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IoT Based Automatic Braking and Crash Detection System

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ABSTRACT: A large number of precious lives are lost due to road traffic accidents every day. The common reasons are driver's mistake and late response from emergency services. There is a need to have an effective road accident detection and information communication system in place to save injured persons. A system that sends information messages to nearby emergency services about the accident location for timely response is absolutely in need.

A number of automatic accident detection systems are proposed by numerous researchers. These include accident detection using smartphones, GSM and GPS technologies, vehicular ad-hoc networks and mobile applications. The implementation of an automatic road accident detection and information communication system in every vehicle is very crucial. This paper presents a brief review on automatic road accident detection techniques used to save affected persons. An automatic road accident detection technique based on low cost ultrasonic sensors is also proposed.

KEYWORDS: Ultrasonic sensor, Arduino, GSM.

I. INTRODUCTION

Now-a-days many systems are used that can automatically detect an accident in appreciably less amount of time and sends the basic information about the accident to the emergency centre. These techniques use smartphone, GSM and GPS, VANET and mobile applications. In smartphone-based accident detection, the Internet services provided by a cellular network operator are used to send the information in case of road accident.

The geographical location of the accident spot is identified by the GPS system. In GSM and GPS based accident detection system; GSM cellular technology is used to send the data in case of road accident. The location of the accident spot is identified by the GPS system.

In VANET-based accident detection system, in case of an accident, information to the emergency department is sent using the VANET - an ad-hoc network between moving vehicles. The location of the accident spot is identified by the GPS system. In mobile application based accident detection system, when an accident occurs, a mobile application, e-CALL for example, detects the accident automatically and makes a call to the emergency services using mobile network operator.

We propose a solution to road accident detect it and sends The Internet of Things (IOT) has provided a promising opportunity to build powerful industrial systems and applications by leveraging the growth of Radio Frequency Identification (RFID) and wireless sensors devices. Benefiting from RFID and sensor **network** technology, common 2 physical objects can be connected, and are able to be monitored and managed by a single system.

The objective of this paper is to detect the accident of the vehicle where it is located and to send the message automatically to the emergency contacts the system is placed inside the vehicle itself. The basic microcontroller AT89C52 is used because of its cost efficiency and also for easy understanding. To find the accident location GPS is used. It gives the latitude and longitude of the location. GSM module is used to send the message to the emergency services. The message along with the location is sent to the mobile phones of the emergency contacts.

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II. EXISTING SYSTEM

In the existing system voltage regulator used for the converting fixed 12volt dc in to variable dc of 5volt and relay operate at 5V beyond that voltage it couldn't operate to brake the motor. Motor driver for the controlling purpose of the motor.LCD shows display when vibration exist 180˚or the accident happened through the GSM it sends message to corresponding pc or smart phone. everything run over the IOT.

III. MODULE DESCRIPTION

1. Arduino

Arduino is a small microcontroller board with a USB plug to connect to your computer and a number of connection sockets that can be wired up diodes, loudspeakers, microphones, etc. They can either be powered through the USB connection from the computer or from a 9V battery.

2. Microcontroller

Microcontroller is a single chip that can perform various calculations and tasks and send/receive signals from other devices via the available pins. Precisely what tasks and communication with the world it does, is what is governed by what instructions we give to the Microcontroller. It is this job of telling the chip what to do, is what we refer to as programming on it. However, the microcontroller by itself, cannot accomplish much; it needs several external inputs: power for one; a steady clock signal for another. Also, the job of programming it has to be accomplished by an external circuit. So typically, a microcontroller is used along with a circuit which provides these things to it; this combination is called a microcontroller board. The Arduino Uno that you have received, is one such microcontroller board. The actual microcontroller at its heart is the chip called Atmega328. The advantages that Arduino offers over other microcontroller boards are largely in terms of reliability of the circuit hardware as well as the ease of programming and using it.

3.Accelerometer

An accelerometer is a device that measures proper acceleration. Proper acceleration, being the acceleration (or rate of change of velocity) of a body in its own instantaneous rest frame, is not the same as coordinate acceleration, being the acceleration in a fixed coordinate system.

4. Ultrasonic sensors

Ultrasonic sensors work by emitting sound waves at a frequency too high for humans to hear. They then wait for the sound to be reflected back, calculating distance based on the time required. This is similar to how radar measures the time it takes a radio wave to return after hitting an object. Ultrasonic sensors work by emitting sound waves at a frequency too high for humans to hear. They then wait for the sound to be reflected back, calculating distance based on the time required. This is similar to how radar measures the time it takes a radio wave to return after hitting an object. Ultrasonic sensor used to find obstacles.

5. GPS Receiver

A GPS receiver's job is to locate four or more of these satellites, figure out the distance to each, and use this information to deduce its own location. This operation is based on a simple mathematical principle called trilateration.GPS receiver calculation.

6. Software Requirement

The software used by the Arduino is Arduino IDE. The Arduino IDE is a cross-platform application written in Java, and is derived from the IDE for the Processing programming language and the Wiring project. It includes a code editor res such as syntax highlighting, brace matching, and automatic indentation, and is also capable of compiling and uploading programs to the board with a single click. There is typically no need to edit make files or run programs on a command-line interface. Although building on command-line is possible if required with some third-party tools such as Ino. The Arduino IDE comes with a C/C++ library called "Wiring" which makes many common input/output

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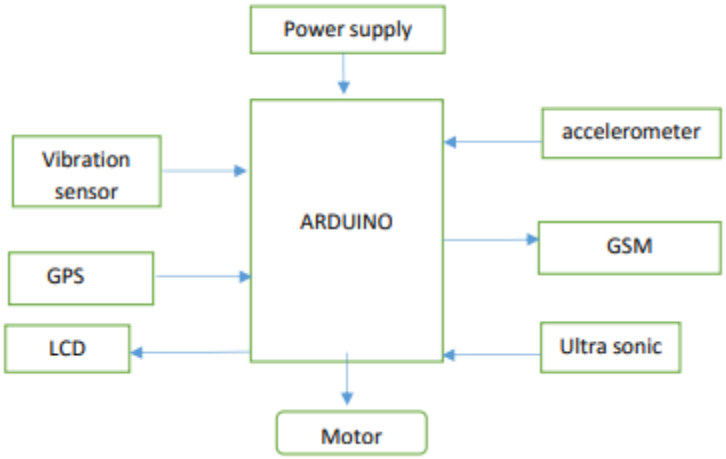
operations much easier. Arduino programs are written in C/C++, although users only need define two functions to make a runnable program.

IV. PROPOSED SYSTEM

The proposed solution implements two ultrasonic sensors to detect the accident. An ultrasonic sensor determines the distance between objects by sending and receiving reflected sound waves. The time between wave generation and reflection is used to calculate the distance between objects. We have used two ultrasonic sensor modules namely, HCSR04 . One ultrasonic sensor module is placed on the wind screen or the front side of the roof of the car, then we measures the distance from the wind screen or the roof (where we have placed the sensor) to the front bumper of the car. This distance will be our first threshold distance that will be predefined to our first system. The other ultrasonic sensor module is placed on the back side of the roof of the car and again we measure the distance from the back roof to the back bumper of the car. This distance will be our second threshold distance that will be pre- defined to our second system.



The objective of the project is to detect the accident of the vehicle where it is located and to send the message automatically to the emergency contacts the system is placed inside the vehicle itself. The basic microcontroller AT89C52 is used because of its cost efficiency and also for easy understanding. To find the accident location GPS is used. It gives the latitude and longitude of the location. GSM module is used to send the message to the emergency services. The message along with the location is sent to the mobile phones of the emergency contacts.

If LED is ON then it indicates the power supply to the circuit of the system. IR sensor is used to detect the obstacle. If there is any obstacle then it will be sent to the microcontroller. Accident location is identified by the GPS and sent to the microcontroller. And that information is sent to the emergency contacts of the victim through the GSM module. Accident location will be in the form of latitude and longitude values using these values we can find the position of the vehicle.GSM module works similarly to the mobile phones we can either message or call a person.

The diagram explains us how the sound waves that are transmitted are totally reflected from a particular target and then back to the transmitter. There is an output that is produced to perform some kind of indication or a controlling function. There is a minimum distance from the sensor that is needed to provide a delay in time so that the echoes could be elucidated. The targets could have any kind of reflective form- also round objects. There are variables which could affect the working of the ultrasonic sensing which includes reflective surface roughness or target surface angle. The signal received from the ADC is also displayed on the LCD display, and it gives the distance between the front of the vehicle and the obstacle .

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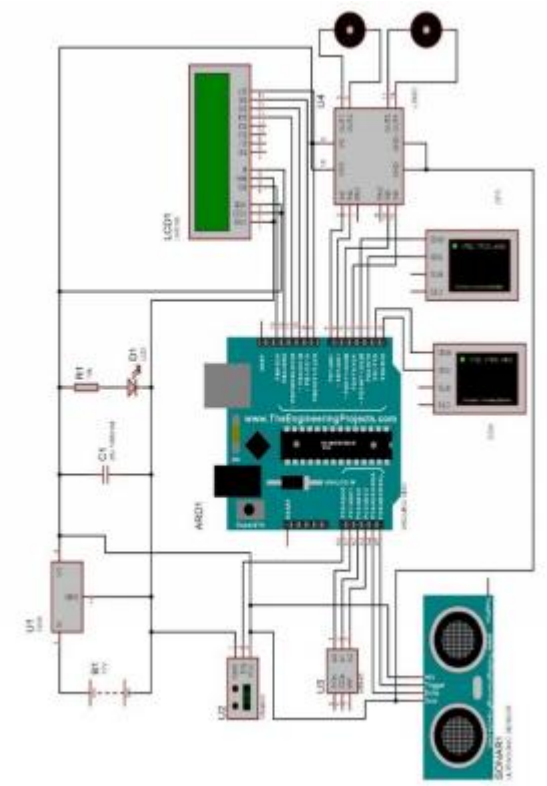
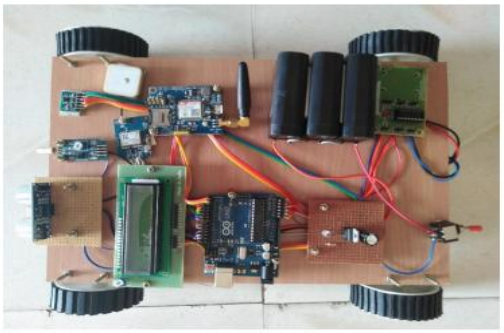
The distance value at which automatic braking should start is already stored in the microcontroller. When the measured distance reaches this value, the Arduino automatically sends the signal to the gear motor which in turn controls braking through mechanical arrangements. Three axis accelerometer sensor the angle of the vehicle when the vehicle angle is changed this vehicle location (from GPS) sent to the IOT using GSM



V. IMPLEMENTATION OF HARDWARE



The hardware kit like a E-vehicle all the components are arranged as in the top view 4V battery three connected series with in to get 12V anything happens first shows the display through sim inserting send messages everything run over internet

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VI. CONCLUSION

The expected performance is achieved through implementation of the proposed system. The sensor and other required components are distributed throughout the car providing more optimal results to detect accidents. The proposed system can also be used for traffic estimation and system performance estimation to prevent loss of life to its maximum.

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