ACCIDENT ALERTING AND IDENTIFYING SYSTEM USING ULTRASONIC AND ACCELEROMETER

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ABSTRACT

In this paper we are going to provide the information how to identify the accident spots which would be easy access for the Emergency Medical Service to provide their services to the people who has met with an accident. Our kit would be placed in the vehicles which consist of GPS, GSM and mems accelerometer, ultrasonic sensor. By using ultrasonic sensor, we intimate the driver about the distance between our vehicle and another vehicle. If the distance is less than the predefined one then a message is displayed indicating the distance. The MEMS placed in the vehicle is going to identify, whether the vehicle is moving in the perfect condition or met with an accident. We continuously read those MEMS values and perform the comparison; if they have matched, then we are going to read the location details by using GPS and send the message from the GSM to family members, EMS and hospital.

Keywords: GSM, GPS, MEMS Accelerometer, Ultrasonic Sensor

I. INTRODUCTION

We have seen in many countries that nearly 20% of the deaths are caused by the road accidents. The main cause for the road accidents are drunk and drive, over speed, driving the vehicle with no sleep etc. if the accidents have occurred on some busy roads someone would call the emergency vehicles for aid, if the accidents have occurred on the highways there would be no send this information to the ambulance or his family. So due to lack of emergency help many people have died on those road accidents. To reduce those deaths we have come up with a system to provide information about the accident occurrence to the driver. If the accident takes place then the information about the accident is sent to his family members, hospital and ambulance.

With the past technology we are going to get the information about the accident, just by sending the message to the ambulance that some vehicle has met with an accident. But it was somewhat difficult to identify the location where the accident has taken place. In present days technology we have in-built devices like air bags, GPS etc., to activate on the occurrence of the accident only in the high-end vehicle or in four wheelers which belongs to the brand. These devices are bit costly so the ordinary vehicle manufactures are not in the position to afford those devices. Then the product proposed by us would be less expensive and small in size, which can be placed in the two wheelers also. Accident occurrence would be identified by the MEMS accelerometer, which will be sending the co-ordinates of three axes X, Y, Z. So according to the position placed by the MEMS, the co-ordinate values will also change. By the change in the values we are going to identify whether accident has occurred or not.

II. SYSTEM OVERVIEW

Fig: Over View of Process
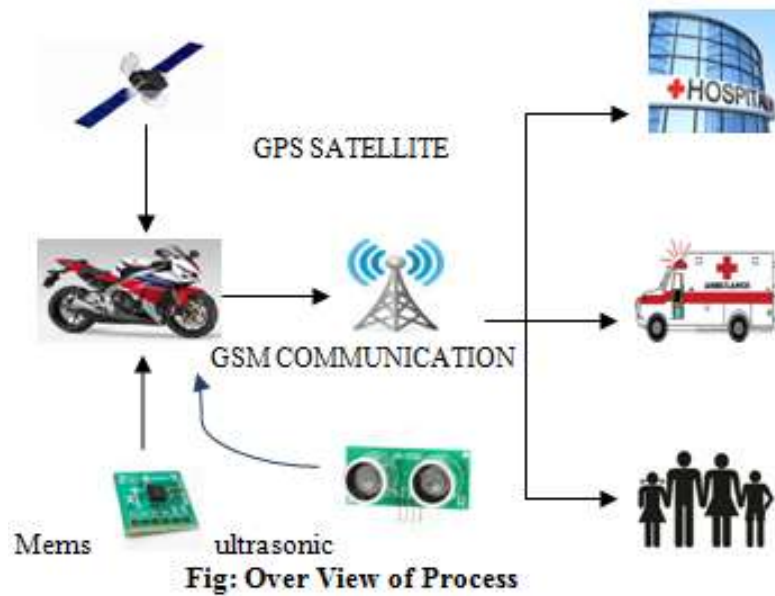
Basically the components in the project are micro controller, GPS, GSM, MEMS ACCELEROMETER and ULTRA SONIC SENSOR. GPS, GSM, MEMS, ULTRA SONICE SENSOR are placed in the bike, to transmit the information of the accident through GSM and receive the location details using GPS, to receive the information of the distance of another vehicle using ULTRASONIC SENSOR. That information would be transmitted to the ambulance, family members and also to hospital.

In case of two wheelers the kit can be placed under the driver seat and ultrasonic sensor would be placed near the head lights. The kit should need protection from dust and dirt so it is safe to place the kit under the driver seat. By placing the kit under the driver's seat there would be no problem for the network coverage area of mobile and no problem for the GPS to read the location details by using the satellite.

III. BLOCK DIAGRAM
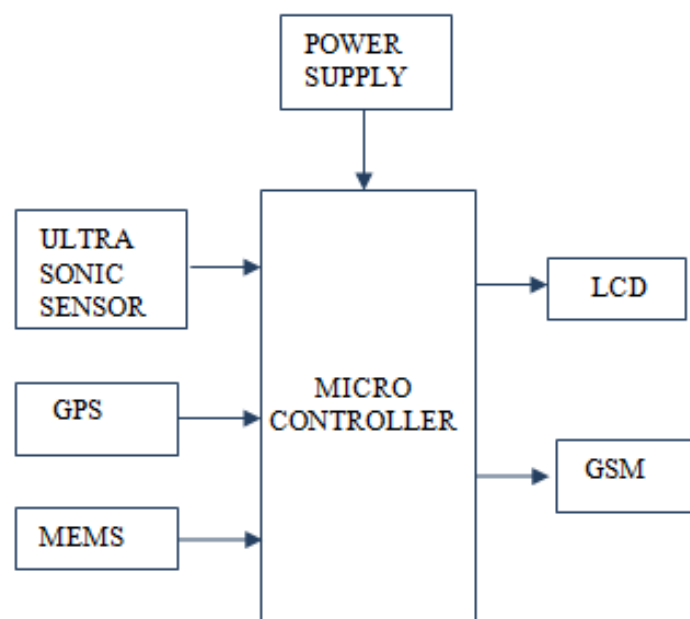
Fig: Block Diagram

IV. WORKING PROCESS

Our main motto is to reduce the deaths caused by the accidents, to reduce the deaths we need to provide the emergency help as quickly as possible to the people in the accident. To provide that quick help we have developed this project with the different modules.

Initially when the program has started it is going to read the 3-axes values from MEMS and distance between the owner's vehicle and another vehicle.

4.1 Micro Controller (LPC 2148)

Controller is the main part of the product which performs all the required operations and will control all the remaining modules. Some important features are:

 i) 40kb of on-chip static RAM.

ii) 512kb of on-chip flash memory.

iii) 128 bit wide interface/accelerator enables high speed 60 MHz operation.

iv) In-built USB 2.0

v) In-built RTC

vi) In-built ADC of 10bit which takes 2.44ns for conversion.

vii) With in-built I2C and SPI communication.

4.2 Ultra Sonic Sensor

This sensor is going to give information about the distance of another vehicle from our vehicle. It needs to be placed on the front side of the vehicle; it is going to send pulses continuously in the straight path. If there is an obstacle on the path then those rays would be reflected back. Sensor is going to calculate the distance of the obstacle according to the time taken for the rays to reflect back. If the object is within the prescribed range (predefined distance) then it is going to inform the driver that there might be a chance of accident or else it is going to leave that and again going to check for the distance of the vehicle.

4.3 MEMS

It is Micro Electro Mechanical System. This is the main device used to identify the accident occurrence according to the received co-ordinate values. Initially we need to fix the mems to the base of the vehicle and read 3-axes values. Then make the vehicle to lie down, now read the values of the three co-ordinates and store them in array. Now we need to write so effective code that we need to read the values from the mems and perform the comparison operation with the predefined values stored in the array. If the values match then it indicates that the vehicle has fallen down by meeting with some accident, then its need to inform the GSM to send message

Fig: MEMS Module

4.4 GPS

It is Global Positioning System. When the vehicle has met with an accident then controller makes the GPS into the working mode and then starts reading the values of the present location (latitude and longitude value) by using the satellite. While reading the values from the GPS we can get the information about speed with which the vehicle is moving, altitude of the GPS from the sea level, exact time is calculated, number of satellites used to read the data, etc. Those values will be fed to the GSM to transmit the information.

4.5 GSM

It is Global System for Mobile communication. The received information from the GPS about the latitude and longitude values will be stored in the message and with the vehicle number, that information will be transmitted to the respective family member, ambulance, and also to hospital. This GSM works under serial communication, to perform that action we require a separate serial port. But in case of our controller we have only two sets of serial communication ports.

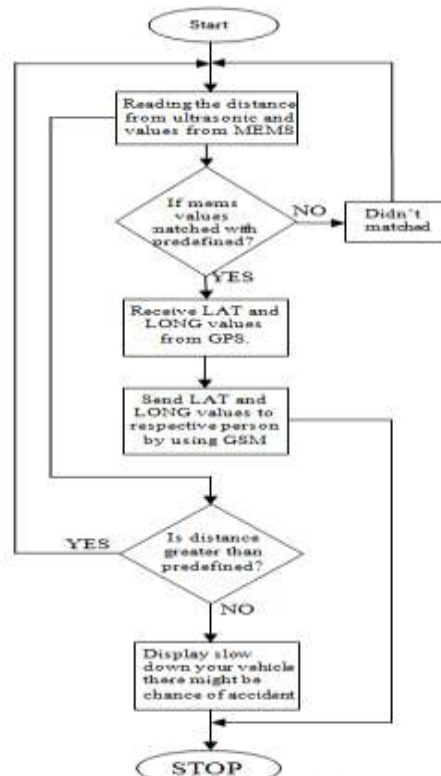**FIG: GSM Module**

V. FLOW CHART

Fig: Flow Chart of the Process

VI. EXPERIMENTAL RESULTS

We have performed the experiment on bicycle by placing the kit on the back seat (carrier) and placed the ultrasonic sensor on the front part. The predefined distance we have prescribed is 3mts, when we have taken the bicycle and moved it very close to another vehicle with distance less than 3mts automatically "SLOW DOWN A CHANCE OF ACCIDENT" is being displayed on the LCD screen.

We have made the bicycle to hit another vehicle and after falling down, within minutes; message has been transmitted to 3 different person's informing "TS 28 BT 2148 VEHICLE HAS MET WITH AN ACCIDENT AT LAT: 4807.035, N, LONG:01136.045, E." Thus over project has been succeeded in identifying the accidents and inform that to the respective mobile number we are going to feed in program.

Fig: when another vehicle is near danger is display on driver screen

Fig: when vehicle met an accident message received by mobile

VII. CONCLUSIONS

We have placed the kit on the vehicle and checked the output. Thus this project can be used as accident alerting system and also can be used as accident identifying system and also used as accident informing system, by sending that information to the respective person. We can also say this as a lifesaving project.

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