ACCIDENT DETECTION WITH MEMS AND ALERT SYSTEM FOR MEDICAL EMERGENCY

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ABSTRACT

The motor vehicle population is growing at a faster rate than the economic and population growth. Accidents and the death rate due to road accidents, especially two wheelers are also increasing at an alarming rate. most of the accidental deaths that happen due to lack of immediate medical assistance, on the facility for providing immediate medical assistance to accident area can reduce the fatality to greater extends. In this project the arduino microcontroller Atmega328 is interfaced with MeMs.This entire system should be placed on a moving vehicle

KEYWORDS: *Accident detection; Mems; Gsm; Gps.*

1. INTRODUCTION

With the increasing global demand for security, identification of people and assets and the merginnations directive into unions, expansion and complexity of transport networks, raises the demand for Vehicle Tracking System. Vehicle Tracking System or Automatic Vehicle Location System (AVL) is now one of the most popular technological changes in all over the world that is going to make our personal and business life lot easier. As the term suggests, it enables one to track or monitor the location of vehicle in instant time. Primarily, the system functions with the help of different technologies like the Global Positioning System (GPS), traditional cellular network such as Global System for Mobile Communications (GSM). But GPS is more effective and accurate in this field. As far as vehicle tracking in India is concerned, its uses and market are expected to increase within a couple of years.

The main concept of the proposed project work is to identify the crashed vehicle position (location Program has been developed which is used to locate the exact position of the vehicle and also to navigated track of the moving vehicle on Google Map.GPS provides highly accurate position information and can be used for a variety of land, sea, and air applications. GPS, which began as a military application, has become a viable tool for many commercial and personal applications. One such application has been a vehicle location tracking system (VLTS). These tracking systems incorporate a GPS receiver and a wireless transceiver that allow a remote unit to track the vehicle's position. GPS Tracking device acquire GPS signals from GPS

satellites and calculates its position on the earth. To acquire GPS information, a wireless receiver capable of the civilian L1 frequency (1575.42 MHz) is required. The GPS receiver measures distances to four or more satellites simultaneously. Using triangulation the receiver can determine its latitude, longitude, and altitude.

2. SYSTEM FEATURES

A. Architecture of the proposed system

The proposedsystem consists of accident detection system and a smart phone. The accident detection system continuously monitor the vehicle is in normal driving posture or met any accident. The system monitors the pulse rate of the driver continuously. if any abnormal condition is detected the alert will be sent to mobile numbers mentioned in the code written for arduino microcontroller. The system will have the details of the driver and the Gps coordinates send the alert. The high level architecture of the proposed system is shown in the figure 1

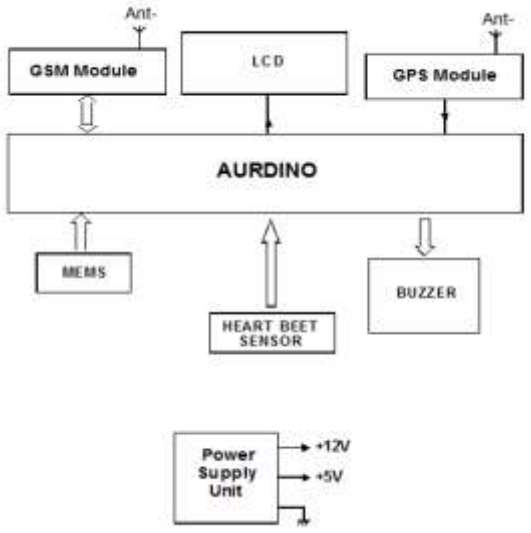


Figure 1:Block diagram of accident detection system

B.Accident detection system

Microcontroller used is ATMEGA 328. The code is written in the internal memory of Microcontroller i.e., in the ROM. With the help of instruction set it processes the instructions and acts as interface between GSM and GPS with help of serial communication and also used for selection of GPS or GSM through the switching transistors. The accident detection i.e. MEMS sensor is shown in the figure 2. With the help of transistor the microcontroller switches between GPS and GSM. GPS receives the data and GSM transmits and receives the data. So the GPS system will receive the Longitude and Latitude values corresponding collided vehicle position through the satellites. GPS TX pin and GSM TX pin are connected through two individual transistors that are controlled by the controller itself for switching the data that is to be read from the GPS or GSM.

3. DESIGN OF ACCIDENT DETECTION SYSTEM

A. Accelerometer (MEMS) sensor

Figure 2: Accelerometer sensor

Accelerometer (MEMS) sensor is used whose output values will be along X, Y and Z axes. Output of Accelerometer is input to the microcontroller. GPS receiver gives location of vehicle to microcontroller in each second. Message with location of accident is sent using GSM to preprogrammed numbers. GSM is connected to microcontroller through

MAX232. MAX232 IC synchronizes baud rates of microcontroller and GSM modem. Data is given to MAX232 through RS232 cable. The MEMS sensor is shown in the figure 2 Microcontroller supports TTL voltage levels. MAX232 is used to convert TTL voltage levels into RS232 voltage levels and vice versa.

B. Heartbeat sensor

Figure 3: Heartbeat sensor

It is the most popular technique which is used for measuring the heart rate .This technique is called as average calculation. A person average rate (i.e. beats per minute) can also be calculated by counting the no of pulses in a given time. In this method it is necessary to calculate Beat to Beat and no of beats per minute is calculated which is measured in this project. The heartbeat sensor is shown in the figure 3.When the blood volume at the finger tips is changed and it is monitored through IR sensor called as transmittance method. In this method Infrared light emitting diode and Infrared sensor are present which is closed in an region that fits over the tips of the finger For designing of Heartbeat sensor we use technique called Plethysmography.If there is a change in the volume of blood this technique will respond. When the measured pulses go abnormal an SMS will be sent through GSM.

C.Buzzer

A buzzer is provided to alarm the nearby passengers that the accident has occurred, thus, there will be more chances of exploring the help from the fellow passengers for the victim.

D. Arduino controller

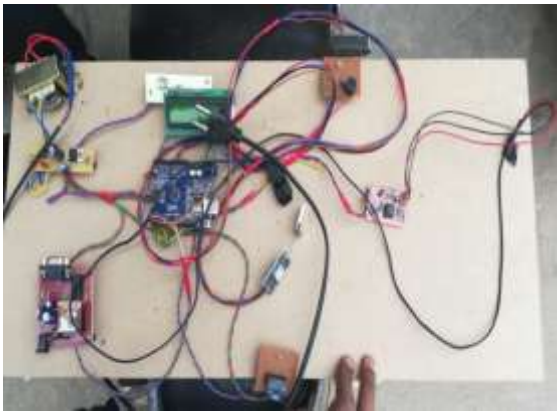
Arduino is a open source electronics platform easy-to-use hardware and software.Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or breadboards (*shields*) and other circuits.The Arduino controller is shown in the figure 4. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++.

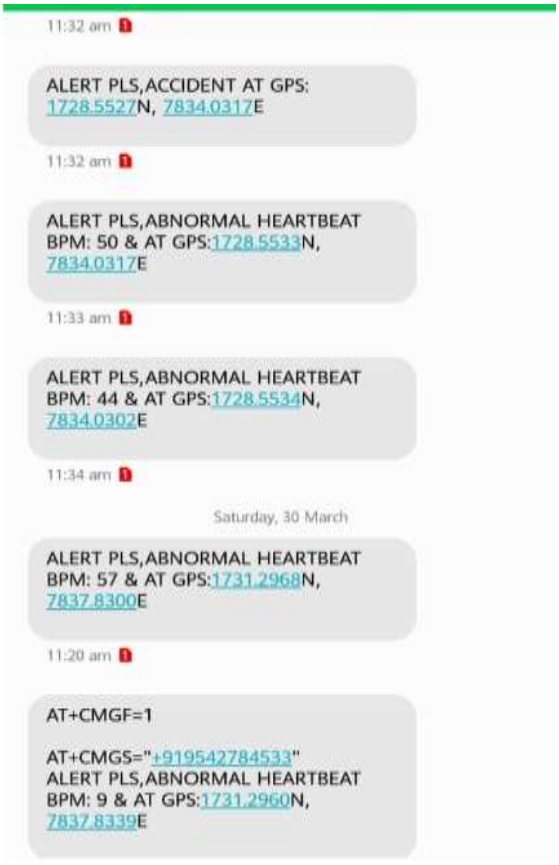
Figure 4:Arduino controller

4. FABRICATION, TESTING AND ANALYSIS

Buzzer will be activated when the heartbeat is in abnormal condition occurs 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. Whenever accident of vehicle is occurred

then the device sends messages to given mobile number. The circuit diagram of this project is shown below in figure 5.As we know that if the accident occurs a message will be received to the registered mobile number. By knowing the longitude and latitude we can find the location of the person. The Output of this project is shown in the below figure 6





4. CONCLUSION

The Project titled "Accident detection with MEMS for Medical Assistance" using GSM, GPS, MEMS" is a model for Vehicle Tracking unit with the help of Google maps and also with the help of GPS receivers and GSM modem.

The proposed system deals with the detection of the accidents. But this can be extended by providing medication to the victims at the accident spot. By increasing the technology we can also avoid accidents by providing alerts systems that can stop the vehicle to overcome the accidents

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