VEHICLE ACCIDENT PREVENTION SYSTEM USING GSM AND GPS IN AIR BAGS

Prajwal Shivaji Nanaware[1], Pruthviraj Bharat More[2], Suresh Yallappa Nandiwale[3],

Rohan Rajaram Narhe[4], Prof. Dhanore R. T.[5]

Student, Dept. of Mechanical Engineering, JSPM's Imperial College Of Engineering & Research,

Pune, Maharashtra, India[1-4]

Assistant Professor, Dept. of Mechanical Engineering, JSPM's Imperial College Of Engineering & Research, Pune,

Maharashtra, India[5]

Abstract: Now a day, it became very difficult to know that an accident has occurred and to locate the position where it has happened .There is no system of identification and intimation regarding an accident in previous. Later on the SMS service begins for intimation and purpose. GPS and GSMmake the usage for intimation and identification of place. When an accident occurs the information only be sent through GSM but there is no possibility to locate the spot. This projectpresents a GPS and GSM based accident identification and information system using GPS and GSM-SMS services. So the main intention of the project is to find the accident spot at any place and intimating it to ambulance through GPS and GSM networks. The GPS based vehicle identification module contains vibrating sensor GSM module and a GPS modem connected to the microcontroller. Thereceiver section consists of a GSM receiver. The transmitter section consists of a microcontroller, GPS module, GSM transmitter and vibration sensor. This project implies a system which is a solution to this drawback, when a vehicle meets with an accident immediately a Vibration sensor will detect the signal, and sends it to the Arduino microcontroller. Microcontroller will send an alert message through the GSM modem includingthe location to the police station or a rescue team. So the police can immediately trace the location through the GPS modem after receiving the information. The proposed systems have been simulated and practically design by the use of hardware components and the results are satisfied with the expectation.

I.   INTRODUCTION

Automobile has a great importance in our daily life. We utilize it to go to our workplace, keep in touch with our friends and family, and deliver our goods. But it canalso bring disaster to us and even can kill us through accidents. Speed is one of the most important and basic risk factors in driving. It not only affects the severity of a crash, but also increases risk of being involved in a crash. Despite many efforts taken by different governmental and non-governmental organizations all around the world by various programs to aware against careless driving, yet accidents are taking place every now and then. However, many lives could have been saved if the emergency service could get the crash information in time. This will help in detection and alert of the accident and can help to save the life of the injured person. The system can be the solution for accidents at isolated places where no one is around to report if an accident has occurred. The usage of auto mobiles has improved linearly over the past decade, which increased in the risk of human life. This is because due to the insufficient emergency facilities. Therefore, in order to overcome this situation, we are using an alert system which helps in improving the emergency system of the accident system. This system detects the accident occurrence and the co-ordinates of the accident i.e. the latitude and longitude of the location are messaged to the rescue team. When there is a sudden acceleration in the Accelerometer and a drastic change detected by the Vibration Sensor, the system will consider it as an accident. Hence, it will alert the GSM Module and the GPS Module, which will further detect the location and willsend a message indicating about the accident with the location where it has occurred. This project helps in providing feasible solution to the poor emergency facilitates.

The existing system mostly focuses on the safety of the passenger but not on the immediate help after accident. India has earned the dubious distinction of having a greater number of fatalities due to road accident in the world. Road safety is emerging as a major social concern around the world especially in India. The system implemented by us aims at automatically detecting an accident and alerting the nearest hospital or medical services about the exact location of the accident.

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. The alert message contains the geographical coordinates, time and angle in which the accident has occurred. When an accident occurs, it is detected with helpof a sensor which activates the device, the sensor gives its output to the microcontroller. The microcontroller sends the alert.
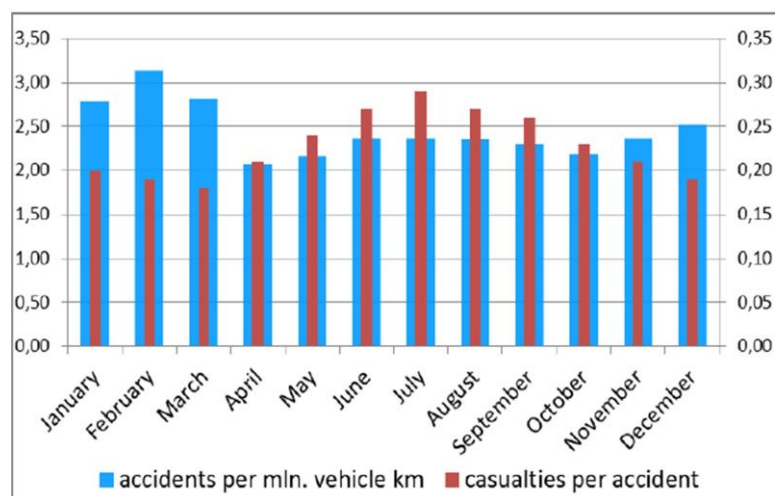
We have used GPS and GSM module for our project. GPS (Global Positioning System) is a satellite navigation system used to determine the ground position of an object. It is a global navigation satellite system that provides geo location and time information to a GPS receiver anywhere on or near the Earth. Here GPS is used for both tracking and navigation. This enables a base station to keep track of the vehicles and navigation system helps the driver to reach the destination. GSM is an open,digital cellular technology used for transmitting mobile voice and data services. The GSM system is the most widely used cellular technology in use in the world today. It has been a particularly successful cellular phone technology for a variety of reasons including the ability to roam worldwide with the certainty of being able to operate on GSM networks. It is also highly economic and less expensive.

Background

With the growing population the use of vehicles has become superfluous .and this has led to increase the traffic hazards and the road accidents, which causes huge loss of life because of the poor emergency facilities. The purpose of the project is to find the vehicle where it is and locate the vehicle by means of sending a message using a system which is placed inside of vehicle system, Most of the times we may not be ableto find accident location because we don't know where accident will happen. When a vehicle meets with an accident immediately Vibration sensor will detect the signal,and sends it to Arduino microcontroller. Microcontroller sends the alert messagethrough the GSM modem including the location to the police station or a rescue team. So the police can immediately trace the location through the GPS modem after receiving the information.

Motivations

Life of the people is under risk, a million of peoples die every year as result of road traffic crashes. This is because of the lack of best emergency facilities available in our country.

Problem Statement

The unavailability of the precise methods for accident occurrence detection beside to a reliable locating tool with a quick reporting feature is the major problem under the research. The accidents are also increasing now days. Due to the delay in the arrival of ambulance to the accident spot it causes the loss of human life. So, it is necessary to take the accident victim to the hospital as early as possible.

Objectives

To detect the vehicle accident and transmit the location of the accident to the rescue team and police center, so will get the exact location by the geographicalcoordinates transmitted via message with the help of map.

To minimizing the delay of ambulance to save the injured.

II. LITERATURE SERVEY

Shete, Shah et a tried to solve automobile thefts. Developed an intelligent vehicle tracking and locking system in which the user will be able to interact with the system and to control his vehicle through an android based smart phone. He aim is to design such tracking system that reduces the time and cost to find out the stolen vehicle. If therate of vibration exceeds the threshold value it will automatically send the messages to the nearby hospitals and as well as the relatives of the victim, Shete, et al.

Rathinakumar and Manivannan have seen that the accident occurs due to a drunkendriver and improper use of belt. The main cause of accident is due to the driver drowsyand tired condition, which will be noticed by the help of eyes sensor which will not start and also informs the status of the driver to the base station along with the vehicle ID. Their system includes three modules; automatic speed control module, accident detection and information sending module and security enabling module. In case ofany accident, the vibration in vibration sensor increases beyond the limit and information is sent to GSM module. The GSM can send message to respective authority, Rathinakumar and Manivannan.

Kumar and Jayasree main concentration of this project is to find out the vehicle which is met with an accident by using MEMS sensor and GPS, GSM .This system will be placed in a moving vehicle. The ARM controller will poll GPS module in prefixed intervals and sends the vehicle location information (Latitude & Longitude) to central station over GSM network .This module provides information about the accident to the hospital and police station, Kumar and Jayasree.

Pingle and Ahirrao in this paper tried to save people lives from car accidents by using GSM and GPS model. They designed a system has accuracy which can detect accidents in significantly less time and sends the location information to medical center within a fraction of seconds covering the time, geographical coordinates and angle in which a vehicle accident had occurred. The message is sent through the Internet Dongle and the location of the accident is detected using GPS module. When the accident occurs the alert message is sent automatically to the rescue team and tothe police station & family members, Pingle, et al.

Wakure and Patkar in this paper helped when the car accident occurs. When accident occurs, Accelerometer will detect signal and will send signal to AVR controller, microcontroller will enable airbag to blow and message with accident location is sent to pre-programmed numbers such as ambulance, police station, etc. viaGSM. Message will give longitude and latitude values. From these values location of accident can be determined, Wakure, et al.

III. AIRBAG SYSTEM

AIRBAG SYSTEM:

The airbag of initial phase were inflated using compressed-gas canisters. However, thepressure canisters could only be accommodated in the instrument panel. Connection tothe steering wheel proved problematic since it could only be sealed with great difficulty .In the next development phase environments were carried out with liquefiedgas and solid fuels. The

solid propellant should supply the thermal energy needed to expand the liquid Fringe. Although the necessary inflation time of 1/30 second was reached this system was still too heavy 20-25.A neoprene-coated polyamide fabric wasinitially determined as a suitable material for air bag. After 1970, research concentrated on an inflator filled with solid fuel to inflate the airbag Together with development partners from the chemicals and automotive industries, This method of producing the gas was perfected for series production as of 1974.since the beginning of the nineties, all automobile manufacturers have been offering airbags as a standard feature or optional extra, even in compact class car.

However the world-wide use of the airbag system didn't proceed harmoniously since on the U.S.-American market it is specified as the only restraint system (Passive system) whereas in Europe it has been developed an as additional safety device(SRS:Supplemental Restraint System) to seat belt system. These different developments have affected the size of airbag and inflactor. As a sole Passenger protection system the airbag must be much bigger and must inflate earlier since the unprotected panel. The number of persons, drivers and passenger killed in traffic has dropped continuously since 1970.
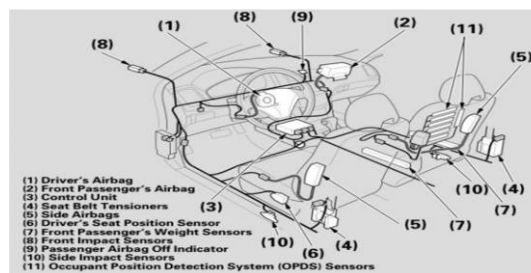
Type of Airbags:

Side Safety Airbag:

Children must never sit too close to the opening for the side airbag. The side airbags offer increased protection in a side-on collision. In order to be effective, the side airbags need to inflate very quickly. Working of side Airbag The airbag inflates with such force that injury can be caused if the occupant is not sitting upright, or if there areany objects close to the opening for the side airbag. And too close to the opening for the side airbag not properly seated in a suitable child safety seat correctly. Correct position-property restrained in a suitable child safety. The child is correctly seated in a suitable child restraint system on the rear seat. There is enough space between thechild and the opening for the side airbag.

Passenger Airbag Off Indicator:

Preventing deployment of airbags when children or children in child seats, in particular rear facing child seats, are placed on the front passenger seat. The extreme force from the deploying airbag, hitting rear facing child seat would in most cases result in the child being seriously injured or even killed. Children facing forward are also exposed to potential injury but the danger is not as extreme as with rear facing child seats. This study focuses mainly on how to communicate the considerations of placing small child in rear facing child seat in the front passenger seat of car equipped with passenger airbag. Whether an automatic or manual system, an indication display would be beneficial for the driver (parent) to be able to monitor the airbag status.

The reasons for this are:

To inform the car occupants that there is disconnection system in the car.

To inform the car occupants if the airbag is switched ON or OFF.
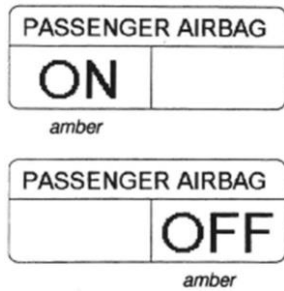
To verify airbag status in manual system.

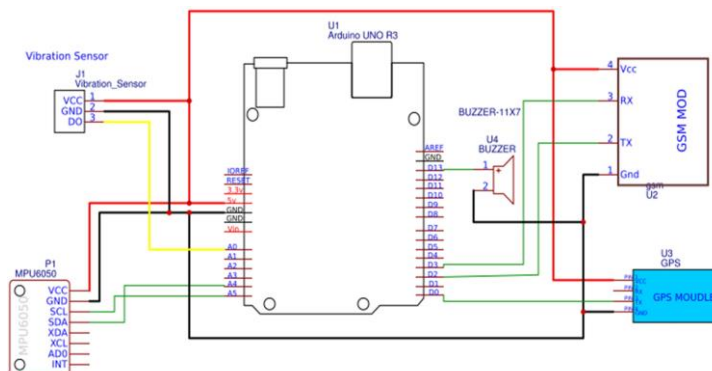

Fig 3.11 Indication Using Text   Fig 3.12 Indication Using

Fig.Passenger Airbag off Indicator

IV. METHODOLOGY

Working Principle

Circuit connection for our Accident Alert System device is not so complex. Here Tx pin of GPS module is directly connected to RX pin (RX0) of Arduino Uno. By using Software Serial Library here, we have allowed serial communication on pin RX0 and TX0, and made them Rx and Tx respectively and left the Rx pin of the GPS Module open. By default, pin 0 and 1 of Arduino are used for serial communication but by using the Software Serial library, we can allow serial communication on other digital pins of the Arduino. 5 Volt supply is used to power the GPS Module. GSM module's Tx and Rx pins of are directly connected to pin D8 and D7 of Arduino. For GSM interfacing, here we have also used software serial library. GSM module is alsopowered by 5v supply. An optional LCD's data pins D4, D5, D6, and D7 are connected to pin number 12, 11, 6, and 5 of Arduino. Command pin RS and EN of LCD are connected with pin number 4 and 3 of Arduino and RW pin is directly connected with ground. A Potentiometer is also used for setting contrast or brightness of LCD. An Accelerometer is added in this system for detecting an accident and itsx,y, and z-axis ADC output pins are directly connected to Arduino ADC pin A0, A1, and A2.

Flowchart

The figure below explains how the system is work and shows the steps that the systemfollows at the operation.
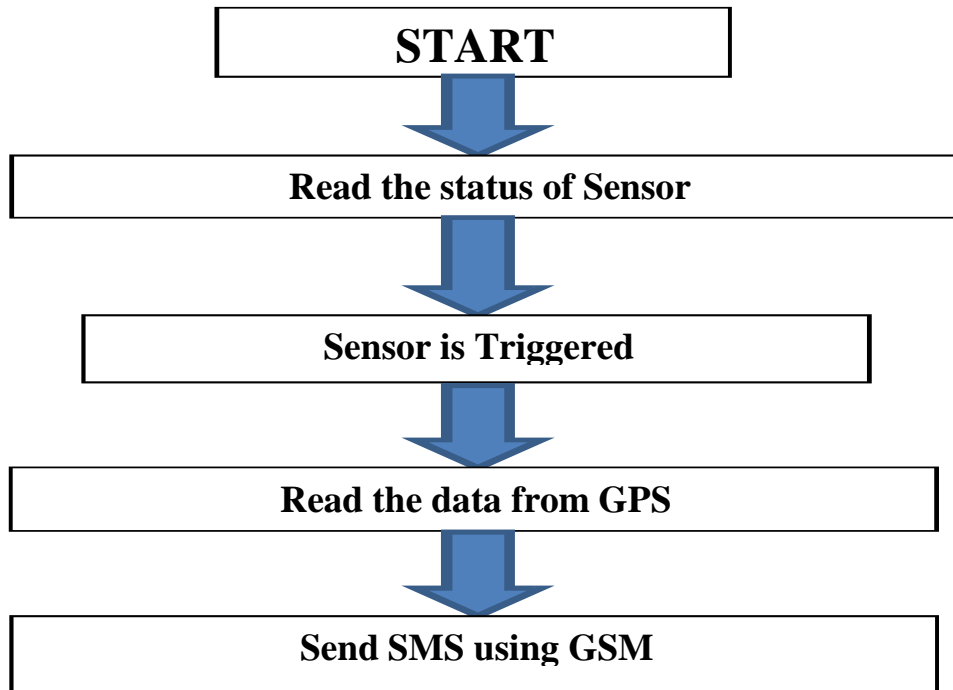
V. RESULTS

The system detects accident from a vehicle and send message through GSM module. The message is received by another GSM module. GPS Module track the exactlocation of the accident, Hence there is small variation in the coordinates, initial value of latitude and longitude are same but fractional value changes with small difference. At the simulation we tread the GPS and GSM modules with Virtual terminal, it act same as the modules work with more efficient at PROTEUS program. We connect the vibration sensor in the simulation with a variable resistance to control vibrate level. The results we get from the simulation are shown in the figure 4.1. At hardware we built, Arduino receive analog signals from the vibration sensor , it display on the LCD

, We set a certain limit for the amount of vibration if the shock exceed the limit then a delay of 10 second will display at the LCD and start count down to 0 , we introduced akey that will abort sending message if the key have been pressed before countingdown finish , GPS will send the coordinates to microcontroller , GSM will send a message to the recorded numbers , the message that will be send is shown in figure 4.2the full system is shown in figure 4.3.
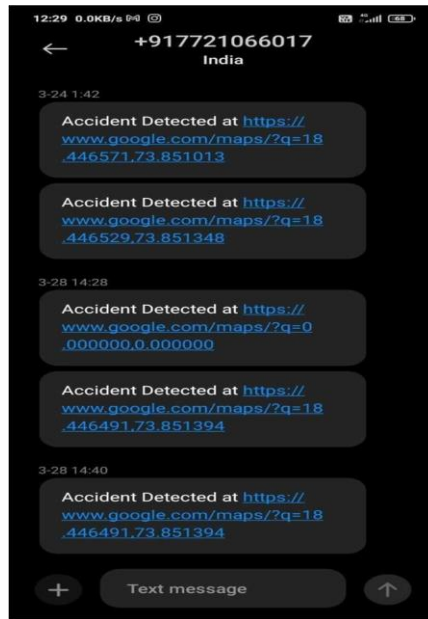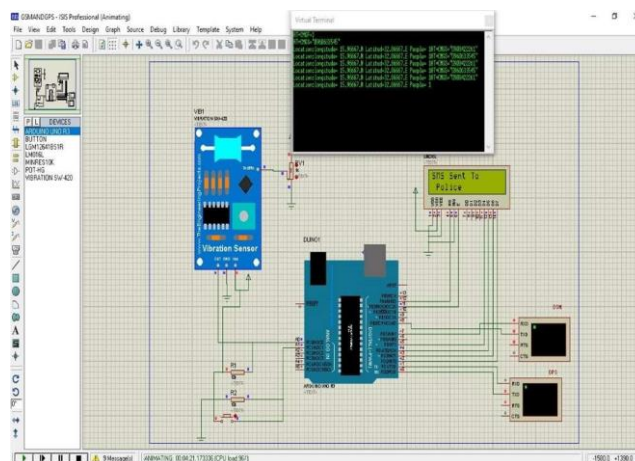
Figure 6.1 The Alert Message

Fig.Simulation of the System

VI. CONCLUSION

A system to detect an event of accident has been developed. The proposed system deals with accident alerting and detection. It reads the exact latitude and longitude of the vehicle involved in the accident and sends this information to nearest emergency service provider. Arduino helps in transferring the message to different devices in the system. Accelerometer monitors the accident happening direction and gyroscope is used to determine rollover of the vehicle. The information is transferred to the registered number through GSM module. Using GPS, the location can be sent through tracking system to cover the geographical coordinates over the area.

VII. FUTURE WORK

1.Further this system can be implemented by using sound sensor, in order to make it more accurate and efficient to detect an accident. This is extended with alcoholic detection also. If the person who is driving took alcohol then the vehicle will be stopped immediately by giving alarm. This can also be developed by interconnecting camera to the controller module that takes the photograph of the accident spot makes tracking easier.

2. We found the location of the accident but there may be chance that the traffic jam will be high in that path. So we need to come up with some algorithm which gets the nearby hospitals with minimal distance and traffic. We may add some module.

VIII. REFERENCES

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