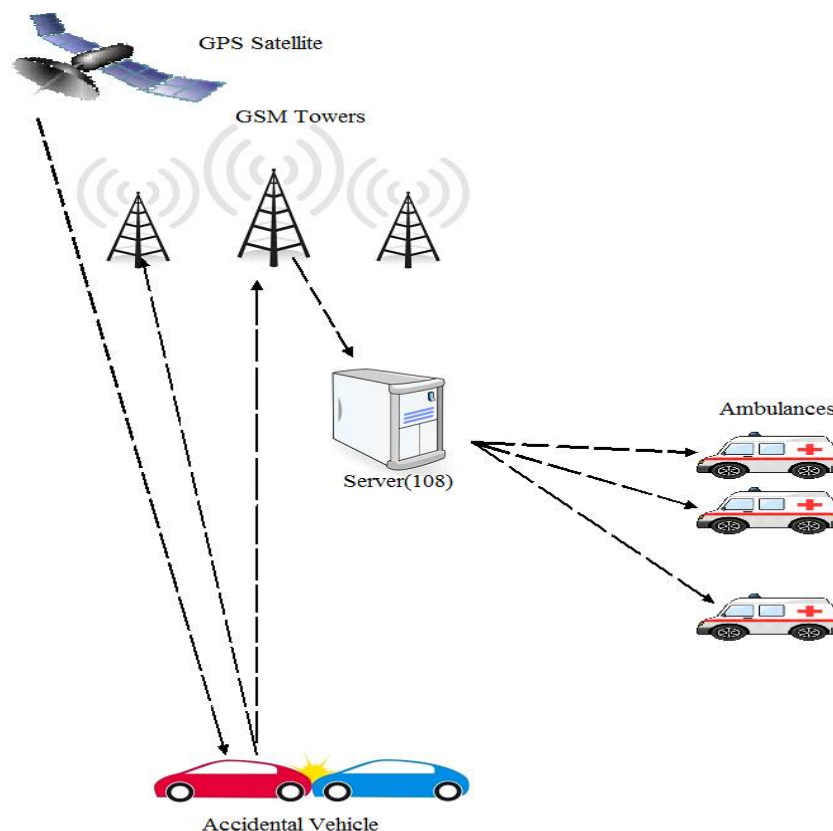
### IV. PROBLEM DESCRIPTION

The Accident Alert and Tracking System is the system which track vehicle current location using global positioning system (GPS).This product gives the live updates of accidental vehicle with their location details. It ensures the vehicle which has got accident to send location details to web server located at emergency ambulance center further that location details of accidental vehicle send to nearby ambulance as well as display it on map.

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**Figure 1:** System Architecture

As per the system architecture, Accident Alert and Tracking System are working same as follows. When the accident will occurred, then the system will direct send the accident alert message along with location details of the accidental vehicle to emergency dispatch sever further it will send that alert message to the nearby ambulance so that it will go to that location. By using system like this we can decrease the mortality rate which is lead by accident.

## V. METHADODOLOGY

This system is a prototype model of Accident Alert and Vehicle Tracking System using GSM and GPS modem and Raspberry Pi working will be made in the following steps:

- A piezoelectric sensor will first sense the occurrence of an accident and give 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.

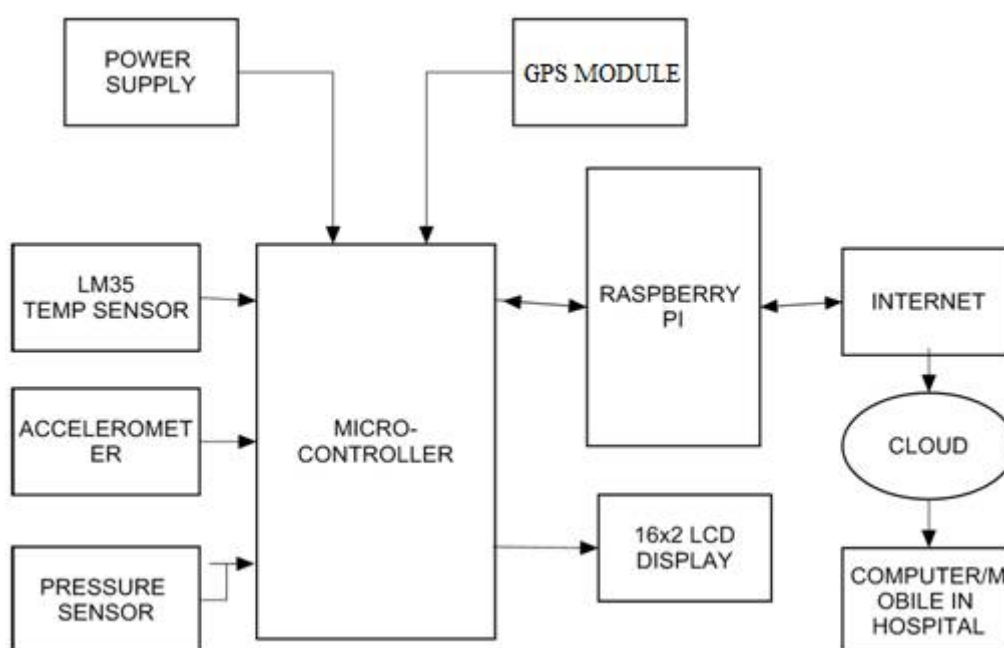
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## VI. SYSTEM ARCHITECTURE

This is the block diagram of vehicle tracking and accident alert system. This shows the overall view of the vehicle tracking and accident alert system circuit. The blocks connected here are LCD display, GPS, GSM, Shock Sensor, Power supply, temperature sensor, accelerometer etc.



### Accident alert & Vehicle tracking system working :-

This system takes input from GPS and which goes into rs232. This Rs232 sends data into max232 and it converts the data format and sends it to the Rx (receiver pin) of microcontroller and this microcontroller stores this data in USART buffer and the data stored is sent again through Tx pin into max232 this max 232 sends the data into GSM via rs232. This is how vehicle tracking works using GSM and GPS. The lcd interfaced to the microcontroller also shows the display of the coordinates. This lcd display is only used to know the working condition of the vehicle tracking system.

Accident in the sense it could be collision of two vehicles or fire accident inside the vehicle. These shock sensors are attached to the car on all sides of the vehicle and they all are connected to the OR gate .OR gate is used because to detect at least one sensor is high .the output from the or gate is connected to the interrupt pin of microcontroller and whenever this pin 12 is high the micro controller sends the message about the accident.

## VII. CONCLUSION

The aim of the paper is to give an overview of vehicle tracking and vehicle accident detection system. This Vehicle accident detection system can track geographical information automatically and sends an alert SMS regarding accident. Experimental work has been carried out carefully. The result shows that higher sensitivity and accuracy. This system is verified to be highly beneficial for the automotive industry.



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