

# Vehicle Tracking and Accident Detection System Using GPS and GSM

K. Venkatesh<sup>1</sup>, N. Bharatkumar<sup>2</sup>, V. Shanmukharao<sup>3</sup>, A. Manikanta<sup>4</sup>, K.Jeevan kumar<sup>5</sup>  
<sup>1,2,3,4,5</sup> B. Tech, Students Department of Electrical and Electronics, AITAM, Tekkali, A.P

**Abstract** - The present generation requires the information time to time. The usage of technology has been increasing extensively from day to day. So, we are planning for combining the present technology with requirement of information and transmission and created “vehicle tracking and accident detection system using GPS and GSM”. In case of an accident it will send an alert message through GSM along with location with the help of GPS module. The distinctive utility of this project is vehicle fall detection, if the rider falls down from the bike its sends message to registered mobile number. Fall detection measurement can be observed by accelerometer. This system is widely used in stolen vehicles, school/college buses and cabs.

## 1.INTRODUCTION

This circuit is designed for tracking the location of vehicles. Most of tracking systems are made by using GPS. This is very simple and cheap. This is a very good method for preventing our vehicles from stolen. This tracking system sends us the geographical coordinates and by using these coordinates we can track our vehicle position on electronic maps using internet. By using these tracking systems, we can share real time information about transportations. this system also used for trains buses.so we can share real time information or position of trains and buses with passengers. Means passengers can see the real time of arriving busses or trains at the platforms on Mobiles. In this system we are using the GSM module for sending the coordinates of vehicle on mobile phone via message. GPS is sending the coordinates continuously in form of string. After reading this string using Arduino extract the required data from string and then sends it to mobile phone using GSM module via SMS. This information is called latitude, longitude, and location URL. GPS used 3 or 4 satellite for tracking the location of vehicle.

An Accelerometer is used to detect the acceleration. It is the main sensor used to detect the accident. Once the accident is detected GPS collect the current position values which include latitude (N or S), longitude (E or W), date and time. The location values are given to microcontroller. Controller gives this information to GSM module. By using GSM module, we can send the message to preprogrammed number.

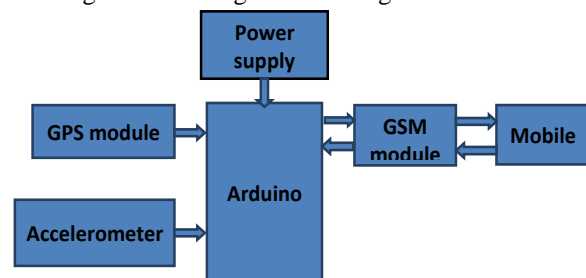
## 2. BLOCK DIAGRAM OF PROPOSED SYSTEM

GPS:

GPS stands for Global Positioning System and used to detect the Latitude and Longitude of any location on the Earth. GPS module is the main component in our vehicle tracking system project. This device receives the coordinates from the satellite for each and every second, with time and date and send it to the arduino.

GSM:

GSM stands for Global System for Mobile Communication. A GSM modem is a specialized type of modem that accepts a SIM card and operates over a subscription to a mobile operator just like a mobile phone. GSM modems are a cost-effective solution for receiving SMS messages because the sender is paying for the message delivery. To perform these tasks, this GSM modem supports an AT command set for sending and receiving SMS messages.



#### Arduino:

The Arduino Uno is a micro-controller board based on the ATmega328. It has 14 digital input/output pins, 6 can be used as PWM outputs, 6 used as analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the micro-controller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The preprogrammed code is stored in this Arduino.

#### Accelerometer:

This Accelerometer module is based on the popular ADXL335 three-axis analog accelerometer IC, which reads off the X, Y and Z acceleration as analog voltages. By measuring the amount of acceleration due to gravity, an accelerometer can figure out the angle it is tilted at with respect to the earth. By sensing the amount of dynamic acceleration, the accelerometer can find out how fast and in what direction the device is moving. The accelerometer is very easy interface to an Arduino Micro-controller using 3 analog input pins and can be used with most other micro controllers, such as the PIC or AVR. In order to sense angular position and acceleration we use the ADXL 335 MEMS based accelerometer. It is a 3-axis system which gives analog output corresponding to the X, Y and Z axis of the orthogonal coordinate system.

### 3. WORKING

The working of the project is explained by using the different components. The components we are using this project is GPS gsm Arduino accelerometer. This module is used to locate the vehicle and also gives the accident location. so we can track the vehicle throughout the journey. We track the vehicle location in form of Latitude and Longitude (GPS coordinates). GPS Coordinates are the value of a location. In this project we are using "Arduino pro mini" model. The GPS gsm and other components are connected to the Arduino. This is the main part for interfacing between the devices. This Arduino takes up to 12v supply from the external devices and it will regulate to the 5v. The working of the Arduino is to store the gps coordinates continuously and sends to the mobile through the gsm when the user needs the vehicle position. The latitude longitude coordinates are stored to the Arduino by

using the gps module. whenever user wants to locate the vehicle then the Arduino sends the message to user using gsm. The operation of Arduino is based on the user code, user provide a phone number in the code for the message alert. This Arduino is used as main microcontroller, when the accident happens, the vibration senses the shock and send it to an Arduino microcontroller, at the same time, with GPS the latitude and longitude of that particular location is obtained. GPS stands for Global Positioning System . GPS module is the main component in our vehicle tracking system project. Gps modem neo-6m is used, this device receives the coordinates from the satellite for each and every second, with time and date. And used to detect the Latitude and Longitude of any location on the Earth, GPS Receiver is used for detecting coordinates of the vehicle and with that the exact location of the accident site is determined. then gsm module is used, gsm stands for Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM module is used for sending the coordinates to user by SMS. AT (attention) commands are used to control the GSM module. The simcard is placed in the simslot of the gsm and here, GSM modem A6 is interfaced with microcontroller. So that, when user sent a message to the gsm then the SMS will be sending automatically to the particular numbers which would be entered in the code. in this project we are also added accident detection system. in accident detection system accelerometer is the main component.

The model of Accelerometer is adxl335. Accelerometer will check shock intensity and the validity of sending message. Accelerometer module is a three-axis measuring device which reads off the X, Y and Z acceleration as analog voltages. By measuring the amount of acceleration due to gravity, an accelerometer can figure out the angle it is tilted at with respect to the earth's the gravity values changes, the change in values are causes to get the accident alert message through the gsm module. The change in analog input to the Arduino, based on the programmed code the user gets an accident alert message.

when we ready with our hardware after programming, we can install it in our vehicle and power it up with a lithium polymer battery 9v. Whenever user wants to know the location of vehicle Then we just need to send a SMS, "Track Vehicle", to the system that is placed in our vehicle. Then the user gets a message which

contains location coordinates along with location URL. If accident occurs, Accelerometer detects the sudden change in the axes of vehicle and GSM module sends the alert message on your Mobile Phone with the location of the accident. Location of accident is sent in the form of Google Map link, derived from the latitude and longitude from GPS module.

#### 4.APPLICATIONS

Used in automotive and transport vehicles from lighter vehicles like cars, to heavier automotive like ships and aero planes. Security and remote monitoring of vehicles especially during military operations. This system is also can be interfaced with Vehicle airbag system such that when the sensors detect the accident, the air bags get opened. School transport vehicle accident detection. This project can be used for cab or car of companies.

Other Applications of this project are:

**Stolen Vehicle Recovery:**

Both consumer and commercial vehicles can be outfitted with RF or GPS units to allow police to do tracking and recovery. In the case of LoJack, the police can activate the tracking unit in the vehicle directly and follow tracking signals.

**SOS Services:**

If the driver or any other person in the car is feeling sick, then he/she can press the SOS switch and call for Emergency Services.

**Fleet Management:**

When managing a fleet of vehicles, knowing the real-time location of all drivers allows management to meet customer needs more efficiently. Whether it is delivery, service or other multi-vehicle enterprises, drivers now only need a mobile phone with telephony or Internet connection to be inexpensively tracked by and dispatched efficiently.

**Asset Tracking:**

Companies needing to track valuable assets for insurance or other monitoring purposes can now plot the real-time asset location on a map and closely monitor movement and operating status.

**Field Sales:**

Mobile sales professionals can access real-time locations. For example, in unfamiliar areas, they can locate themselves as well as customers and prospects, get driving directions and add nearby last-minute appointments to itineraries. Benefits include increased productivity, reduced driving time and increased time spent with customers and prospects.

**Anti-Hijack and Vehicle Security System**

Both consumer and commercial vehicles can be equipped with GPS Tracking system. The presence of a vehicle tracking system helps the police to recover the stolen vehicle by tracking its movement.

**Tracking your possessions and near ones**

GPS Tracking System helps you to keep a track of your car, luggage, valuable possessions, pets and even loved ones. They can be located easily keeping you free of stress and worries.

GPS Tracker can also help you in locating where your child is going late at night

**Oil and Gas Industry**

GPS Vehicle Tracking System helps the oil distributors by monitoring the oil tanker's movements in the given location so that exact time of oil distribution to the customer's oil station can be monitored. Drivers have also the facility to send alert to the fleet managers in case of any emergency / accidents / mishaps etc. This leads to improved asset utilization, customer satisfaction, vehicle and driver safety and safer work environment.

**Ambulance Tracking and Emergency Medical Services**

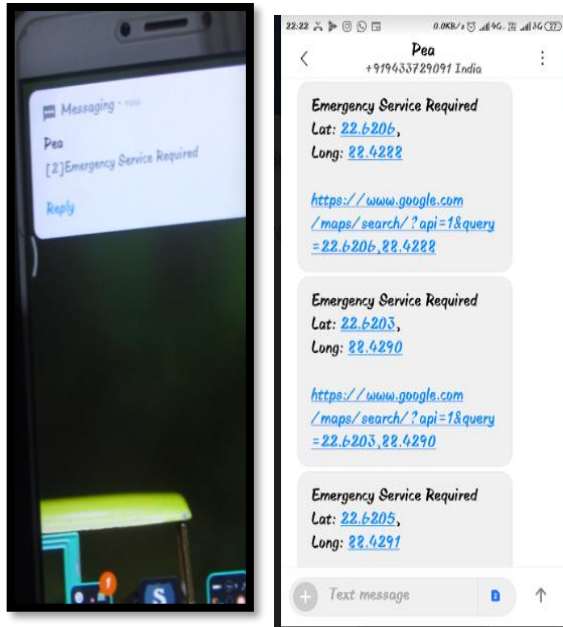
Through GPS vehicle tracking system, ambulances and EMS Fleet can be monitored and sent quickly to the critical patients, thus providing timely medical facility, and saving lives.

#### 5.RESULT

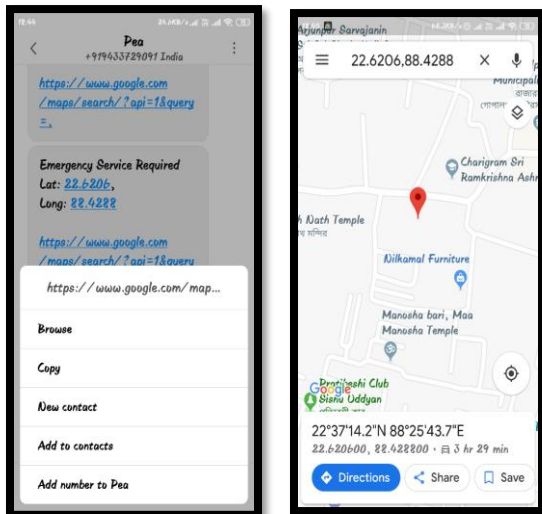
The proposed system is developed to provide the information about the accident occur and the location of the accident. It helps to easily provide the assistant and help to the victim of the accident. This system uses GPS module to locate the vehicle. GSM is used to provide the information of accident. The results of the proposed systems are satisfactory.



Message Received



Location with google map link received, we can browse it and look for directions



## 6.FUTURE SCOPE

- This system can be interfaced with vehicle airbag system that prevent vehicle occupant from striking interior objects such as the steering wheel or window.
- We can reduce the size of the kit by using GSM and GPS on same module.
- It can store the previous navigating positions of vehicle using large size EEPROM.
- This can also be developed by interconnecting camera to controller module that takes the photographs of the accident spot that makes the tracking easier.

## 7.CONCLUSION

Nowadays, the present generation requires the information time to time. this system will give the solution for this problem. most cases of accidents area unit by motor bikes. The severities of those accidents are increased day by day. In some cases, the victims are died because of the poor emergency facilities. this system provides optimum solutions to poor emergency facilities provided to victims in road accidents. This system gives the location of vehicle and also the proposed system is developed to provide the information about the accident occur and the location of the accident. It helps to easily provide the assistant and help to the victim of the accident. This system uses GPS module to locate the vehicle, GSM is used to provide the information of accident and accelerometer is used to detect the accident.

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