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# Real Time Accident Detection and Tracking System using GPS and GSM

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## ABSTRACT

Now-a-days lots of accidents happen on the road due to many causes such as, high speed, drunk & drive, over stress, etc. In many situations, the family members or ambulance & police authority is not informed in time. In present scenario, the GPS is the very important part of a vehicle system. The purpose of this paper is to find the location of vehicle by sending the message using GSM module. The Arduino is the major control unit to detect when an accident occurs. The system will send accident location acquired from GPS. So, the police authority can immediately trace accident spot through the GPS modem and it will help to save human life.
**Keywords :** GPS, GSM, Arduino, Vibration Sensor, LCD, Alert Message.

## I. INTRODUCTION

Always the advancing technology has made our day-to-day lives easier. Transportation has great importance in our daily life[10]. But it can harmful to precious human life and even can kill it through an accident. The present world there are so many vehicles used as transportation it's result every year the number of death is increasing.

Following are the major reasons of an accidents,

- Over speeding
- Over stress
- Drunken drive
- Distraction to driver
- Red light jumping
- Avoiding safety gears like seat belt

This paper Real Time Accident Detection & Tracking system is introduce the main objective is to control the accidents by sending a message to the registered mobile number using wireless communication when an accident is occur[1].

In present days the rate of accidents is increased rapidly. Due to usage of vehicles like cars, bikes and other heavy vehicles can be increased, because of this reason the accidents can be happened due to over speed and other major reasons. People are going under risk because of their over speed and their errors, due to unavailability of advanced techniques, the rate of accidents can't be decreased. To reduce the accident rate, this paper introduces a optimum solution.[7]

In this paper the, Arduino is used as a microcontroller board. GPS & GSM, vibration sensors, LCD display are also used in this paper. Arduino is heart of the system which helps in transferring alert message to different devices in the system. Vibration sensors will be activated when an accident is happen and the information is transfer to registered mobile number through GSM module. GPS system will help in

finding the location an accident spot. At the end of system, LCD screen displays the output.

With this system, a solution is created along with the hardware components so that the information is transferred to the near-by police station or ambulance.

Real Time Accident Detection & Tracking system detects an accident in less time and send information to family members or emergency services which help in saving the valuable lives.[14]

## II. Block Diagram

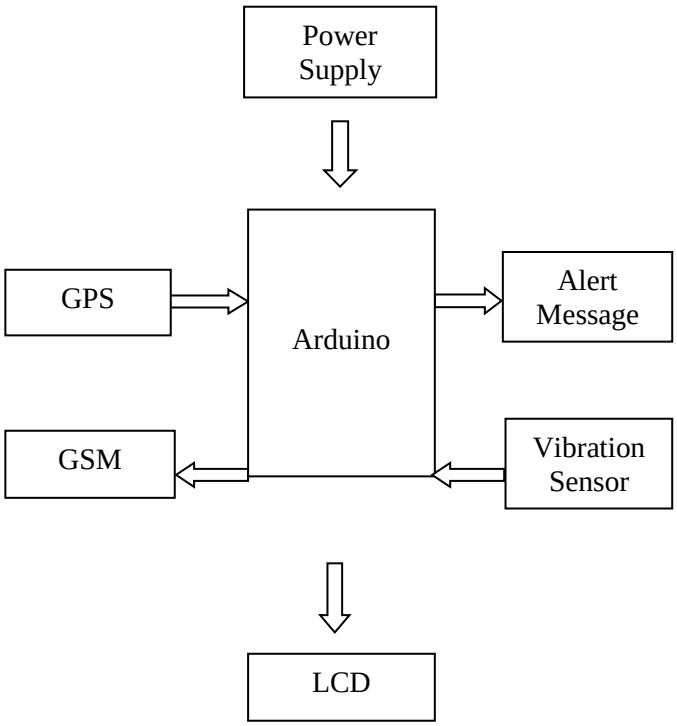


Fig 1. Block Diagram of Real Time Accident Detection & Tracking System using GPS & GSM

## III. Working

First of all, the power supply provide the required current to the whole circuit. When an accident is occurred, the location details of vehicle collected by the GPS module. A vibration sensors will sense occurrence of accident and give it's output to Arduino microcontroller board. LCD screen displays the output status which will be collected by the Arduino. The GSM module collects information from Arduino and then transfer it to the registered mobile number through message.

In this system, the Arduino is used for controlling whole process with help of GPS and GSM module.[8] GPS is used for detecting co-ordinates of the vehicle and GSM helps to send the alert message with these co-ordinates.

### A. Arduino

The Arduino microcontroller board is the heart of this system. It refers to an open-source board and also used as programming software. It is easy to handle by designer, programmer, hobbyists, and anyone interested in creating intelligent environments.[9]

The work of this microcontroller unit is collect the information from all other modules such as GPS. It is a control unit used to detect when an accident is occurred. Here, the ATmega328P Arduino is used as a microcontroller board. The main advantage of this unit is simple programming language. It is designed to make new user to boost their confidence in programming. It is suitable for making demo model of any idea.

### B. GSM Module

The GSM is digital technology used for transfer mobile voice and information services. The GSM system is widely used in the world today. It has been a particular successful cellular technology for a variety of reasons including the ability to roam. It is also highly economic and less expensive.[5]

GSM is used as a media which is used to control the transformation load from anywhere by sending a message. Hence, no need to waste of time by manual operation and transportation.

GSM module is preferred in this system for communication between accident detector, alert system and registered mobile. It collects information from Arduino and send message to the registered mobile number. In this system, SIM900 is used.

The SIM900 is a quad-band GSM module which can easily handle by the user. It is deliver a best quality performance for information like SMS with low power consumption. It is easily available in the market.

### C. GPS Module

To find the location on the Earth, whole part is divided into some co-ordinates where the location can be easily captured by module called GPS.[1]

The GPS is used by people todays technical world. It consists of satellites group and developed by tools like receiver. In the group of satellites there are at least four satellites should be present. Each satellite from these group is fitted out with the stable atomic clock. The exact location of an accident place which getting by the GPS system is display on the screen in the form of latitude and longitude value. The GPS satellite transmit the information that is indicate it's location and current time.

The GPS module is used to find location of the vehicle and information fetched by GPS receiver. The received information is send to Arduino and then transferred to the registered mobile number.

### D. Vibration Sensor

The vibration sensor plays important role in this system by the sensing occurrence of an accident.[2]

When a vehicle meets with an accident the vibration sensor immediately detect the signals and inform to the Arduino microcontroller board. It acts as a bulgur alarm.

### E. LCD Module

The LCD is a flap screen display. Liquid crystals usually do not emit the light signal directly, instead using a backlight to produce images in colour or monochrome. LCDs are available to display fixed images with low information content, which can be displayed, as in a digital clock.[3]

The LCD screen is used to display the separating instructions and output status. In this system, 16*2 LCD display is used.

### F. Circuit Diagram

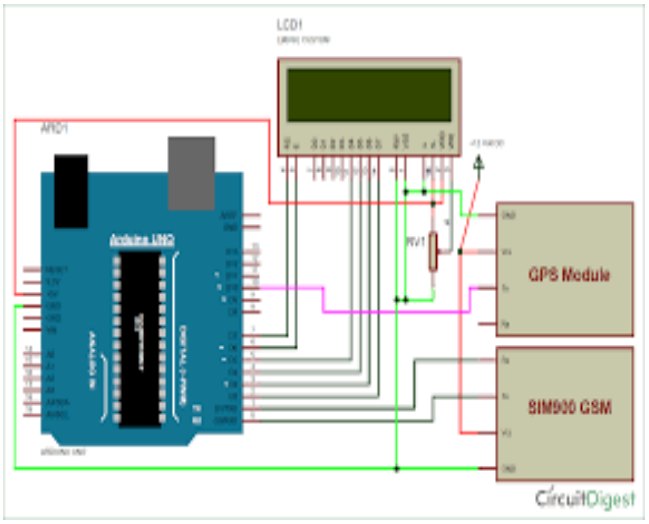


Fig 2. Circuit Diagram of Real Time Accident Detection & Tracking System using GPS & GSM

Here, the Arduino microcontroller board is connected to 16*2 LCD display, GPS module and SIM900 GSM. Arduino used in this system which is based on ATmega328p microcontroller. It is used for controlling all the modules in the circuit.[11]

Two major parts other than microcontroller are GSM module and GPS module. For providing communication between GSM, GPS and alert message here GSM SIM900 is preferred. SIM900 has ranging frequency from 900MHz to 1900MHz. The LCD screen display which will used in this system, is 16*2

in the sense that 16 pins as rows and 2 pins as columns.

Circuit provides the power supply to different module as LCD display & Arduino-5 volt, GPS & GSM-12 volt. The whole circuit consists of ground, digital and analog pins.

Some connection in the system are like as Tx pin of GPS module is directly connected to pin number 10 of Arduino. By default pin 0 & 1 of Arduino are used for serial communication. Tx & Rx pins of GSM module are connected to pin D2 & D3 of Arduino respectively. An optional pins D4, D5, D6 & D7 of LCD are connected to pin number 6, 7, 8 & 9 of Arduino respectively. Pins RS & EN of LCD are connected to pin number 4 & 5 of Arduino. Pin RW is directly connected with ground.

## IV. ADVANTAGES

1. Easy to detect the exact location of vehicle.
2. Intelligent high-tech safety system.
3. Saves the time & precious human life.
4. Alert police & medical unit about accidents.
5. Easy to operate by the users.

## V. APPLICATION

1. Used in automotive & transport vehicles.
2. Security of vehicle during military operation.
3. School transport vehicle accident detection.

## VI. FUTURE SCOPE

The Real Time Accident Detection & Tracking System can also developed by interconnecting camera to controller module that take photographs of accident spot and makes tracking easier.

## VII. CONCLUSION

The proposed system deals with the detection and tracking location. The Arduino microcontroller board helps in transfer the information to different modules. When an accident occurs then vibration sensor will be activate and inform to microcontroller. These information then transfer to LCD module through registered mobile number by using GPS & GSM module.

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