

# "Secure transportation internet of things of vehicles using ultrasonic sensor and arduino board in Obstacle Detection"

**Ms.Shweta Borse<sup>1</sup>, Ms.Mayuri Sapkal<sup>2</sup>, Mr.Ritesh Kolhe<sup>3</sup>, Prof.K.D.Wagh<sup>4</sup>**

Students in Department of Computer, Pune Vidyarthi Griha's Collage Of Engineering, Nashik<sup>1,2</sup>

Lecturer in Department of Computer, Pune Vidyarthi Griha's Collage Of Engineering, Nashik<sup>3</sup>

**Abstract:** Vehicle accidents are one of the leading causes of fatalities. Because of not getting help on time, poor emergency facilities, people lose their lives. This project deals with the optimum solution to this drawback. The high demand of automobiles 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 alarm device for vehicle accidents is introduced in this project. The vehicular module is used to prevent vehicle accident. An accelerometer can be used in a car alarm application so that dangerous driving can be detected. When the obstacle will prevent then system will start to buzz

**Keywords:** Obstacles detection, alcohol detection, accelerometer, alarm device, Performance.

## 1.INTRODUCTION

The high demand of automobiles 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 alarm device for vehicle accidents is introduced in here. The proposed design is a system which can detect accidents is 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 application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way.

## 2.LITERATURE SURVEY

Kiran Sawant et al. created an accident alert system using modem and Raspberry Pi. A piezoelectric sensor first senses the occurrence of an accident and gives its output to the microcontroller. The sensor detects the latitude and longitudinal position of a vehicle. The latitudes and longitude position of the vehicle is sent as message through the . 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

Pseudo Algorithm :

Initialization: Lastlon=0, LastLat=0, LastAlt=0, DistTh=0 2.

Get new GPS data: {Lon, Lat, alt, Speed, hdhop, status}

AddNewPoint(GPS data)

Go to step 2 [1].

Mrs Manasi Patil et al., described a better traffic management system using Raspberry pi and RFID technology. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. When an accident occurs the value of one of the sensor changes and a message to a predefined number (of the ambulance) is sent through GSM. The GPS module which is also interfaced with the controller also sends the location of the vehicle. When the message is received by the ambulance, a clear route has to be provided to the ambulance. The ambulance has a controller ARM which is interfaced with the RFID tag sends electromagnetic waves. When an ambulance reaches the traffic signal the RFID reader which is placed on the joints detect the electromagnetic waves of the tag. If the traffic signal is red, then the readers goes through the database in fraction of seconds and turn the red light green. And automatically in such condition the RFID on opposite joints turn the opposite signal red. This provides a clear route to the ambulance. [2].

V.Sagar Reddy et al., developed an accelerometer based System for driver safety. The system has the advantage of tracking or identifying vehicles location just by sending a SMS or email to the authorized person. The system is designed by using Raspberry Pi (ARM11) for fast access to accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. Images captured by the camera on the vehicle are emailed to the concerned person (for example the owner of the vehicle) along with the type of accident and the time of the accident. When we designed this system into vehicle detected accelerometers values based to compare both X and Y axes value to the threshold value if the value is greater than the threshold value then send a snap shot to the predefined email id and Parallel send message to predefine number to the mobile [3].

Sri Krishna Chaitanya Varma et al., proposed an Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. AT89C52 microcontroller is used in the system. When the system is switched on, LED is ON indicating that power is supplied to the circuit. When the IR sensors that are used sense any obstacle, they send interrupt to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information is sent to a mobile number as a message. This message is received using GSM modem present in the circuit. The message gives the information of longitude and latitude values. Using these values the position of the vehicle can be estimated[4].

Apurva Mane et al., described the methods for vehicle collision detection and remote alarm device using Arduino. Key features of this design include real-time vehicle monitoring by sending its information regarding position (longitude, latitude), time, angle to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft occurs. Also user/owner has an access to get real-time position of a vehicle in real time. Whenever accident occurs MEMS and vibration sensor detects and sends the signals to microcontroller, by using GPS particular locations where accident has occurred is found, then GSM sends message to authorized members. [5].

Prof.Mrs.Bhagya Lakshmi V et al., proposed a FPGA Based Vehicle Tracking and Accident Warning system using GPS. FPGA is mainly used to track position of any vehicle and send automated message to pre programmed number. The owner of vehicle, police to clear traffic, ambulance to save people can be informed by this device. FPGA controls and co-ordinate all parts used in system. With the help of accelerometer sensor, the exact position of the vehicle can be detected. It can also be predicted whether the vehicle is in normal position or upside down[6].

### **3. PROPOSED SYSTEM**

The main aim of the project to develop a system automatic speed control of vehicle and accident avoidance using alcoholic sensor and ultrasonic sensor .whenever any obstacle is detected in running vehicle depends on distance automatically control the speed of vehicle. sensor detect the driver is drunk or not if found drunk then alarm start buzzer.The system has a switch to enable driver to stop alert system in case of false alarms. This system acts as a black box to vehicles.

The above figure can represents the circuit diagram of our design. Coming to the operation, Many accidents at Highways are taking place due to the close running of vehicles, all of sudden, if the in front vehicle driver reduces the speed or applied breaks, then it is quite difficult to the following vehicle driver to control his vehicle, resulting accident. To avoid this kind of accident, the warning system, which contains alarm and display system can arrange at rear side of each and every vehicle. The circuit is designed such that whenever the infrared signal is interrupted, logic high signal is generated and it is fed to microcontroller, on receipt of this signal, the controller activates the display board and alarm automatically.

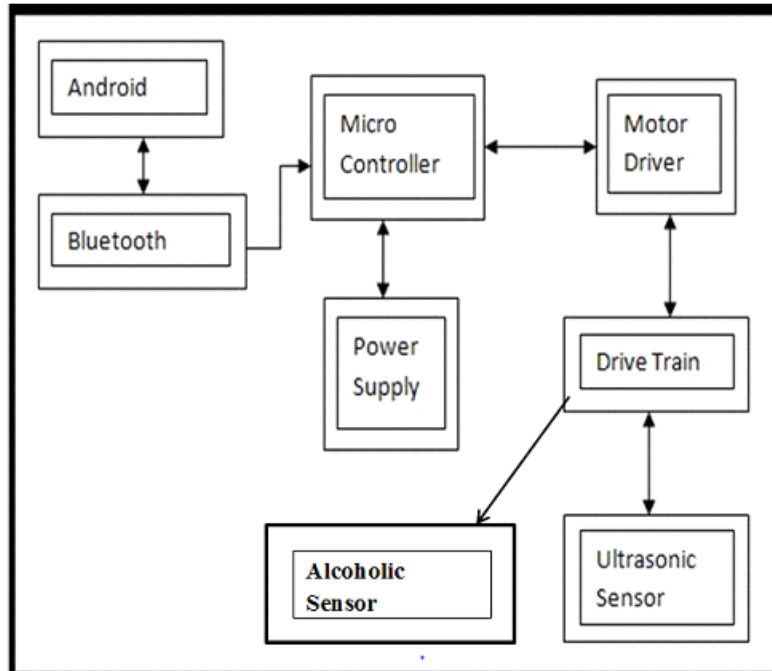
The ultrasonic sensor system continuously sends signals and monitors any car or other obstacles are in front of car. The distance up to which ultrasonic sensor can work may be up to meter. When any obstacle or vehicle detected by ultrasonic sensor system it will send signal to the embedded board. After receiving this signal embedded board sends a signal to the motor to reduce the car speed automatically which can control car speed immediately. Vehicle is controlled automatically without any manual operation when the vehicle is at meter distance away from the front vehicle. Also give alarm to alert to the driver..

### **4. SYSTEM ARCHITECTURE**

#### **5.1 Selection of hardware :**

- 1) Arduino Uno R3 Microcontroller
- 2) Power Bank
- 3) 4 WD Robot Chesis
- 4) LM 298H Bridge Module
- 5) Bluetooth Module HC-06
- 6) Mini Bread Board

- 7) Battery Holder
- 8) 0.5mm Male -Male, Male-Female Jumper Wires
- 9) Ultrasonic sensor
- 10) Alcohol Sensor MQ3
- 11) Buzzer
- 12) DC motor



5. System Requirements

### 5.2 Selection of software and language :

- 1) Front End : Android Studio
- 2) Back End : C
- 3) Arduino IDE

### 5.3 Module Description :

#### Ultrasonic sensor



The principle of working of an ultrasonic sensor is easy. The sensor transmits ultrasonic sound waves and waits for reflected sound waves. After receiving reflected sound wave or usually named echo, sensor detects the distance in different ways. Fig.2 shows the detection of an ultrasonic sound waves in an object. Ultrasonic ranging module HC-SRO4 provides 2cm 500cm noncontact measurement function, the ranging accuracy can reach to 3mm. The modules

includes ultrasonic transmitters, receivers and control unit. The ranges can be increased by using other type of ultrasonic sensors.

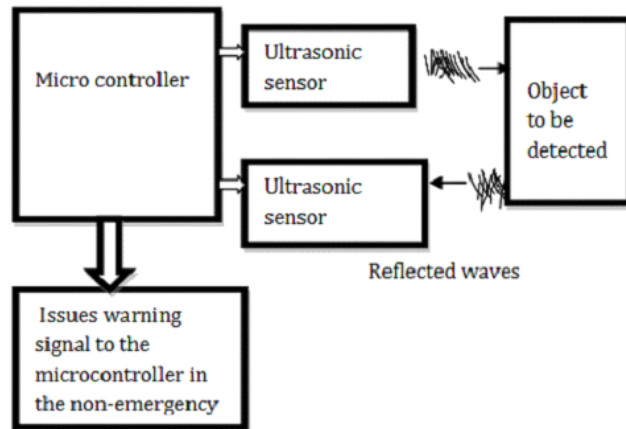


Fig:Working Of Ultrasonic Sensor

The basic principle of work:Using IO trigger for at least 10us high level signal.The Module automatically sends eight 40kHz and detect whether there is a pulse signal back.If the signal back, through high level, time of high output IO duration is the time from sending ultrasonic to returning.

**Alcohol Sensor MQ3**



Alcohol sensors are used for checking the concentration of alcohol in a sample. Now a days they are mainly used by traffic police. To check the alcohol concentration users have to blow in the straw for some minutes. The air blown contains the vapour which are used for calculating the alcohol content.

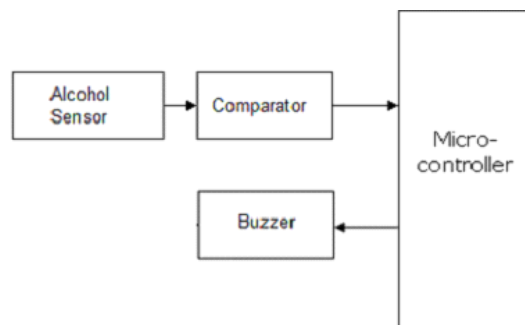


Fig: Working Of Alcohol Sensor

**Switch and Alarm**

Alcoholic sensor séance the alcohol and buzz the alarm for some precautions. The system has a switch to enable driver to stop alert system in case of false alarms. This system acts as a black box to vehicles.

**Accelerometer**

Accelerometer is a electromechanical device that measures proper acceleration. It controls the speed when any obstacle comes in front of the car and stop the car after some distance.



### Bluetooth

In this system we used bluetooth module to connect the car to Mobile Application. This mobile application is used to control the car. This works like Remote of car.

### 6.CONCLUSION

The project IOT Based Vehicle Tracking and Accident Detection System has been successfully designed and tested. Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

### 7.ACKNOWLEDGMENT

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