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ACCIDENT DETECTION AND MESSAGING SYSTEMTECHNOLOGY

G.R. Patil[1],Neeraj Singh Bani[2],Prateek Kumar[3], SumerSingh[4]

[1]*Professor, Department of Electronics and Telecommunication Engineering, Army Institute of TechnologyPune, Maharashtra, India*
[2,3,4]*Student,Department of Electronics and Telecommunication Engineering, Army Institute of TechnologyPune, Maharashtra, India*

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 draw back.In this paper,we are giving insight to an automated accident detection and messaging system which uses GSM and GPS technology.The system uses Arduino Mega 2560 with Force senor and Piezo buzzer interfaced to it and Adafruit library.*

Keywords-*Accident Detection, Messaging,Force Sensor,GSM (Global System for Mobile Communications), GPS (Global Positioning System), Piezo Buzzer, Arduino Mega 2560.*

I.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 and messaging device for vehicle accidents is introduced in this paper. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid centre within a few seconds covering geographical coordinates in which a vehicle accident had occurred.Accident detection basically involves three most important procedures:

A. Detection of the accident.
B. Detection of accident Location (The GPS detects the latitude and longitudinal position of a vehicle).
C. Sending message and On Buzzer (The GSM send the location of accident to the first aid center).

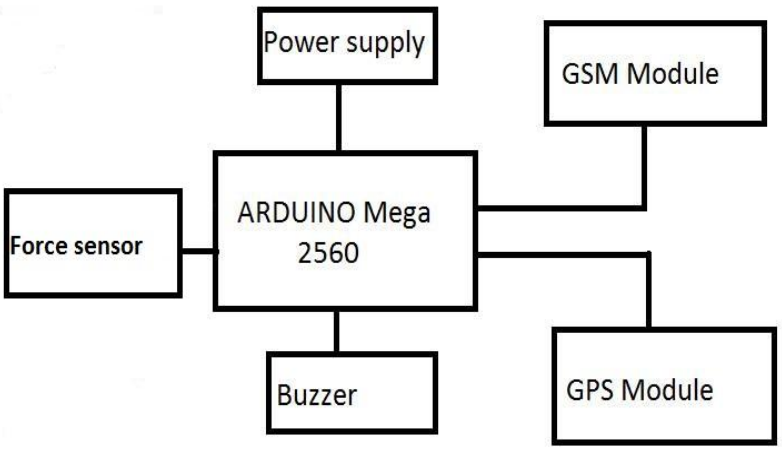

Figure 1. System overview

II. LITERATURE REVIEW

The topic of accident detection and messaging system is comparatively aged areason being primarily the practical importance of the subject and interest of cognitive researchers in a hypothesis. Though other methods of detection also exist like accident detection using pressure sensor or gyroscope but this method is simple, cheap and provide accurate result.

Ashish Kushwaha et al. in [1] have proposed GPS and GSM Based Accident Alarm System. The purpose of this work is to find the vehicle accident location by means of sending a message using a system which is placed inside the vehicle system. Author has used assembly programming for better accuracy along with GPS and GSM. In this project, whenever a vehicle meets with an accident immediately vibration sensor will detect the signal and send it to the microcontroller. Microcontroller sends the alert message through the GSM to an authorized mobile no. An alternate condition can be allowed by pressing a switch, in order to interrupt the flow of sending the message in case of no casualty.

Hu Jian-Ming, Li Jie, Li Guang-Hui et al. in [2] proposed a stolen vehicle recovery system. The system ensured increased safety and credibility. It used C8051F120 microcontroller and a vibration sensor. The vehicle owner gets the message regarding the vehicle location at specific intervals through GSM.

C.Prabha et al. in [3] have presented Automatic Vehicle Accident Detection and Messaging System Using GSM and GPS. In this paper an accelerometer can be used in a car alarm application so that dangerous driving can be detected. This paper is useful in detecting the accident precisely by means of both vibration sensor and Micro Electro Mechanical system (MEMS) or accelerometer. In this project GPS is used for tracking the position of the vehicle, GSM, ARM controller is used for saving the mobile number in the EEPROM and sending the message to it when an accident has occurred.NiravThakor et al. in [4] have presented Automatic Vehicle Accident Detection System Based on ARM &GPS.The system detects the vehicle accident with the help of vibration sensor or MEMS sensor. GPS module captured the location of vehicle accident and a message is transmitted with the help of GSM modem

III.METHODOLOGY

The prototype model of an automatic vehicle accident detection and messaging using GSM and GPS modem using Arduino Mega 2560 working will be made in the following steps:

Complete layout of the whole set up will be drawn in form of a block diagram.

- A force sensorwill first sense the occurrence of an accident and give its output to the Arduino Mega 2560.
- The GPS detects the latitude and longitudinal position of a vehicle.
- The latitudes and longitude position of the vehicle is sent as message through the GSM.
- The phone number 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 number.

GSM – Global System for Mobile Communication

GSM is used as a media which is used to control and monitor the transformer load from anywhere by sending a message. It has its own deterministic character. Thereby, GSM is used to monitor and control the DC motor, Stepper motor, Temperature sensor and Solid State Relay by sending a message through GSM modem. Hence no need to waste time by manual operation and transportation. Hence it is considered as highly efficient communication through the mobile which will be useful in industrial controls, automobiles, and appliances which would be controlled from anywhere else. It is also highly economic and less expensive; hence GSM is preferred most for this mode of controlling.

GPS - Global Positioning System

GPS is used in vehicles for both tracking and navigation. Tracking systems enable a base station to keep track of the vehicles without the intervention of the driver where, as navigation system helps the driver to reach the destination.

Whether navigation system or tracking system, the architecture is more or less similar. When an accident occurred in any place then GPS system tracks the position of the vehicle and sends the information to the particular person through GSM by alerting the person through SMS or by a call.

Accident Detection and Messaging System execution is simple as the system makes use of GSM and GPS technologies. GPS is used for taking the coordinates of the site of the accident while GSM is used for sending the coordinates to cell phones. To make this process all the controls are made using Arduino.

First step:

Force Sensor, which detects the accident and in turn sends the signals to Arduino

Second step:

The Arduino takes control and starts collecting the coordinates received from GPS.

Third step:

Coordinate received are later sent to the Central Emergency Monitoring Station by using the GSM.

YES

NO

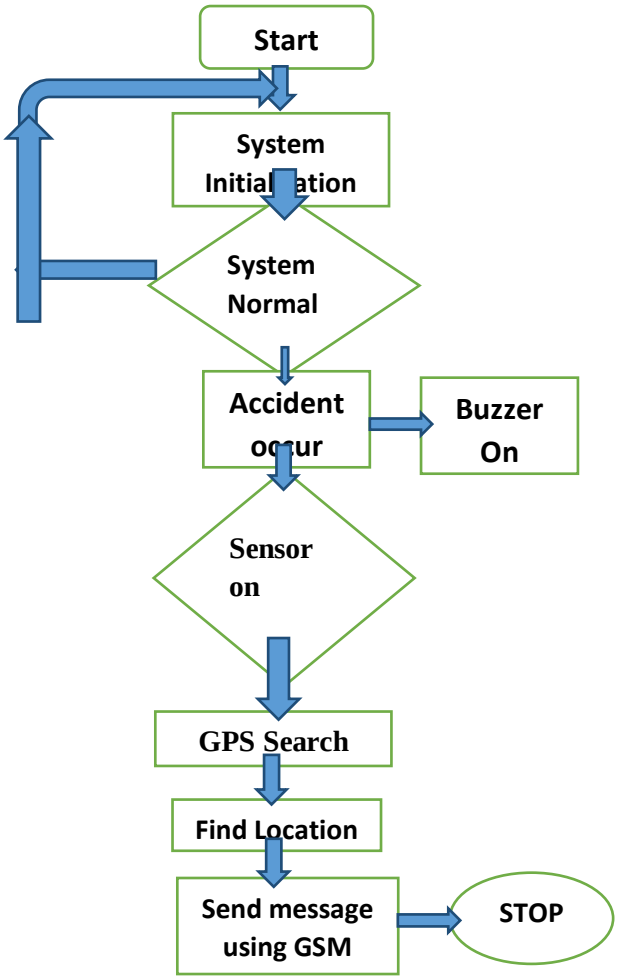

Figure 2. *Steps in accident detection and messaging*

IV. EXPERIMENTATION AND RESULTS

Table 1. *Functions used during implementation.*

Command	Expected Output	Observed Output
Adafruit_GPS.h	Initialise library of GPS	Initialised library of GPS.
"AT+CMGF=1"	Should Sets the GSM Module in Text Mode	Sets the GSM Module in Text Mode
"AT+CMGS=\"x\"\r"	This will send SMS to this number e.g. x	SMS is received to x
"AT+CCLK"	returns the accurate date and time	returns the date and time
GPS.latitude/100+0.2422, 4 ,GPS.longitude/100+0.3504, 4	GPS will give location in term of latitude and longitude.	Location is received in term of longitude and latitude.

V.CONCLUSION

We successfully implemented accident detection and messaging system which used Force sensor for accident detection, GPS system for position and GSM for message sending. This system locates the accident spot accurately, realizing the automation of accident detection and messaging system. Consequently, it will save the precious time requiredto save the accident victims. In the current era, everything is getting automated which leads to need of security. In such case, accident detection and messaging system will play a vital role. These systems can be made more intelligent and efficient by means of interactive and learning platforms.

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