

GSM BASED ACCIDENT PREVENTION SYSTEMS FOR NEXT GENERATION TRAFFIC CONTROL USING PARALLEL MONITORING TECHNIQUE

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Abstract:

The major problem that is occurring in our developed country is the maintenance of roads whereas the identification of the potholes and humps, not only useful to the drivers to avoid accidents or damaged vehicles. This helps us to maintenance of road .This paper which says about the potholes and humps detection on the roads. This gives time alerts to the drivers, it helps to avoid accidents or vehicle damages. Mainly we have used ultrasonic sensors which used to identify the potholes and humps and also measures the depth and height of the roads respectively. The data which are sensed by the sensors include potholes depth and height of the hump and geographic location which is to be already stored in the database.This information serves us a valuable source to the government authorities and vehicle drivers where the application which is used android to alert drivers so that precaution measure can be easily taken to avoid accidents or else flash messages with an alarm sound can also produce audio beep.

Keywords – Ultrasonic, database, potholes.

1. INTRODUCTION

India is one of the most popular country in the world and it has a fast growing economy. Roads are the dominant means of transportation in India today. However, in India most of the roads are narrow and congested. It has a poor surface quality and less maintenance.

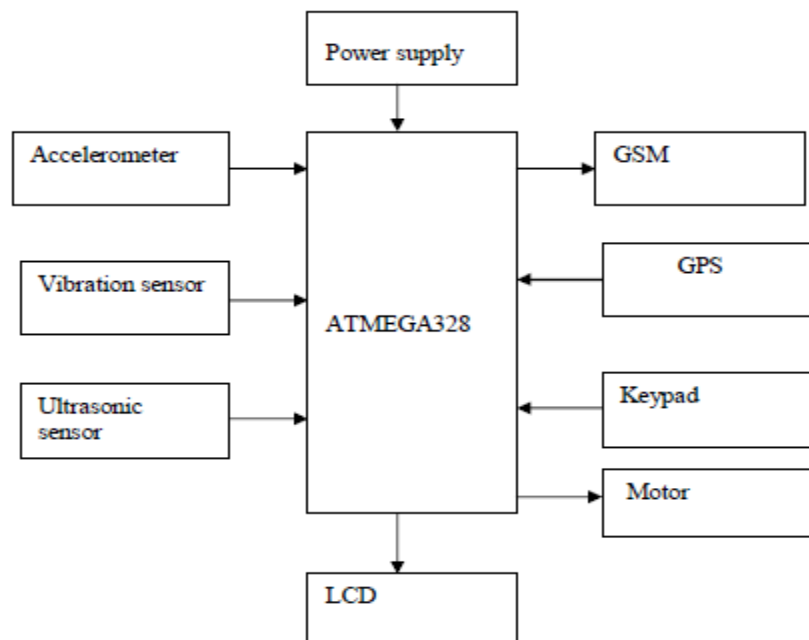


Fig.1.Block diagram

Since we are in India driving is a breath holding, potentially threatening affair. Vehicle population has been increased tremendously over the last two decades. Nowadays traffic congestion and road accidents are increasing mainly due to this proliferation of vehicles. Roads in India normally have speed breakers so that vehicle's speed can be controlled to avoid accidents. These speed breakers are unevenly distributed with unscientific heights. Heavy rains and movement of heavy vehicles are the main reasons for the formation of potholes. This also leads to major traumatic accidents and loss of human lives. According to the survey report "Road Accidents in India,2011", a total of 1,42,485 people had lost their lives due to fatal road accidents by the ministry of road transport and highways.

2. PROPOSED METHOD

In this circuit diagram, the connections are based on the proteus software. Mainly transformer is used in this, we are using step down transformer where to control the microcontroller pins. Whereas each component have various ranges all varies from different ranges. The accelerometer which is used to control the speed of the vehicles on the road by automatic. The liquid crystal display (LCD) which is used to display the output of the alert messages through the devices.

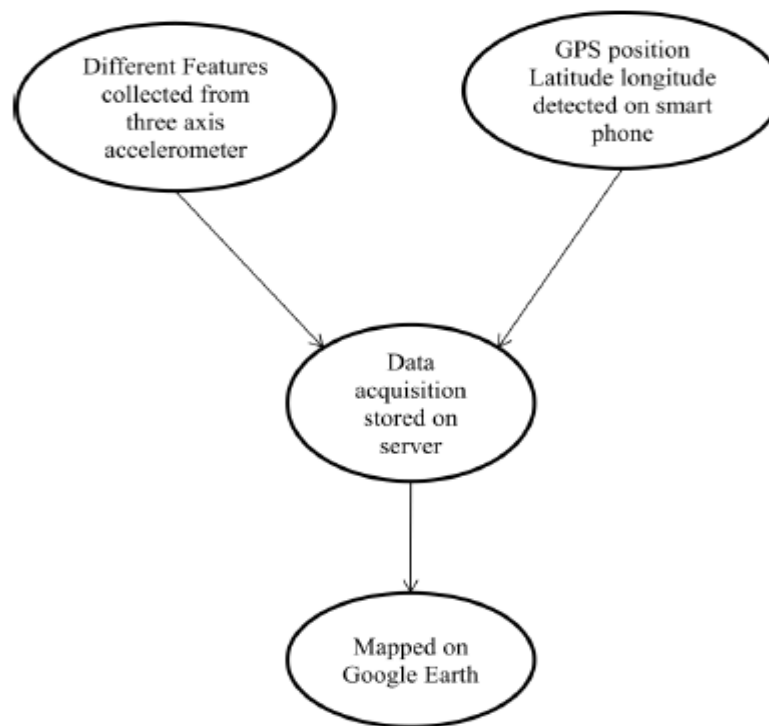


Fig.2.Overview of safe driving

Here we have used Ultrasonic sensor, Vibration sensor, GSM, GPS, Accelerometer, transformer and microcontroller, The system which offers the cost effective for the detection of the potholes and humps

which notifying drivers about their presence, the components used in the system are, Atmega328 microcontroller :It is 40 pin microcontroller with 8k program memory. Microcontroller is the main part of the system which is responsible for various task processing from the sensor inputs to alert the drivers. Ultrasonic sensor HC-SR04: The active ultrasonic sensor is used to transmits and receives the signal. The distance is calculated is based on the object travels through the roads. Where the sensor works at frequency of 40 kHz that use to measure the distance ranges from 2 to 400 cm. GPS Receiver: Global Positioning System is a satellite navigation system which is use to capture the location and time irrespective of the conditions, the GPS information format from the NMEA (National Marine Electronic Association). GSM SIM 900: Global standards for mobile communication for standards second generation .SIM which is used to communication over the telecommunication network. The modem which we are using to receive the alert text message and also which can make the voice call is a quad band modem. The speed of the vehicle including time and date will be recorded once it travels exceeding the allowable speed limit. At the same time a warning alarm would alert the driver. All the speeds recorded by black box will be examined to ensure the drivers are always obeying the rules. Information such as time, date, speed limit and vehicle registration number recorded by black box were set at SMS part in mobile phone. Then, the mobile phone itself will transmit all the data via SMS to other mobile.

3. METHODOLOGY

The Fire Bird V robot is the 5th in the Fire Bird series of robots. All the Fire Bird V series robots share the same main board and other accessories. Different family of microcontrollers can be added by simply changing top microcontroller adapter board. Fire Bird V supports ATMEGA2560 (AVR), P89V51RD2 (8051) and LPC2148(ARM7) microcontroller adapter boards. This modularity in changing the microcontroller adapter boards makes Fire Bird V robots very versatile. Sharp IR range sensors consists of IR LED and linear CCD array, both encapsulated in the housing with precision lens assembly mounted in front of them. IR LED with the help of the leans transmits a narrow IR beam. When light hits the obstacle and reflects back to the linear CCD array, depending on the distance from the obstacle, angle of the reflected light varies. This angle is measured using the CCD array to estimate distance from the obstacle. It gives same response to different coloured objects as measured distance is function of the angle of reflection and not on the reflected light intensity. LCD can be interfaced in 8bit or 4 bit interfacing mode. In 8 bit mode it requires 3 control line and 8 data lines. To reduce number of I/Os required, Fire Bird V robot uses 4 bit interfacing mode which requires 3 control lines and 4 datalines. In this mode upper and lower nibble of the data/command byte needs to be sent separately. Robot has 3 KHz piezo buzzer. It can be used for debugging purpose or as attention seeker for a particular event. The buzzer is connected to PC3 pin of the micro controller. Also the same buzzer is used in battery monitoring circuit to alert the battery low indication. Buzzer is driven by BC548 transistor. Resistor 100K is used to keep transistor off, if the input pin is floating. Buzzer will get turned on if input voltage is greater than 0.65V. This GPS receiver gives data output in standard NMEA format with update rate of 1second at 9600 bps. Receiver has onboard battery for memory backup for quicker acquisition of GPS satellites. Module can directly work on 5V supply and can be interfaced with the 5V TTL / CMOS logic. Board has 10 pin male berg connector at the both ends for easier mounting on the PCB and comes with the two 10 pin female berg connectors which can be soldered on your PCB. This GPS module is very easy to interface and requires only Transmit, Receive pin of the serial port of the microcontroller.

4. RESULT ANALYSIS

Traffic, especially in a country like India, is a common word. People in such countries count the amount of time spend over traffic too. After analysis, one of the reasons for the traffic was the number of potholes on the road. Because of many reasons like rains, oil spills, road accidents or inevitable wear and tear make the road difficult to drive upon. Unexpected hurdles on road may cause more accidents. Also

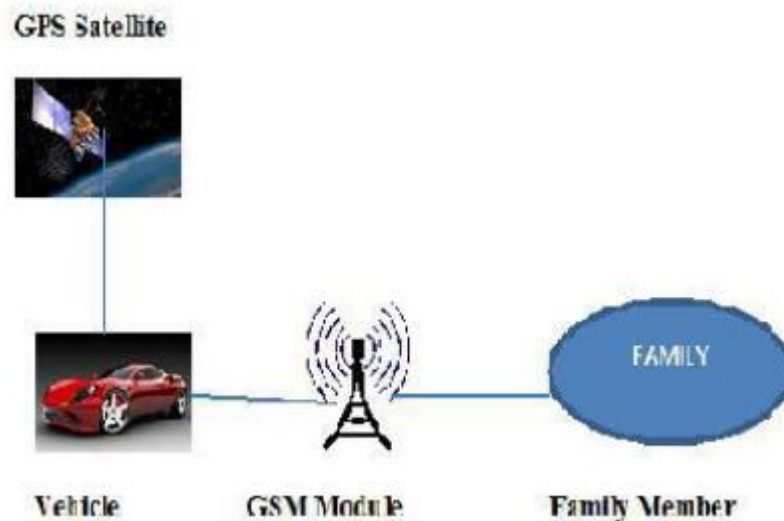


Fig.3.Overview of result

because of the bad road conditions, fuel consumption of the vehicle increases; causing wastage of precious fuel . Thus the motivation for making a system which can detect the pothole and inform about the same. However, many countries have roads dotted with potholes, but no road monitoring system to watch the road condition before the damage to the surface due to wear and tear becomes very expensive to repair. Some of the several advantages of having such a road monitoring system can be a boon. Such a system can identify problem areas early and the relevant authorities can be alerted in time to take preventive steps. Our system can be broken into 3 modules.



Fig.4.Hardware structure

The first is to sensing the pothole on the surface with the amount of depth of the pothole. Secondly, to take a picture at the same moment the pothole is being detected. Thirdly, to send the picture and the location of the pothole to the concerned authority. This GPS receiver gives data output in standard NMEA

format with update rate of 1second at 9600 bps. Receiver has onboard battery for memory backup for quicker acquisition of GPS satellites. Module can directly work on 5V supply and can be interfaced with the 5V TTL / CMOS logic. Board has 10 pin male berg connector at the both ends for easier mounting on the PCB and comes with the two 10 pin female berg connectors which can be soldered on your PCB. This GPS module is very easy to interface and requires only Transmit, Receive pin of the serial port of the microcontroller.

CONCLUSION

The working of the experiment is done with the real time applications .And it was almost tested with the artificial potholes and humps by fixing the experiment in the bike and car and the first test was taken to record and stored in the data base, the second test was taken to find the alerts were generated based on the humps and potholes in the road by the detection of ultrasonic sensor. The mobile application is the advance technology used additional to this system were it provides the alert to the drivers while driving the vehicle .Where the solution of the experiment is that to mainly avoid the accidents on the roads and to control the speed of the vehicle is the main aim of the paper.

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