VEHICLE ACCIDENT DETECTION SYSTEM BY USING GSM AND GPS

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Abstract -*Arduino Based Vehicle Accident Alert System using GPS, GSM and Accelerometer. Accelerometer detects the sudden change in the axes of vehicle and GSM module send the alert message on your Mobile Phone with the location of the accident. The advancing technology has made our day to day lives easier. Since every coin has two 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.*

Keywords :Arduino, GSM, GPS, LCD, Vibration Sensor

1. 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 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, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of both Micro electro mechanical system (MEMS) sensor and vibration sensor. The Angle of the rolls over of the car can also be known by the message through the MEMS sensor. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way. 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.

2. PROBLEM DEFINITION

Accident detection and vehicle messaging system using GSM modem which helps to detect accident by vibration sensor. Vibration sensor (Piezo elements) comes in handy when you need to detect vibration or a knock. Can use these for tap or knock sensors pretty easily by reading the voltage on the output. Vibration sensor helps to send the signal to Arudino controller. Arudino controllers send the alert message through GSM modem with location. If the person meets a small accident, the driver can inform attention is not required by terminating the message using switch. This is to avoid wasting the time of the medical and police team. GSM modem is similar to mobile phone without any display, keypad and speakers. This accepts a SIM card, and operates over a subscription to a mobile operator.

3. METHODOLOGY

The Prototype of this Accident Detection and information passing technique uses the following steps:

1. The Complete Setup is depicted in the form of block diagram.

2. Piezoelectric sensor detects the first occurrence of the accident and it is intimated to the MCU.

3. The Latitude and Longitude are detected using GPS and it is sent as message to the rescue team through GSM.

4. The message receiver number is pre stored in the EEPROM.

5. A OFF Switch is also provided at times of need to avoid false message.

4. 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, here 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. Hence this automatic system is more efficient and less expensive and more convenient to use from were ever possible. Hence can be preferred mode of communication for controlling purpose.

5. 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. GPS module sends the data related to tracking position in real time, and it sends so many data in NMEA format. NMEA format consists several sentences.in which we only need one sentence. This sentence starts from $GPGGA and contains the coordinates, time and other useful information. This GPGGA is referred to GLOBAL POSITIONING SYSTEM FIX DATA .Know more about NMEA sentences and reading GPS data here.

6. LITERATURE SURVEY

At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking the position of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In this project GPS is used for tracking the position of the vehicle, GSM is used for sending the message and the ARM controller is used for saving the mobile number in the EEPROM and sends the message to it when an accident has been detected. From the past event and the existing approach the below Drawback are been noted:

1. Manual system is adopted.

2. Tracking of accident is a crucial process in the system.

3. Required medical attention cannot be given to the needed person.

4. Life loss and property loss were not stopped in large scale. Considering all the drawbacks into account we have formulated a proposed system which covers all the above mentioned drawbacks.

5. The Automated system is used once the accident occurs.

6. This system GSM will send the message to the More Human life can be saved using this automated system.

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7. DESCRIPTION

Now a days large amount of accidents are happening in highways due to increase in traffic and also due to rash driving of the drivers. And in many situation the family members or the ambulance and police authorities cannot able to get information regarding to that accident in an appropriate time. This result in delaying the help which is more important to that person who suffer from that accident. Our project automatic accident vehicle detection and messaging system using GSM modem is designed to overcome such problem and to prove help for the person who met with accident and save their life too by passing message to rescue team in right time.

In this project we are using accident detection unit which fitted the vibration sensor in the vehicle. For example, In case of accident, occurs if the car is hit to some other vehicle or an object it create some vibration in that case then the vibration sensor will detect the vibrating signal and it pass the message to the arduino. Arduino is used as a Central Processing Unit (CPU) of our project. When the arduino receives a signal from vibration sensor it immediately pass the message to GSM modem then the GSM modem then the GSM modem will starts its process. In this project we used reset button it will be used by the driver if the accident is very normal for example if the driver hit the wall in some situation like parking then the driver will press the reset button this will inform the arduino to that system will not send SMS. But if the driver is not in a situation to press the switch or if the accident is really a major accident then the driver will not press the reset button and then the system will send SMS.

Here, we use GSM modem to send SMS to the family members and the rescue team. Buzzer is also used to indicate as a accident has been occurred which will create a beep sound. Thus the life of a person who met with an accident has been identified and save their life too.
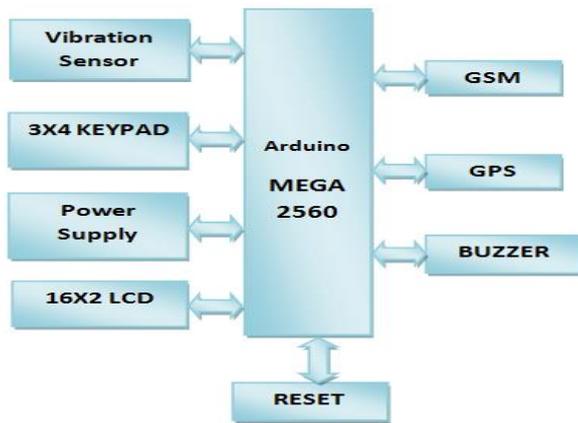
Fig -1: Block Diagram

8. HARDWARE DESCRIPTION

8.1 ARM7 TDMI

The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers (CISC). This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core. Pipeline techniques are employed so that all parts of the processing and memory systems can operate continuously. Typically, while one instruction is being executed, its successor is being decoded and a third instruction is being fetched from memory. The ARM7TDMI-S processor also employs a unique architectural strategy known as Thumb, which makes it ideally suited to high-volume applications with memory restrictions, or applications where code density is an issue. The key idea behind Thumb is that of a super-reduced instruction set.

8.2 SENSOR

A piezoelectric sensor is used as accident detection sensor. A piezoelectric transducer has very high DC output impedance and can be modeled as a proportional voltage source and filter network. The voltage V at the source is directly proportional to the applied force, pressure, or strain. The output signal is then related to this mechanical force as if it had passed through the equivalent circuit.

8.3 MAX 232

The MAX232 is a dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5-V supply. Each receiver converts TIA/EIA-232-F inputs to 5-V TTL/CMOS levels. These receivers have a typical threshold of 1.3 V, a typical hysteresis of 0.5 V, and can accept ±30-V inputs. Each driver converts TTL/CMOS input levels into TIA/EIA-232-F levels.

8.4. EEPROM

24C04 EEPROM is used in this project. This EEPROM stores the mobile numbers entered by the user for receiving accident alert SMS. The data stored in the EEPROM will retain even the power is off for long time.

8.5 16X2 LCD

16 X 2 LCD is used to display the operating instructions and status of the output. HD44780U is used in the project. The HD44780U dot-matrix liquid crystal display controller and driver LSI displays alphanumeric, Japanese kana characters, and symbols. It can be configured to drive a dot-matrix liquid crystal display under the control of a 4- or 8-bit microprocessor. Since all the functions such as display RAM, character generator, and liquid crystal driver, required for driving a dot-matrix liquid crystal display are internally provided on one chip, a minimal system can be interfaced with this controller/driver. A single HD44780U can display up to one 8-character line or two 8-character lines. The HD44780U has pin function compatibility with the HD44780S which allows the user to easily replace an LCD-II with an HD44780U. The HD44780U character generator ROM is extended to generate 208 5X8 dot character fonts and 32 5X10 dot character fonts for a total of 240 different character fonts.

8.6 CONTRAST CONTROL

It is a simple variable resistor (preset) with linear characteristics. This is used to adjust the contrast of the display.
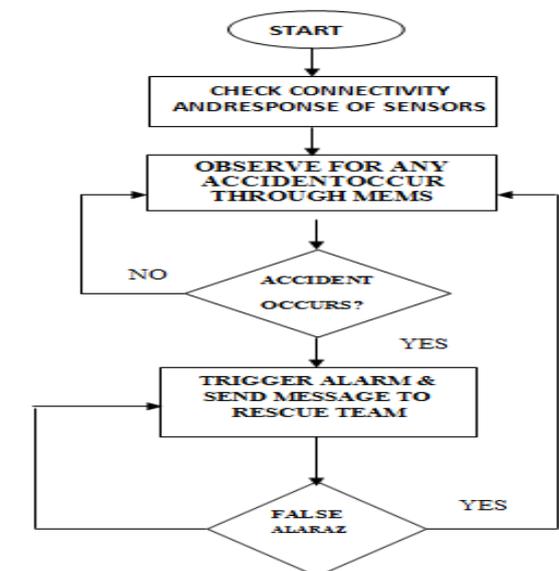

**Fig -2** Flow Diagram of Accident Detection system
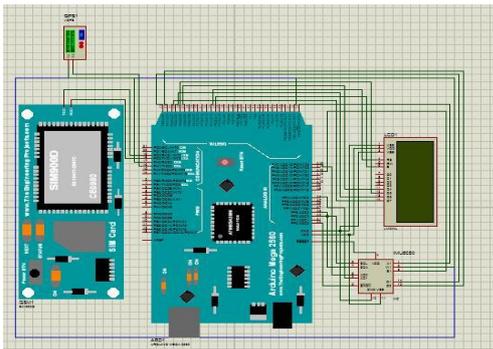
Fig -3: Circuit Diagram
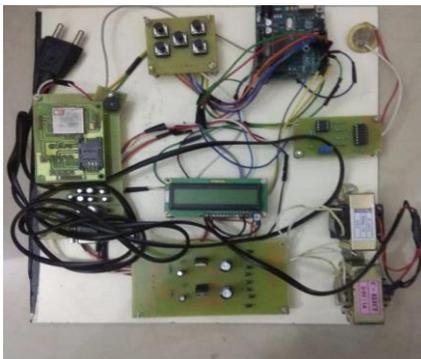
Fig -4: Hardware Implementation

9. ADVANTAGES

- Isolates both GSM&GPM
- Alerts police and medical units about accidents.
- Simple design and can be interfaced with other systems.
- Easy to operate by the user.
- Reliable system.
- Easy to operate.
- Monitors hazards and threats.
- Sophisticated security.
- Simple and Reliable Design.

10. RESULT

The system detects accident from vehicle and send message through GSM module. The message is received by another GSM module. Google Map Module It displays Google map show u exact location of accident and it details. It gets detail SMS from accident location. Hence there is small variation in the coordinates, initial value of latitude and longitude are same but fractional value changes with small difference.

11. SCOPE AND FUTURE WORK

A wireless webcam can be added in this for capturing the images which will help in providing driver`s assistance. This can also be bettered by locking all the brakes automatically in case of accident. Mostly in accidents, it becomes serious as the drivers lose control and fail to stop the vehicle. In such cases, the vibration sensor will be triggered because of the vibrations received and also processed by the processor. The processor has to be linked to the devices which can lock the brakes when triggered. With this improvement, we can stop the vehicle and can weaken the impact of the accident. This system can also be utilized in fleet management, food services, traffic violation cases, rental vehicle services etc.

12. CONCLUSION

Our idea is used to detect accident and automate emergency assistance services. As a result, system is sending SMS to the nearest Emergency assistance service provider from accident location. 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 device for vehicle accidents. This design is a system which can detect accidents in significantly less time and sends the basic information. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the accident occurs the alert message is sent automatically to the rescue team and to the police station and the message is sent through the GSM module.

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