

Automatic Vehicle Accident Detection and Messaging System Using GSM and GPS Modem

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Abstract - The always advancing technology has made our day to day lives easier. Since every coin has 2 sides similarly technology has its benefits as well as its disadvantages. The rise in technology has increased the rate of road accidents which causes huge loss of life. The poor emergency facilities available in our country just add to this problem. Our project is going to provide a solution to this problem. According to our project when a vehicle meets with an accident, a sensor situated on the vehicle will detect it immediately and send a message to the microcontroller. The microcontroller then sends the alert message with the help of GSM modem to a police control room or rescue team which will include the location with the help of GPS. Also the alert message containing the location of accident will be sent to the relatives of the victim. In case there is no casualty the driver can terminate the alert message by a switch provided in the vehicle. This will save the valuable time of rescue team. Our project is useful for detecting the accident precisely with the help of sensor and microcontroller. Keeping in mind the scope for improvement, we can add a wireless webcam which will capture the images at the time of accident which will help in providing accurate help to the victim as quick as possible. It can be interfaced with vehicle airbag system and a bomb detector.

Key Words: Sensor, microcontroller, GPS module, GSM module, alert message.

1. INTRODUCTION

The advent of technology has also increased the traffic hazards and the road accidents. Due to the lack of best emergency facilities available in our country the lives of the people are under high risk. An automatic alarm device for vehicles is introduced in this paper which sends the basic information to the medical rescue team within a few seconds of an 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. In cases where there is no casualty the message can be terminated with the help of a switch in order to avoid wasting the valuable time of the rescue team.

When an accident occurs it is detected with help of a sensor which activates the device, the sensor gives its output to the microcontroller. The microcontroller sends the alert

message automatically to the police station and the relatives of the person. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module. Hence with this project implementation we can detect the position of the vehicle where the accident has occurred so that we can provide the first aid as early as possible.

2. METHODOLOGY

2.1 WORKING

- i. A sensor will sense the occurrence of an accident and give its output to the microcontroller. Here a button sensor is used for detection which will get pressed when the vehicle meets with an accident.
- ii. A buzzer is present in this system with starts beeping indicating that the system is now activated.
- iii. The GPS detects the latitude and longitudinal position of the vehicle. It is essential to locate the position to provide medical assistance.
- iv. The phone numbers are pre saved in the EEPROM by the user. These numbers can be changed at any point of time.
- v. The microcontroller sends an alert message to these pre saved numbers using the GSM module. Any message can be pre entered in the system by the user.
- vi. A LCD screen displays the status of the output.
- vii. In case there is no casualty, the sending of the message can be terminated with the help of a switch. The switch will restart the microcontroller and its function will start from the beginning.

2.2 GSM- Global System for Mobile Communication

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.

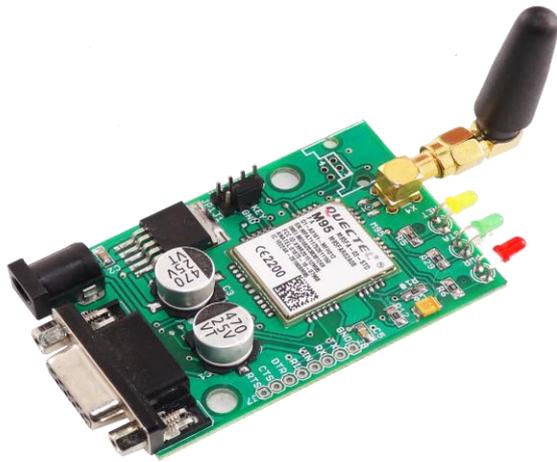


Fig-1: GSM Module

2.3 GPS- Global Positioning System

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 geolocation 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.

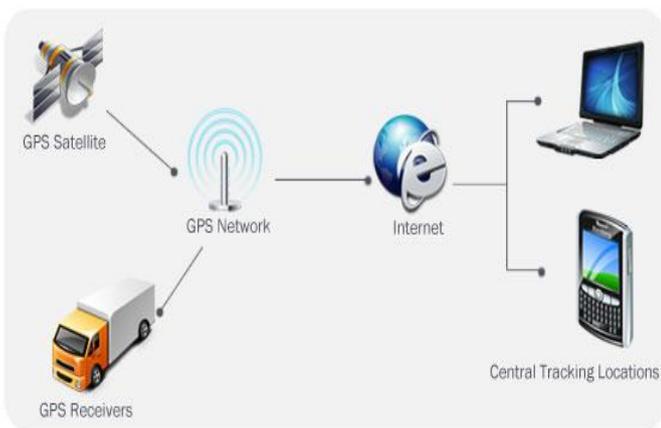


Fig-2: GPS Tracking System

2.4 HARDWARE DESCRIPTION

- i. **SENSOR:** A button sensor is used here as accident detection sensor. This sensor is pressed when an accident occurs which activates the device. The sensor sends a message to the microcontroller.
- ii. **MAX232:** The MAX232 is a dual transmitter/dual receiver that typically is used to convert the RX, TX, CTS and RTS signals. It is an integrated circuit

which converts the signals from the RS232 serial port to the proper signal which are used in the TTL compatible digital logic circuits.

- iii. **BUZZER:** A buzzer is an electrical device that makes a buzzing noise and is used for signaling. The buzzer beeps when an accident occurs to indicate that the device has been activated.
- iv. **EEPROM:** The phone numbers of police and relatives can be stored in EEPROM by the user which can be changed anytime. The data stored will retain even if the power is off for long time.
- v. **GPS:** The GPS detects the latitude and longitudinal positions of the vehicle. It is used for both tracking and navigation, GPS receiver can pinpoint the location using a process called trilateration.
- vi. **GSM:** The GSM sends the message with the location to the pre saved numbers. It is also used to control and monitor the transformer load from anywhere by sending a message.
- vii. **LCD:** The LCD screen is used to display the operating instructions and status of the output.
- viii. **RESET:** The reset button is used to reset the microcontroller at any stage of work. It can be used to terminate the sending of the message. If the reset switch is pressed, the microcontroller restarts and the function will start from the beginning.

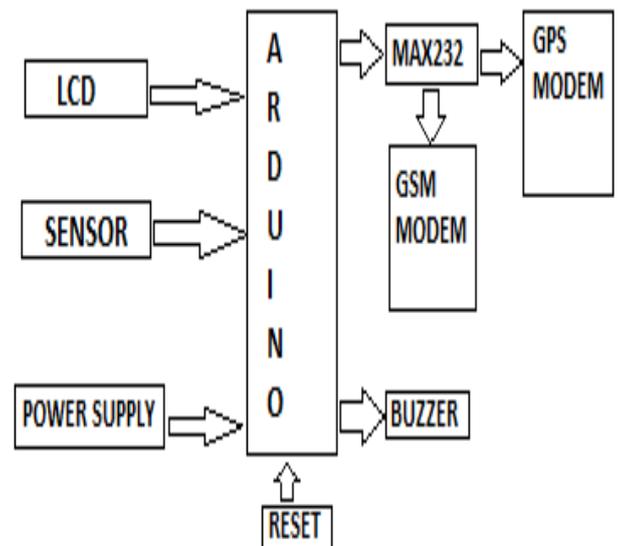


Fig-3: Block Diagram

3. ADVANTAGES

- i. Provides security against theft.

- ii. Monitors hazards and threats.
- iii. Alerts police and medical units about accidents.
- iv. Simple design and can be interfaced with other systems.
- v. Easy to operate by the user.
- vi. Reliable system.

- [2] Understanding GPS: Principles and Applications (Artech House Telecommunications Library), Elliott D. Kaplan (Editor) / Hardcover / (1996)
- [3] Alex Fares, "GSM systems engineering and network management," 2003.
- [4] Md. Syedul Amin, Jubayer Jalil and M. B. I. Reaz, "Accident detection and reporting system using GPS, GPRS and GSM technology," October 2012, DOI: 10.1109/ICIEV.2012.6317382.

4. APPLICATIONS

- i. **Stolen Vehicle Recovery:** In case of theft, the vehicle can be tracked by using vehicle positioning system. The GPS system allows the tracking of vehicle from anywhere.
- ii. **Airbag System:** This system can be interfaced with vehicle airbag system for safety. When an accident occurs both the systems will be activated for the safety of the victim.
- iii. **Bomb Detection:** This system can be used for bomb detection by connecting it to a bomb detector. The buzzer can be used to alert the presence of a bomb in the vehicle.
- iv. **Fleet Management:** When managing a fleet of vehicles, knowing the real-time location of all drivers allows management to meet customer needs more efficiently. Whether it is delivery, service or other multi-vehicle enterprises, drivers now only need a mobile phone with telephony or Internet connection to be inexpensively tracked by and dispatched efficiently.

- [5] Fengyuan Jia Hongyan Wang "A New Type of Automatic Alarming Device to Rescue Accident Injured in Time".
- [6] Sri Krishna Chaitanya Varma, Poornesh, Tarun Varma, Harsha "Automatic Vehicle Accident Detection and Messaging system using GPS and GSM Modems", International Journal of Scientific & Engineering Research, Volume 4, Issue 8, August-2013 ISSN 2229-5518.
- [7] GPS: Theory and Practice, B. Hofmann-Wellenhof et al., Springer Verlag, 1992, ISBN 3-211-82364-6 and 0-387-82364-6

5. CONCLUSION

This system provides the optimum solution to poor emergency facilities provided to victims in road accidents in the most feasible way. With the help of this technology immediate action can be taken when an accident occurs by alerting the respective people by sending a message. The drawback with this system is that it does not work without network. So in areas where no network is available the system will not be able to send the alert message. The proposed method is highly beneficial to the automotive industry. This will help the medical teams to reach the accident spot in time and save the valuable human lives. There is always scope for new improvements by interfacing it with different systems.

6. REFERENCES

- [1] Marie Bernadette Pautet and Michel Mauley, "The GSM system for mobile communications," 1992.