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WIRELESS BLACK BOX FOR VEHICLES USING SENSORS AND GSM 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 designedwith 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 the data in SD Card and display its parameters of every three second such as date, time, temperature, location, vibration, alcohol limit etc. when 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 typesof sensors like temperature sensor. 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. Potentiometers which is used to indicate the speed of the car during the accident. All these parameters sensed by the sensors will send the signal to the Arduino Uno.***

KEYWORDS**:** ***Vehicle Black Box, Sensors, Arduino, Alcohol sensor, Temperature sensor, Vibration sensor, Potentiometers, GSM, GPS, SD Card.***

I. INTRODUCTION

In today's world as the population increases day by day the numbers of vehicle also increase 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. LITERATURE REIVEW

Rajashri R, Lokhande and Sachin, P. Gawate in have developed a Wireless black box using MEMS accelerometer and GPS tracking system to monitor the accident. The system consists of conjunctive components of an accelerometer, microcontroller unit, GPS device and GSM module. At the time of project installation, the registration number of the vehicle, relative's phone number and emergency services number are fed into the source code of the system. When a car meets with an accident the sensor will be activated automatically and start its surveillance mode. If the user is

not in a critical condition and can help himself then he will stop surveillance mode within a given time period else the system will consider the user needing assistance and start auto contacting the call center and specified person. Immediately, the system gathers the car location using a GPS device and records the car details like car owner details, car number, car model, car speed and sends it to the call center and person's relative. Once the call center gets the car status it finds the nearest emergency service and contacts them to reach the accident location to help the person. [1]

Mr. Dinesh Kumar HSDK, Shreya Gupta, Sumeet Kumar and Sonali Srivastava in have designed an accident detection and reporting system using GPS and GSM module. The system incorporates a single-board embedded system that contains GPS and GSM modems connected with a microcontroller 89S52, alcohol sensor and vibration sensor. GPS is used to identify the exact location of the vehicle and GSM is used to inform the exact vehicular location to the preceding number. In accidents, when the drivers lose control and fail to stop the vehicle, the vibration sensor will be triggered because of the vibrations. The processor locks the brakes when triggered and thus the impact of the accident can be weakened.[2]

Shailesh Bhavthankar and Prof. H. G. Sayyed in have designed and implemented an efficient vehicle wireless system for vehicle accident detection and reporting using accelerometer and GPS. The system consists of an ARM7 microcontroller unit, MEMS accelerometer, GPS device, GSM module, Temperature sensor, gas sensor and Alcohol sensor. When a vehicle meets with an accident, a Micro electro mechanical system (MEMS) sensor will detect the signal and send it to the ARM controller. Immediately the microcontroller sends the signal to the GPS module to collect the current position, time and date and then it sends the alert message to family member or emergency medical service (EMS) through GSM modem which contains GPS parameter values. If the vehicle meets with a small accident or no serious injuries to people then we can send a message that we are safe by pressing the switch manually in order to save the valuable time of emergency medical service. [3].

Sri Krishna Chaitanya Varma, Poorness, Tarun Varma and Harsha in have designed a working model of automatic vehicle accident detection and messaging system using a GPS and GSM modems successfully. In this work they have used a basic AT89C52 microcontroller for cost effective and easy understanding. The microcontroller is interfaced to the GPS and GSM module via a multiplexer, where these devices are activated using select lines internally built in the multiplexer. When the IR sensors sense any obstacle, they send an interrupt to the microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information will be sent to a mobile number through a message. This message will be received using the GSM modem present in the circuit. The message will give the information of longitude and latitude values. Using these values, the position of the vehicle can be estimated. They have used assembly programming for better accuracy. [4]

Ramchandra Patil and Shivaraj Hublikar in have presented a new vision for the vehicles industry, which is the Black Box system and Collision Avoidance System used for vehicles. The system consists of ARM7LPC2148, GSM Module, Vehicle to Vehicle Collision Avoidance Unit (VVCAU) to avoid crashing between vehicles and Black Box to record the relevant details about a vehicle. This system also contains Alcohol Sensor, Brake Sensor, CO2 sensor, Temperature sensor and Ultrasonic sensor for pre-accident detection systems. GSM module is used to send the SMS to a relative person to indicate an accident has occurred. As soon as the driver runs the motor, this system collects the data from all the sensors and stores them in EEPROM along with date and time. The data saved can be retrieved after the accident for privacy purposes. [5]

III. METHODOLOGY

The prototype model of Wireless Black Box for Vehicles using Sensors and Gsm Module working will be made in the following manner:

- Complete layout of the whole set up will be drawn in form of a block diagram.
- Initially designed module will be fixed inside the vehicle.
- An accident detection sensor or the accident switches used will first sense the occurrence of an accident and give its output to the microcontroller.
- The various sensors connected will sense for the different parameters and give its output to microcontroller and this information from sensors will be recorded and stored in the SD Card
- The GPS detects the latitude and longitudinal position of a vehicle where exactly the accident occurred and this information is sent through GSM to the pre-saved

numbers so that they can take an immediate action to provide rapid service for treatment and rescue.

- If any of the sensor values varies the threshold values, then driver is alerted by the buzzer and parameter values will be displayed on LCD.
- Later the stored information from black box can be used for replay of the accident and analysis, using a file **LOG.TXT.**

IV. BLOCK DIAGRAM

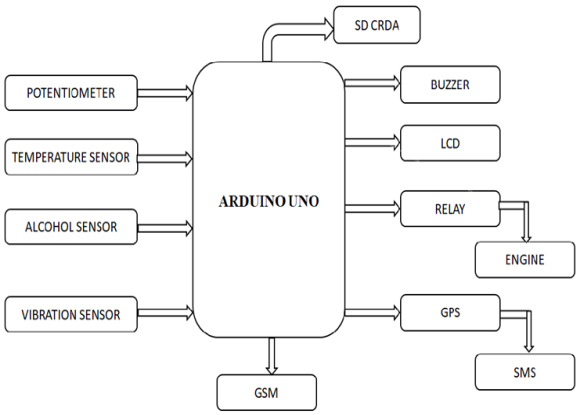

Figure 1: Block Diagram of The System

Four sensors that are temperature sensor, vibration sensor, alcohol sensor and potentiometer are the primary inputs. LCD display, GPS, GSM, SMS 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.

V. RESULT

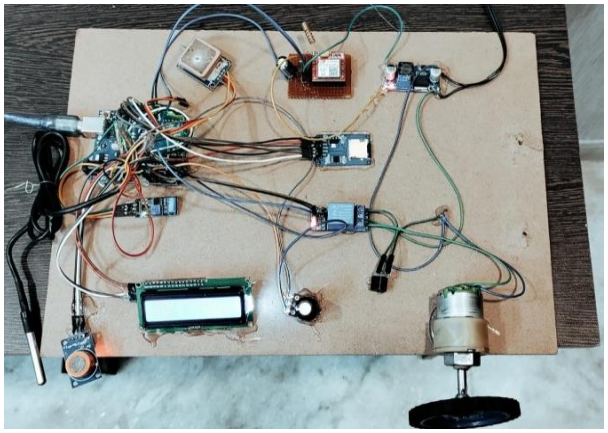

Figure 2: Hardware Set Up

The designed module consists of various sensors which is capable of measuring different parameters. After the accident is occurred then every detail of sensors is calculated and stored in the memory. These values are very useful to know how the accident is occurred. The message is displayed in the phone after the accident is occurred to the vehicle. This is sent to the emergency numbers by the GSM module which is fixed in the vehicle. It even shows the date and time of the accident. The GPS detects the latitude and longitudinal position of a vehicle where exactly the accident occurred and this information is sent through GSM to the pre-saved numbers so that they can take an immediate action to provide rapid service for treatment and rescue.

Figure 3: Temperature Detected.

The driver can be alerted in dangerous situations for example when driver is intimated through buzzer and displays on LCD. when the engine temperature goes high.

Figure 4: SMS For Temp Detected

The information is displayed on the phone once after it reaches a certain temperature with the location where the vehicles is.

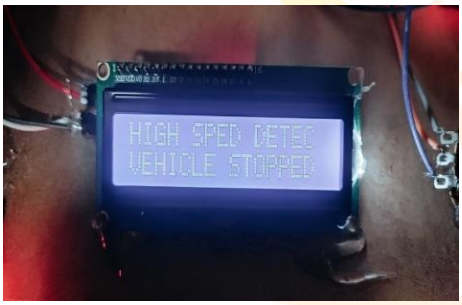

Figure 5: Speed Detected

When the vechicle exceeds the speed of the vehicle ,it indicates with the buzzer sound as well as the on the LCD display.

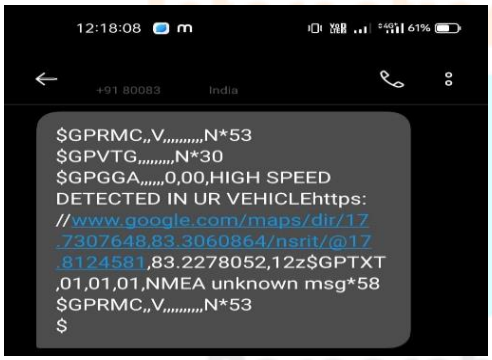

Figure 6: SMS For Speed Detected

The information is displayed on the phone once after it exceeds the speed of the vehicle with the location where it is.

Figure 7: Alcohol Detected

The alcohol sensor is placed at the steering of the car ,it detects when the driver is drunk .if the driver is drunk the vechile will not start.

Figure 8: SMS for alochol detected

The information is displayed on the phone once the driver is drunk and drive.

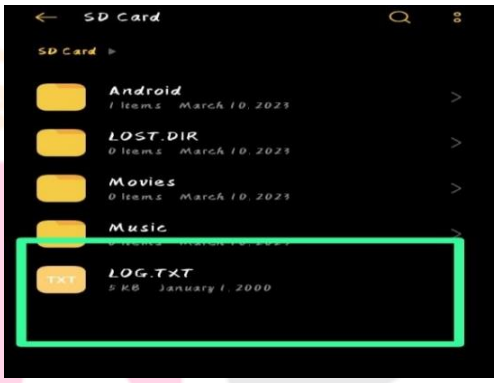

Figure 11: SD Card file

LOG.TXT is a file having information about the vehicle through SD Card.

Figure 12: Date Sored in SD Card

Data that is stored we can even reset after the data once it is retrieved.

Figure 13: Location of The Device

It gives the exact location of the vehicle through GPS.

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. 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 every three seconds such as date, time, temperature, location, vibration & alcohol limit. Finally, we conclude that a 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.

FUTURE SCOPE

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. And we can also implement by adding the voice recorder, camera's (capturing videos). Long range infrared sensors can be used to avoid accidental collisions. Instead of microcontroller, CPLD chips can be used which has much more features than microcontroller.

REFERENCES

[1] Rajashri R. Lokhande and Sachin P. Gawate, "Design & Implementation of Vehicle Black Box for Driver Assistance and Alert", IOSR Journal of Computer Science (IOSR- JCE), 2014.2

[2] Mr.Dinesh Kumar HSDK, Shreya Gupta, Sumeet Kumar, Sonali Srivastava, "Accident Detection and Reporting System Using GPS and GSM Module", Journal of Emerging Technologies and Innovative Research (JETIR), Volume 2, Issue 5, May 2015.

[3] Shailesh Bhavthankar and Prof. H. G. Sayyed, "Wireless System for Vehicle Accident Detection and Reporting using Accelerometer and GPS", International Journal of Scientific & Engineering Research (IJSER), Volume 6, Issue 8, August 2015.

[4] Sri Krishna Chaitanya Varma, Poornesh, Tarun Varma and Harsha, "Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems", International Journal of Scientific & Engineering Research (IJSER), Volume 4, Issue 8, August 2013

[5] Ramchandra Patil and Shivaraj Hublikar, "Design and Implementation of Car Black Box with Collision Avoidance System using ARM", International Journal of Innovative Technology and Exploring Engineering (IJITEE), Volume4, Issue3, August 2014.

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