

## **AUTOMATIC ACCIDENT DETECTION & MESSAGING SYSTEM FOR VEHICLE APPLICATION**

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### **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. Our project will provide an optimum solution to this drawback. According to this project, when a vehicle meets with an accident, the Micro electro mechanical system sensor will detect the signal and this signal will be analyzed by Arduino. The Arduino sends the alert message through the GSM Module including the location to police control room or a rescue team. So, the police can immediately trace the location through the GPS Module, after receiving the information. Then after confirming the location necessary action will be taken. The aim of this work is to automatically detect an accident and alert the nearest hospital or medical services, Family members about the exact location of the accident.

**Keywords:** GSM, GPS, Arduino, Sensor

### **1. INTRODUCTION**

The number of vehicles exponentially increases due to growth in the automobile industry. As the number of vehicles increases, the accident also increases. The reason of most of the road accidents are heterogeneous traffic and lack of traffic separation. According to World Health Organization (WHO), India is the leading country in the road accident deaths. In India, 13 million peoples were dead in road accident in the year of 2014-15 [1,2]. These statistics are reported accidental records but there are numbers of accident, which are unreported. Hence, the numbers of actual accident are more than the statistic of World Health Organization (WHO).

The existing system mostly focuses on the safety of the passenger but not on the immediate help after accident [3]. This system sends the basic information to the medical rescue team within a few seconds of an accident [4, 5]. This device can detect accidents and sends an alert message to rescue teams in significantly less time which will help in saving the lives of the people [6].

M.Rajendra Prasad et. al, has discussed the IoT based automated vehicle accident detection systems. When an accident occurs it is detected with help of a sensor which activates the device, the sensor gives its output to the microcontroller. The microcontroller sends the alert. The main aim of the project is save the person [7].

### **2. METHODOLOGY**

In this large professional growth everybody is busy with their lives. People, especially in urban areas have to move from one place to another any time of the day with much of speed. Due to this reason and sometimes due to inefficient people in the driving seats road accidents are quite

common thing that can happen. Road accidents can snuff out a life if the victim is not given proper medical attention at proper time. So, in this project we have planned to design a system that can detect road accident and identify the location through GPS. After that, through GSM interface this will be notified to the nearest emergency care unit so that the victim can get immediate medical attention.

### 3. COMPONENT DESCRIPTION

The component requirements of hardware implementations are discussed below

#### 3.1 ARDUINO UNO

Arduino UNO which is shown in Figure 1 is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts. It is also similar to the Arduino Nano.



**Figure 1.** Arduino UNO

#### 3.2 GSM Module

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. The GSM module is shown in Figure 2. Global System for Mobile communication (GSM) is an architecture used for mobile communication sends the SMS alert to our mobiles.



**Figure 2.** GSM Module

### 3.3 Liquid Crystal Display (LCD)

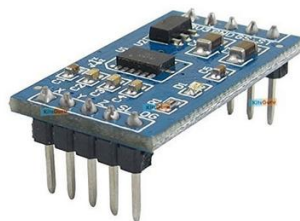
Liquid Crystal Display is used to display the status of the accident and SOS numbers this all are consist of LCD as shown in Figure 3.



**Figure 3.** LCD display

### 3.4 Accelerometer

An accelerometer is an electromechanical device that will measure acceleration force which is shown in Figure 4.



**Figure 4.** Accelerometer sensor

### 3.5 Vibration Sensor

The Vibration sensor which is shown in Figure 5 is also called a piezoelectric sensor. Measure the vibration and measure the pressure of the vehicle.



**Figure 5.** Vibration sensor

### 3.6 Buzzer

A buzzer is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Buzzer is a very small, low cost and compact two pin structure. It gives a continuous beep sound for alert. This buzzer can be used by simply powering it using a DC power supply ranging from 4V to 9V.



**Figure 6.** Buzzer

### 3.7 GPS Module

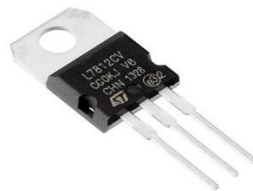
GPS stands for Global Positioning System and is used to detect the latitude and longitude of any location on the earth, with the exact UTC time. GPS module is used in our project to track the location of the accident spot.



**Figure 7.** GPS module

### 3.8 Power Supply Regulator

The Regulator used for constant supply as shown in Figure 8.

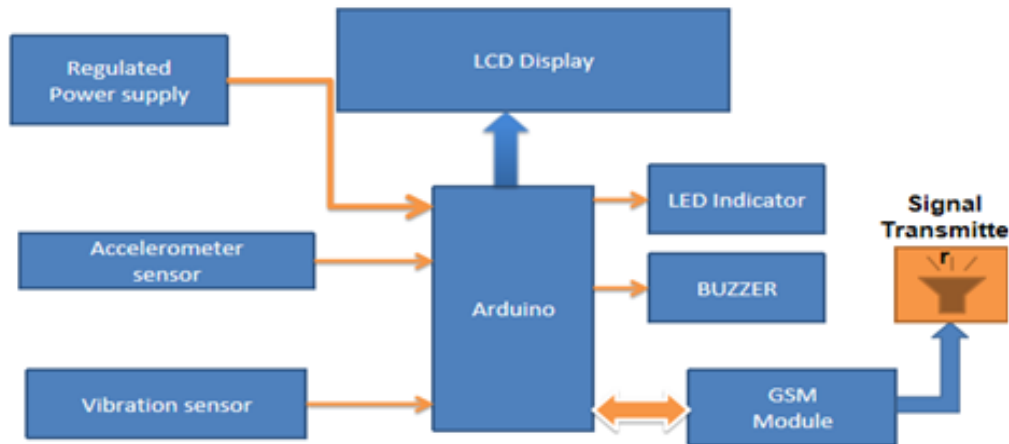


**Figure 8.** Regulator

## 4. PROPOSED SYSTEM BLOCK DIAGRAM

The proposed block diagram is shown in Figure 9. The block diagram shows the Arduino, Accelerometer sensor and Vibration sensor, LCD display, GSM module. When an accident the vibration sensor and accelerometer sensor detects the force and vibrations of the objects. The microcontroller board sends and receiving the signals Analog or digital output/input and LCD

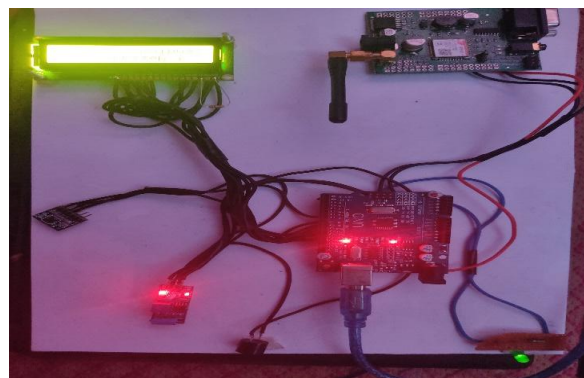
displays the SOS numbers, buzzer is a two pin structure. It gives a continuous beep sound for alert. And GSM Module sends the SMS alert to our Mobiles.



**Figure 9.** Block diagram of proposed system

## 5. OPERATION OF THE PROPOSED SYSTEM

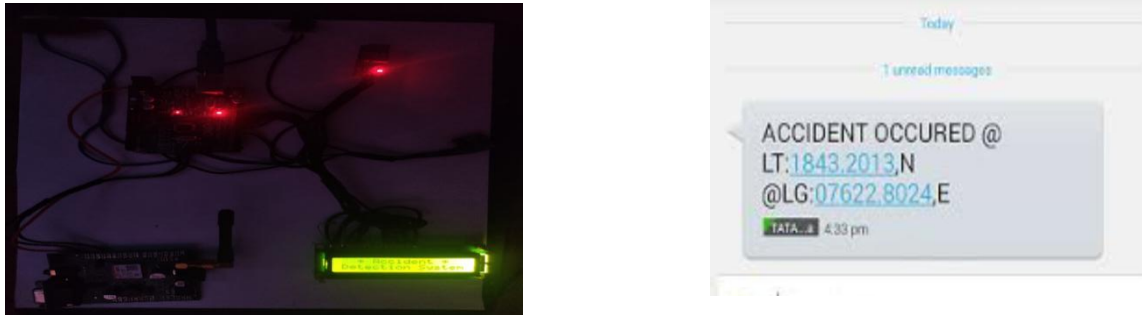
This project will provide an optimum solution to the existing drawback. According to this project when a vehicle meets with an accident immediately vibration sensor will detect the signal & microcontroller sends the alert message through the GSM MODEM. The accident can be sensed by using the vibration sensor. Using ARM controller the mobile number can be saved in EEPROM and sends the message when accident occurs. Using Smartphone the accident location can be tracked. The message can be passed to police station or rescue via smartphone & gets the message immediately about the location of vehicle through GSM. After receiving the information the medical rescue team rushes to the spot and save the person with short duration of time. The hardware implementation of proposed system is shown in Figure 10.



**Figure 10.** Hardware Implementation

## 6. RESULTS & DISUSSION

According to this project, when a vehicle meets with an accident, the Micro electro mechanical system sensor will detect the signal and this signal will be analysed by Arduino. The Arduino sends the alert message through the GSM Module including the location to police control room or a rescue team. So, the police can immediately trace the location through the GPS Module, after receiving the information. Accident detection Alert GSM Module sends the SOS message to our mobile. The execution of hardware model is shown in Figure 11.



**Figure 11.** Execution of Hardware Implementation

## 7. CONCLUSION

Vehicle tracking system makes better fleet management and which in turn brings large profits. Better scheduling or route planning can enable us to handle larger loads within a particular time. Vehicle tracking both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity. So, in the coming years it is going to play a major role in our day to day living. The main motto of the accident alert and detection project is to decrease the chances of losing life in such accidents which we can't stop from occurring. Whenever accident is alerted the paramedics can reach the particular location to increase the chances of life. This vehicle tracking and accident alert feature may play a more important role in day to day life in the future.

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