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ANTI-COLLISION SYSTEM USING GPS AND GSM MODULE

Sushant Deshmukh , Vishal Tarange
Department of E & TC
AISSMS IOIT, Pune, Maharashtra, India

Abstract— This paper presents a system which will detect the obstacles in front of a vehicle. This system consists of AT mega 328 controller, ultrasonic sensor, accelerometer, GPS and GSM. The ultrasonic sensor which is interfaced with the Arduino is used for detection of obstacles. The GPS is used for the sending the location coordinate of vehicle using GSM module.

Keywords— Controller, ultrasonic sensor, accelerometer, GPS and GSM.

I. INTRODUCTION

The goal of the anti-collision system is to save people in accident. This system helps the driver to stay alert and observe the surrounding vehicle movements, the latest such as GPS which is highly useful now-a-days.

Over the past ten years, the use of vehicles has improved continuously, which increase the chance of risk to human life. The reason is due to inadequate emergency services. In this paper, we use anti-collision system to strengthen the emergency system during accident.

In this system, the device detects the occurrence of the accident and location coordinates are sent to the predefined number. By using Accelerometer Sensor, we can observe an accident. This system provides weak emergency services with an alternative.

The Anti-Collision system detects the accident and sends the location coordinates to a smart phone or device.

II. PROPOSED ALGORITHM

A. Objective

- i. Alert the driver to avoid any possible collision.
- ii. System should detect the collision or accident of vehicle if occurred.
- iii. It should send the alert message and location of accident to the emergency number.

B. Block Diagram

The project is based on Controller AT mega 328, Accelerometer, Ultrasonic sensor, GPS, GSM Sim800C, Buzzer, LCD Display.

As the population of world is increasing, the necessity of vehicle is needed. With the rise in transportation, road accidents have been increased taking number of lives.

Approximately 450,000 accidents happen in India, in which about 150,000 loses their live, while many becomes injured or disabled.

The high demand for transportation has increased traffic accident and people suffering from road accidents have also increased. Due to this there is shortage for manpower in emergency services available in our nation.

Many cases, when an accident occurs, the families of the injured person do not receive the news of the accidents on time and the medical assistance reaches the accident spot late and traffic between accident spot and hospital also increases the chances of losing the victim's life.

The Anti-Collision system is installed in the vehicle to prevent any possible unwanted accident.

In this system, we make use of GPS and GSM technologies, accident detection and reporting is easy.



Figure 1 Block diagram of Anti-Collision system using GPS and GSM module

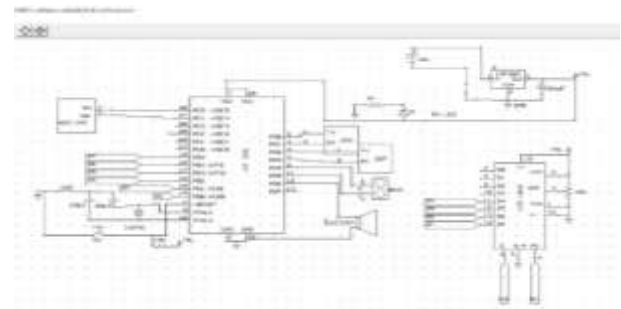


Figure 2 Circuit Diagram of Anti-Collision system using GSM and GPS

Circuit Diagram Description

- The circuit diagram of Anti-collision system using GSM and GPS module is shown in above figure(2).
- The location coordinates are acknowledged and then this coordinates are further forwarded to specific person via SMS.
- Circuit connection of this Anti-collision system, here the TX pin of GPS is connected to controller's pin number 2, RX pin of GPS is connected to controller's pin 3. The GPS module is powered by 5-volt supply.
- The GSM module's TX pin is connected to controller's pin 4, RX pin of GSM is connected to controller's pin 5.
- The echo pin of ultrasonic sensor is interconnected to pin number 6 of the controller, trigger pin is given to pin 11 of controller.
- The pins of buzzer are connected to pin 12 of controller and ground respectively.
- In Anti-collision system, an accelerometer SCL pin is connected to pin 28 of controller, SDA pin is connected to 27 pins of controller
- A 16*2 LCD is added to display the output.
- The system is powered by 5V input from power supply circuit.

C. Working

The Arduino is used as a controller which is used in many projects and autonomous systems. The two important parts of this project other than controller are GSM module and GPS module which used as receiver.

In this project, the whole process is being controlled by controller with the help of GSM module and GPS receiver.

The coordinates of vehicle are detected by using GPS receiver, then the alert SMS along with google map link and coordinates is sent by using GSM module.

Ultrasonic sensor is used for determining the minimum distance required to avoid collision.

To detect sudden change in any axis or accident, accelerometer is used. To show coordinates and status message a 16*2 LCD is used which is optional.

Whenever the accident takes place, the car tilts and its axis values are changed by accelerometer. Controller reads these values and checks if there any change in any axis.

If there any change takes place then controller reads the coordinates from GPS module data and then sends SMS to the numbers which are already set in controller that may include family members or ambulance or police, along with the accident's location. The message also includes google map link of the accident place, so that we can easily track the accident location.

Once we receive the message, we will be redirected to the Google map by just clicking on the link and then we can check the exact spot of vehicle.

III. EXPERIMENT AND RESULT

Location data reading from GPS module



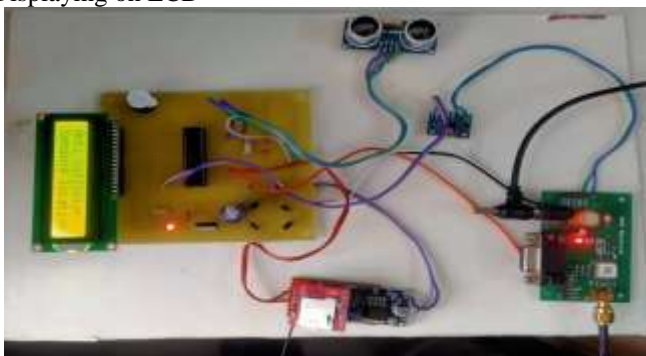
GPS module SIM 28ML has to be tested to check if it is able to point the location. GPS receivers actually work by figuring out how far they are from a number of satellites. They are pre-programmed to know where the GPS satellites are at any given time. The satellites transmit information about their position and the current time in the form of radio signals towards the Earth. These signals identify the satellites and tell the receiver where they are located. It indicates the position fix; it will blink at various rates depending on what state it is in. No Blinking indicates that it is searching for the satellites. If it blinks every second which indicates that the position is found.

Sending Alert message by GSM SIM 800L



We have to make sure that the connection is established between microcontroller and GSM. There are two ways of doing it, one is to connect TX pin of GSM to RX pin of microcontroller and RX pin of GSM module to TX pin of microcontroller. Second is by selecting two PWM enabled pins of microcontroller (Pin 9, 10). It uses software serial library of microcontroller, when the connection is established, the data can be fed directly to GSM.

Displaying on LCD



Interfacing between LCD and microcontroller is also tested. Next is to placing LCD on the bread board. Carefully check whether all the connections are tight and correct. Power up your microcontroller via USB and check whether the LCD lights up. If yes, proceed

IV. CONCLUSION

The proposed Anti-collision system using GPS and GSM module can be saviour of individuals who are victim of light of street accident. It can assume a very important and fundamental component of lessen the passing rate in road crashes. The presented system is abnormally easy to know that even a nonprofessional individual can make a use of it without any problem. The arrangement includes equipment and programming section. The equipment section includes accidents recognition sensor. It is operated by microcontroller unit and is packed in the vehicles. Generally, advantages of this system is minimum cost, security and simpler experience to user. The system presented in the task lessen the death setbacks caused by the road accidents.

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