

Project Easyrider

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Abstract—The Project Easyrider is here to avoid accidents and manage if the misshappening may occur it includes a messaging and GPS system which notifies drivers family, ambulance and nearby fire station with the exact location of the accident.



Fig 1. The Team of Project Easyrider.

I. EQUIPMENTS USED

1. Arduino UNO REES52 - 1
2. Piezzo Bzzers - 2
3. Ultrasonic Sensor HC-SR04 - 1
4. Vibration Sensor SW-420 - 1
5. Flame Sensor HUB-360 -1
6. GSM Module SIM800A -1
7. GPS Module NEO- 6M - 1
8. Blue and Red LEDs - 3
9. Jumper Wires - 20
10. Breadboard 1-
11. 12V and 5V Battrey 1,1

II. INTRODUCTION

With the beginning of the twenty first century many well developed vehicles came into existence to make the life of humans much easier in terms of quick transportation but does these modification means anything if they not safe

enough. Now, a day we see that most of the road accident takes place due to lack in alertness of the driver. There are many accidents which can be stopped just by ensuring the alertness of driver. So, we here made this project to resolve the problems.

So, we bring to you project easy rider which is our innovative way to reduce these accidents and alerting the drivers the system firstly tries to bring attention of the driver to and arriving vehicle if the driver drives the vehicle to a certain closeness to it then buzzer alerts the driver. Just in case if any miss happening may occurs then it sends message to his family and concerned safety authorities.

III. BASIC ALERTING SYSTEM

The ultrasonic sensor HC-SR04 have 2 pins apart from vcc and ground which are trig and echo. Trig is an output pin while echo is an input pin. And voltage requirement is 5v. This particular sensor has a range of 2 cm -4 m and triggers waves of frequency 40Hz. The built-in function pulseIn() gives the duration between triggered wave and echoed wave as output in seconds as passes to arduino. Then it is multiplied with the velocity of wave (0.034 cm/s) and divided by 2 which is equal to the distance between the sensor and an obstacle in front of it.

When this distance comes under a predefined range(10-30 cm in our implementation), The blue LED blinks as the voltage in its pin becomes high. And when the obstacle gets more closer (0-10 cm in our implementation), The Red LED blinks and The buzzer gives warning.

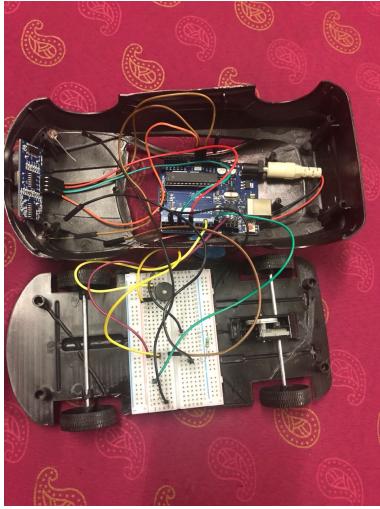


Fig 2.The Buzzer Alert Circuit .

IV. DETECTING ACCIDENT

When a car strikes with any obstacle in its path or another vehicle then there will be sudden vibrations produced in the car, these vibrations will be sensed by the SW-420 vibration sensor, when these vibrations are greater than the set threshold vibration then it will send these vibrations in terms of analog signal to GSM module SIM-800A within milliseconds with GPS module(NEO-6M) it will send message to the mobile number set through code with the location of incident to its relatives and ambulance.

To detect a collision with any obstacle, here we are using a SW-420 Vibration sensor which has 3 terminals - VCC, GND, OUT. The OUT terminal of vibration sensor is connected to analog pin A0 of arduino. And when the accident/collision happens, Vibration sensor measures it and sends the appropriate voltage value into arduino.

V. DETECTING FIRE

To detect fire, we are using an HUB-360 flame sensor here. Which detects the presence of flame near it and sends appropriate voltage into Analog terminal A1 of arduino

VI. WORKING OF GSM AND GPS MODULE

GPS is used to detect any location on the earth with the help of a Global Navigation Satellite System (GNSS). This system includes a wide range of satellites which uses microwave signals that are given to GPS device to give the information of location as well as location and time. According to this project the GPS device in vehicle gives us the location of the place where the accident occurs with the particular type of special signals which further are processed by the receiver to give the location.

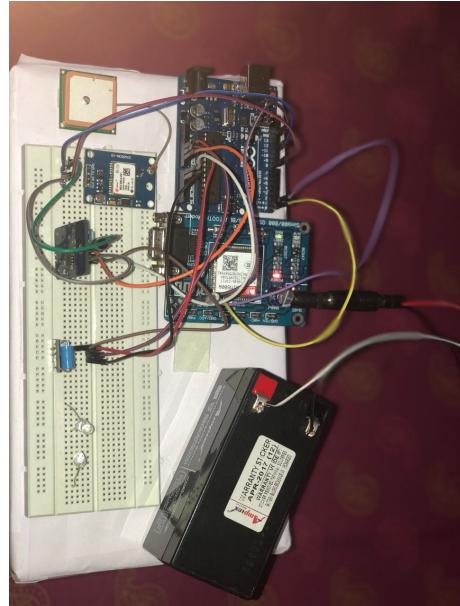


Fig 3. GPS and GSM system.

As the data from vibration and flame sensors reaches the arduino, it's gets compared with threshold values of vibration and heat. If it's higher than these predetermined threshold values, Then the next step is to communicate with the hospital or police or someone like that. For that we are using a SIM800A GSM module and NEO-6M GPS module.

GSM stands from global system of mobile communication. And the model we used required 12v DC supply and operates at 900 or 1800 MHz frequency. Using the SIM800 unit, we can get all the functionalities of a mobile phone including sending and receiving SMS and phone calls, but here we only need to send messages. And for that we use a predefined set of commands called AT commands. For example, The command **AT+CMGF=1** sets the GSM module in SMS text mode **AT+CMGS= " < mobile number >"** defines the number to which the SMS has to be sent.

And the GPS module takes the location of its position. And here we are using a NEO-6M GPS module which works with 9600 baud rate and 3.5v supply. To get RAW data from GPS, We had started a serial communication with GPS using SoftwareSerial.h. And we got a bunch of NMEA sentences-GPS standard language. And TinyGPS++ library to convert it into readable format.

After reading the values from analog pins A0 and A1, arduino checks it with threshold values and if it's higher than that, GPS module takes the location and passes it to arduino. And arduino passes it to GSM module from where it's sent to the mobile number given.

VII. CIRCUIT

Trig pin of ultrasonic sensor was connected to 4th digital pin of arduino and Echo pin was connected to 7th pin. Blue LED was connected to 2nd pin of arduino, red LED was

connected to 13th pin and Peizzo buzzer was connected to 10th pin.

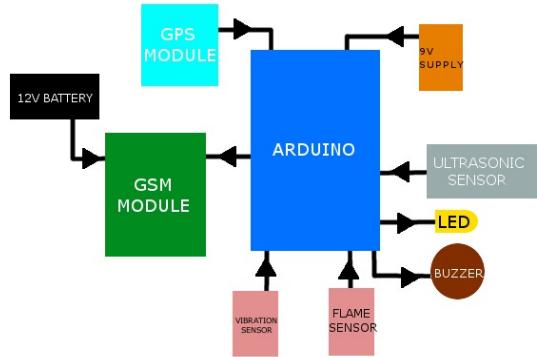


Fig 4. Circuit Diagram

Rx and Tx pin of GSM modules were connected to Tx and Rx pins of arduino respectively. We used a 12v Rechargeable battery to give voltage for GSM module. Since there was only one pair of Rx and Tx pins, we defined 8th and 9th pins of arduino as Rx and Tx pins and connected GPS's Tx and Rx respectively. Both flame sensor and Vibration sensor are connected to Analog pins of arduino -A1 and A0 respectively. Except GSM module , all the equipments need only 5v supply, that we gave from arduino's 5v terminal. And we powered Arduino using a 9v battery.

VIII. COST OF OUR PROJECT

TABLE I
LIST OF COMPONENTS USED

Components	Prize(Rs.)
Arduino UNO REES52	500
5V Piezzo Bzzers	170
Ultrasonic Sensor HC-SR04	198
Full and half Breadboard	200
Vibration Sensor SW-420	230
Flame Sensor HUB-360	190
GSM Module SIM800A	1180
GPS Module NEO- 6M	1050
12V and 9V battrry	520
Blue and Red LEDs	25
Jumper Wires	320

The total Cost of our Project is Rs- 4580/-

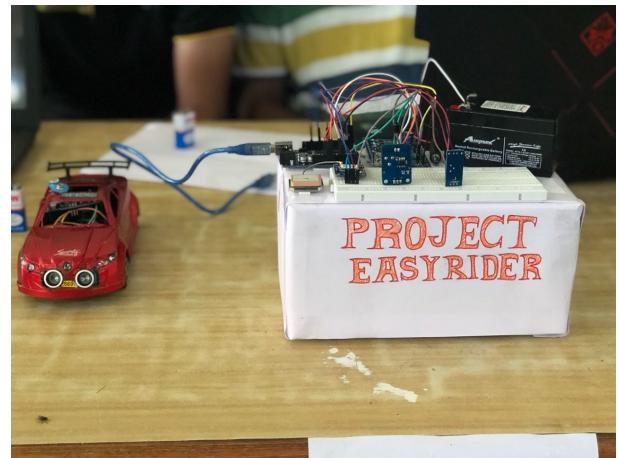


Fig 5 .Overview of our Project.

IX. APPLICATION

This is a very handy project and on large scale implementation could be life saving it has applications for those drivers who usually go for a long drive and drive in hilly regions like Himachal Pradesh for truck drivers. It could be used as a code of safety in trucks also in parking system.

X. COCLUSION

Finally, when the project was made it was working successfully in following manner:

1 The ultrasonic sensor HC-SR04 was responding well and working according to the set range when the distance was greater than 30 cm neither of the lights glow and when the distance was less than 30 to 10 cm the blue light glowed up when the distance was less than 10 cm red light glowed up and activated the buzzer system which made the driver attentive.

2 when the SW-420 vibration sensor sensed a vibration due to collision of car whose value was above the set threshold vibration it sends analog signal to GSM module SIM-800A which then send message and location using our GPS module NEO-6M to a 3G mobile sim card whose number was fixed in our code used for Arduino this message can therefore be lifesaving in real life implementation.

3 flame tester (HUB 360) responded well to flame we used lighter to imitate flames for flame sensor to trigger the response which send message in terms or current to GSM module SIM-800A which then send message and location using our GPS module NEO-6M to a 3G mobile sim card whose number was fixed in our code used for Arduino.

XI. FURTHER IMPROVEMENTS

1. We can add alcohol smell detector in addition to our project which would allow the rider to drive only if the alcohol suitable alcohol sensor would be MQ-3 which has a very good range varying from 0.04-4mg/l alcohol in which

the detection is done by help of alcohol gas sensitive material SnO₂ it works under a voltage up to 24v. It has very simple circuit and low cost.

2. We can modify project when driving through curvy road you usually face road railing they come very close to the bonnet of car so we can modify our circuit algorithm for such roads.

3. We can also add sensors at the back for parking purpose which will have differ distance range depending upon traffic conditions.

4. In project easy rider this is a kind of limitation if the car is too fast than the buzzer alarm system is not very helpful neither the lights to rectify it we can attach it with gearbox depending upon the in which gear the car is it has a particular range the distance of the ultrasonic sensor and buzzer alert system will be changed and also we can connect it with brakes like auto braking system.

5. Based on how fast an object is approaching towards the vehicle we can code the buzzer alert system circuit to respond for that we need it the derivate the relative distance which we are already using in through ultrasonic sensor.

XII. REFERENCES

1. learned different builtin functions from <https://www.arduino.cc>
2. Downloaded rewired libraries from <https://www.github.com>
3. <https://www.TinkerCad.com> to make and simulate circuite.
4. Prize of some components <https://www.amazon.com>
5. www.emartee.com for workinhg of Vibration and Flame sensors.

XIII. ACKNOWLEDGEMENTS

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