

# WIRELESS BLACKBOX FOR CARS USING SENSORS AND GPS MODULE

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**Abstract** - The main purpose of this wireless black box project is to develop a vehicle black box system that can be installed into any vehicle all over the world. This paradigm is often designed with minimum range of circuits. Wireless black box is basically a device that will indicate all the parameters of a vehicle crash and will also store and display its parameters such as temperature, location, vibration, alcohol limit etc. At the time of accident, the message will be sent from the system built inside the car to the registered mobile numbers such as emergency numbers of police stations, hospitals, family members, owner etc. We have used various types of sensors like temperature sensor, which is used to measure temperature. Vibration sensor measures vibrations felt by the car during accident. Alcohol sensor is located on the steering wheel which will indicate whether the driver is drunk. Gyroscope sensor is used to indicate tilt during the accident. GSM module, GPS module are some of the devices used in this project which helps in accomplishing the output.

**Keywords**- Arduino, Gas sensor, Temperature sensor, Vibration sensor, Accelerometer, GSM, GPS, SMS.

## I. INTRODUCTION

In today's world as the population increases day by day the numbers of vehicle also increases on the road and highways. This results in accident that leads to the traffic jams and people do not get the help instantaneously. Road accidents constitute the major part of the accident deaths all over the world. This takes a toll on the property as well as causes human life loss because of unavailability of immediate safety facilities.

Complete accident prevention is unavoidable but at least repercussions can be reduced. In highly populated Countries like India, everyday people lose their lives because of accidents and poor emergency facilities. These lives could have been saved if medical facilities are provided at the right time. In many situations the family members or the ambulance and police authority is not informed in time. This result in delaying the help reached to the person suffered due to accident. In order to give treatment for injured people, first we need to know where the accident happened through location tracking and then send a message to your related one or to the emergency services.

## II. DESIGN OF SYSTEM

Four sensors that are temperature sensor LM35, vibration sensor, gas sensor MQ3, accelerometer ADXL345 are the primary inputs. LCD display, GPS 6MV2, GSM SIM800L are the primary outputs. To indicate motion of car we are using a motor.

Initially the threshold detection level of sensors value is predefined. When the device is switched on, it displays "Wireless Blackbox". Now the user is prompted to give an input such that it exceeds the threshold of the sensors. Once this happens the SMS is sent to registered mobile number with the location of the accident place.

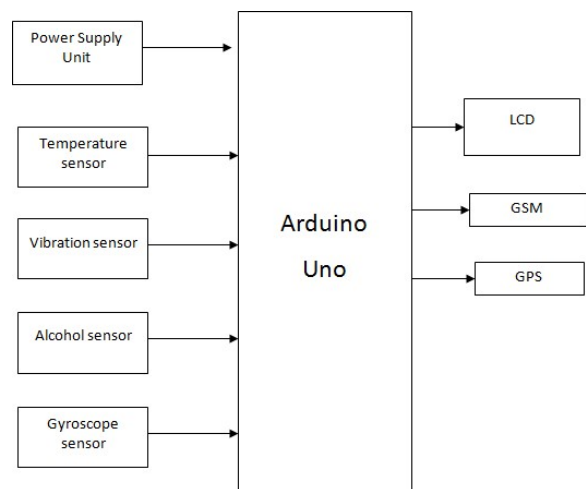


Figure 1: Block diagram of blackbox system.



1.7 “GSM Module,” “GSM SIM800C type is selected to carry the task in communication part. SIM800C is a quad-band GSM/GPRS module that works on frequencies GSM 850 MHz, EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. It has an recognized presentation, industrial grade interface Typical plus embedded TCP/IP protocol which makes it to be presentable and suitable for the electronics project. Since it consumes small of power in its operation, thus it is said able to communicate with any low power consumption microcontroller interface”.

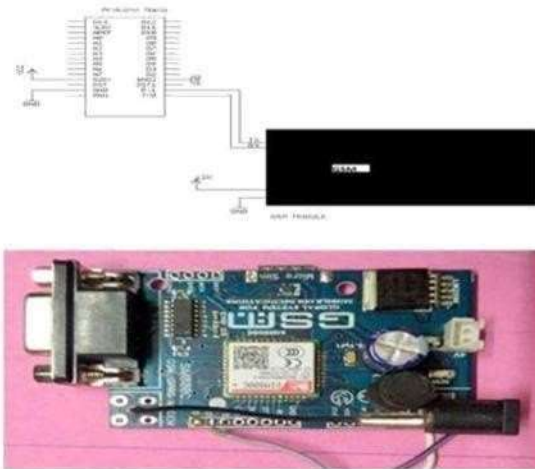


Figure 8: GSM Module interfacing with Arduino

**2. Software Development:**

The software of the project is based on the flow chart in figure 9. When input is exceeded threshold are values of the sensors, microcontroller on the Arduino Uno board will notify GSM module to send an alert messages to the pre-coded mobile numbers. By referring to both figures, the complete program can be constructed later in Arduino IDE software with vibrations sensor, temperature sensor, accelerometer, alcohol sensor, GPS module, GSM module, LCD display screen.

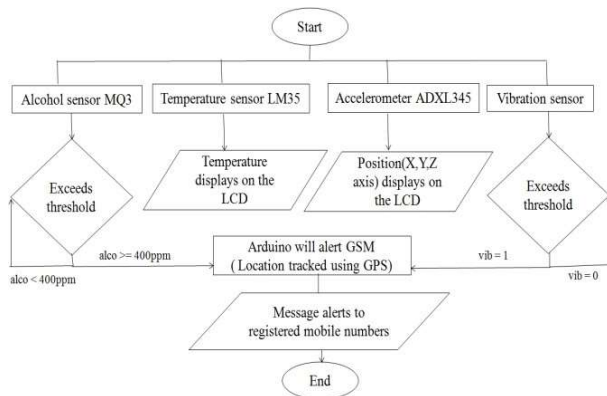


Figure 9: Flowchart of blackbox system.

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START
IF INPUT VALUES EXCEED
THRESHOLD ARDUINO ALERTS GPS
AND
GSM LOCATION TRACKED USING GPS
SM ACTIVATED
SEND SMS TO REGISTERED NUMBER
ELSE
CHECK FOR INPUT VALUES AGAIN
    
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Figure 10: Pseudocode for the Project

This pseudo code gives a brief idea as to how the project “Wireless Blackbox for cars using sensors and gps module” works.

Initially the threshold detection level of sensors value is predefined. When the device is switched on, it displays “Wireless Blackbox”. Now the user is prompted to give an input such that it exceeds the threshold of the sensors. Once this happens the SMS is sent to registered mobile number with the location of the accident place. The GPS receiver helps to collect the location of the place. The GSM module sends the SMS.

**V. SCHEMATIC DIAGRAM**

Schematic diagrams show the connection and interfacing of Arduino Uno board:

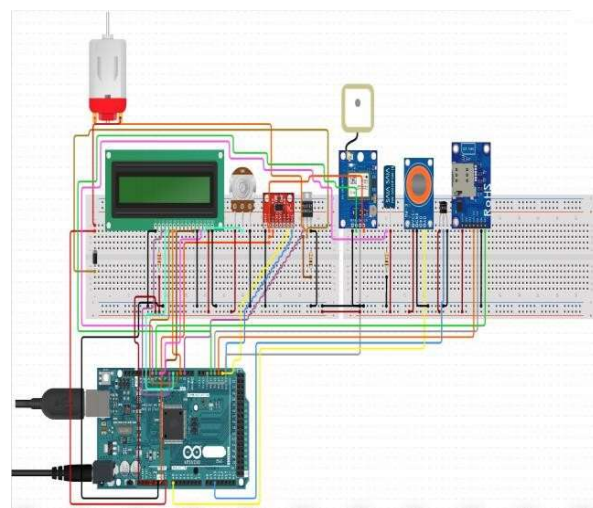


Figure 11: Schematic diagram

## VI. RESULT

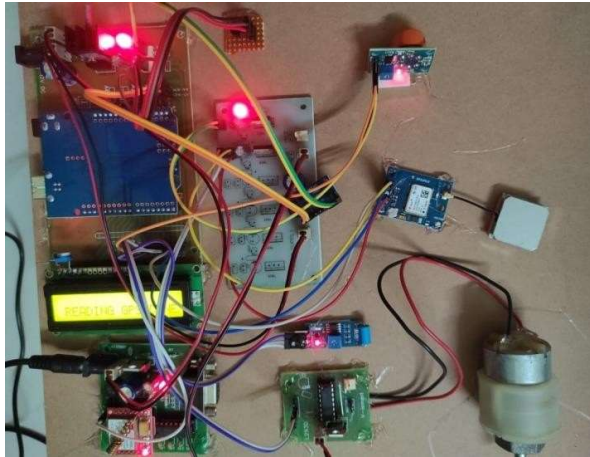


Figure 12: Hardware Setup

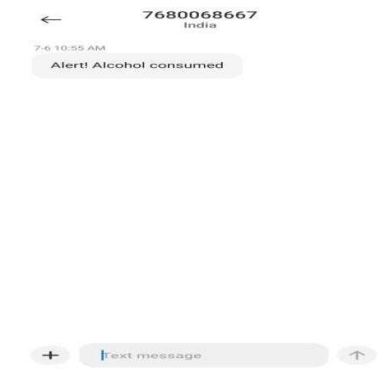


Figure 13: Message alert to the registered number when alcohol limit exceeded

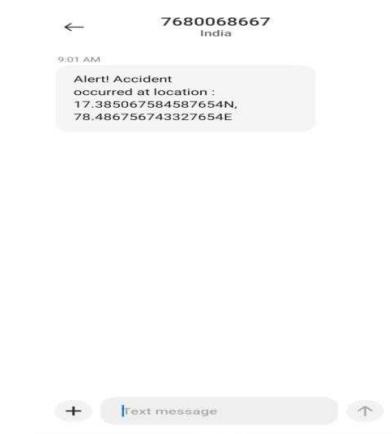


Figure 14: Message alert to the registered number when accident occurred

## VII. CONCLUSION

The sole purpose of this project was to develop a black box system for car accidental monitoring and alerting. The system has successfully overcome the drawbacks of the existing system by introducing alert messages.

Finally, We conclude that system wireless black box using sensors, GSM and GPS tracking has been developed for car accidental monitoring and alerting which gives an intelligent solution to the problem.

In future, by applying ultrasonic sensors features we can detect the distance of a vehicle moving nearby our vehicles. This system can be interfaced with vehicle airbag system that prevents vehicle occupants from striking interior objects such as steering wheel or window.

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