

# Vehicle Collision Control with Over Speed Detection

Gouri G. Agrahari<sup>1</sup> Prof. V.B. Baru<sup>2</sup>

<sup>1,2</sup>Department of Electronics & Telecommunication Engineering

<sup>1,2</sup>Sinhgad College of Engineering, Pune, India

**Abstract**— This project presents a system to detect rash driving on highways. In case of any violation of rules it helps the traffic authorities. In past, lot of devices was made to detect rash driving on highways. Most of the approaches require human concentration and involve a lot of effort, which is difficult to implement. The main aim is to design a system for early detection and alert of dangerous vehicle driving patterns related to rash driving. The presence of a vehicle is detected by IR sensor. A set point of a pair of sensors comprises an IR transmitter and an IR receiver, each of which are installed on either sides of the road. Whenever IR rays are interrupted by a vehicle during first sensor the count up timer is started. When the other IR sensor senses the presence of vehicle, the count up timer is stopped. The speed limit set by the device is kept at the very location depending upon the traffic. The time taken by the vehicle to travel from one set point to the other is calculated by a microcontroller program. Based on that time it then calculates the speed. The LCD is used to display the speed of the vehicle. If the vehicle crosses the speed limit, a buzzer sounds alerting the police. The main motive behind coming up with this system is to increase the safety features of the vehicles. For measuring the distance ultrasonic sensor is used.

**Key words:** Raspberry Pi, Ultrasonic Sensor, Camera, RF Module, GSM, GPS, IR Sensor, ARDUINO, Buzzer

## I. INTRODUCTION

The automotive industry around the world has shown a tremendous enhancement in its production over the recent Years. But along with these, the accident rates are also getting significantly increased. As a result, even the optimistic nature of people has become worried while going outside. United States Department of Transportation data for 2005 from the Fatality Analysis, Reporting System show that for passenger cars, 18.62 fatal crashes occur per 100,000 registered vehicles. In 2009, 33,808 people died in vehicle traffic crashes only in USA. Due to human negligence Most of the accidents occur, such as reckless driving, lack of good infrastructure, etc. Immediate rescue process after an accident can be considered as a tightrope walk between life and death. Fractional time delay of arriving medical help can cost the life of the victims. As such, the prime need to save the precious human life is efficient automatic accident detection with an automatic notification to the emergency service with the accident location. Now-a-days, it became very difficult to know that an accident has occurred and to locate the position where it has happened. Previously, there is no system of identification and intimation regarding an accident. Later on the SMS Service begins for intimation purpose. GPS and GSM make the usage for intimation and identification of place.

## II. LITERATURE REVIEW

### A. MEMS Based Gesture Controlled Robot

Author:AlphonsaJohny1 ,Anusree Chandran2

MEMS based gesture controlled robot aims to build a gesture controlled robot that can be controlled by gesture wirelessly. By wearing the controller glove and performing predefined gestures user is able to control motions of the robot. This robot can detect block objects and stop automatically. The paper describes a robustness of MEMS based Gesture Controlled Robot is a kind of robot that can be by our hand gestures rather than an ordinary old switches or keypad. Hence our target interest is with hand motion based gesture interfaces.

### B. MEMS based Hand Gesture Wheel Chair Movement Control for Disable Persons

Author: V Sundara Siva Kumar†,G.Ramesh† and P Nagesh.

This project is to develop a wheel chair control which is useful to the physically disabled person with his hand movement or his hand gesture recognition using MEMS technology. Driving wheel chair in domestic environments is a difficult task for people with arm or hands impairments .The wheel chair is developed to overcome the above problem described above allowing the end users to just perform safe movements and accomplish some daily life important tasks.

### C. Smart Vehicle Accident Detection and Alarming System Using a Smartphone

Author:Adnan Bin Faiz Ahmed ImteajMahfuzulhoqChowdhury

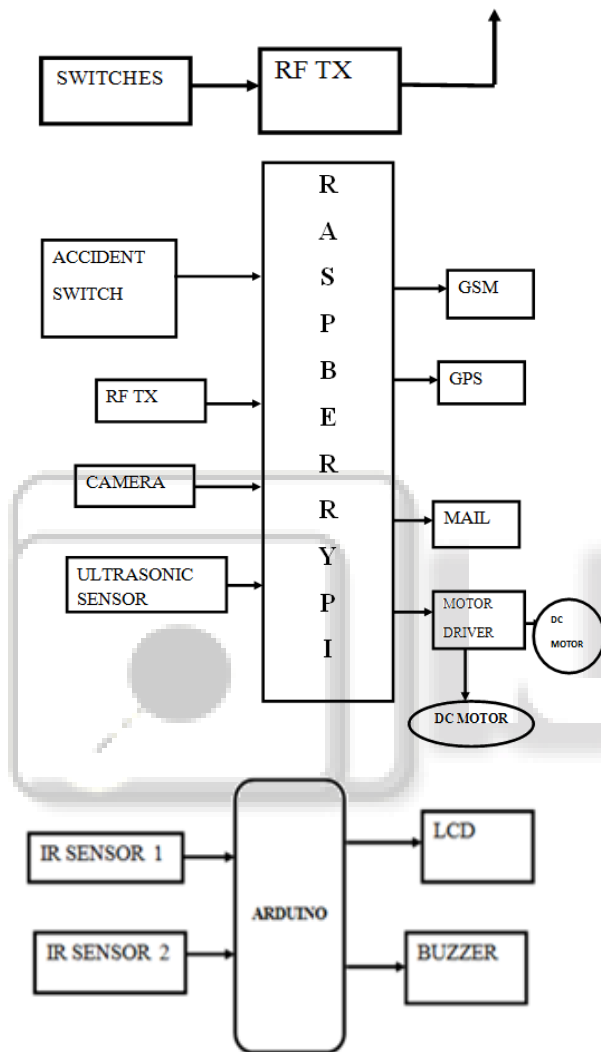
Vehicle accident is the paramount thread for thepeople's life which causes a serious wound or even dead. Theautomotive companies have made lots of progress in alleviating this thread, but still the probability of detrimental effect due toan accident is not reduced. Infringement of spFieed is one of the elementary reasons for a vehicle accident. Therewithal, external pressure and change of tilt angle with road surface blameworthy for this mishap. As soon as the emergency service could divulgeabout an accident, the more the effect would be mitigated. For this purpose, we developed an Android based application that detects an accidental situation and sends emergency alertmessage to the nearest police station and health care center.

## III. MOTIVATION

In todays world, traffic jams during rush hours is one of the major concerns. During rush hours, emergency vehicles like ambulances, police cars and fire brigade trucks get stuck in jams. Due to this, these emergency vehicles are not able to reach their destinations in time, resulting into a loss of human lives. They describe situations, define right-of-way, prohibit or permit certain directions, warn about risky

factors etc, limits speeds in hazardous conditions. Driving is the process which includes visual information processing. In order to accomplish accident free driving, the driver needs a lot of traffic monitoring. Road signs carry much information necessary for the traffic monitoring, they occur in standardized positions in traffic scenes. Real-Time traffic accident prediction focuses on the change of traffic conditions before an accident occurrence.

#### IV. BLOCK DIAGRAM



##### A. Block Diagram description

- Here we are use raspberry pi and arduino as a controller.
- Robot will move fwd and reverse by pressing switch. wirelessly Via RF TX and RF RX.
- Ultrasonic check distance and stop robot.
- Accident switch used whenever accident occurs. This switch pressed automatically.
- Then camera is used to capture the image and send using mail.
- GPS takes location and sends GSM to user.

##### B. In Overspeed Circuit

- IR SENSOR is used to detect an object.
- IR sensors to detect the presence of a vehicle. A set point consisting pair of sensors comprises of an IR

transmitter and an IR receiver, each of which are installed on either sides of the road.

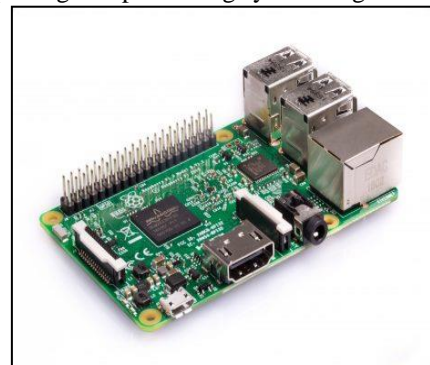
- Whenever IR rays are interrupted by a vehicle during first sensor, the count up timer is starts. The speed limit set by the device is kept at the very location depending upon the traffic.
- The time taken by the vehicle to travel from one set point to the other is calculated by a microcontroller program
- The LCD is used to display the speed of the vehicle.
- If over speed is detected buzzer will beep and LCD shows over speed detected.

#### V. HARDWARE

- RASPBERRY PI
- ARDUINO
- ULTRASONIC SENSOR
- RF MODULE
- IR SENSOR
- CAMERA
- LCD
- GSM
- GPS
- BUZZER
- SWITCH
- DC MOTOR

##### A. Raspberry Pi

Raspberry Pi Model, 512 Mb with a nice black plastic case : The Raspberry Pi is a low cost, credit-card sized computer that plugs in a computer monitor or TV. It uses a standard keyboard and mouse. It has the ability to interact with the outside world, and has been used for real time applications. This board is the central module of the whole embedded image capturing and processing system as given.



##### B. Arduino

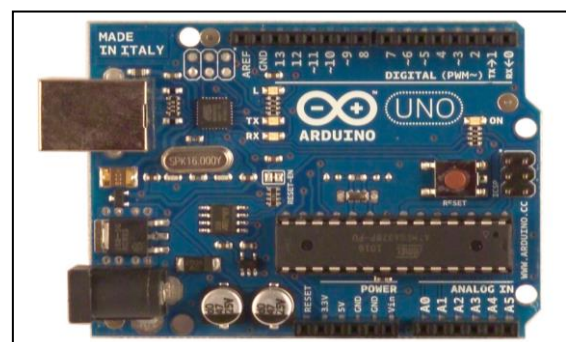
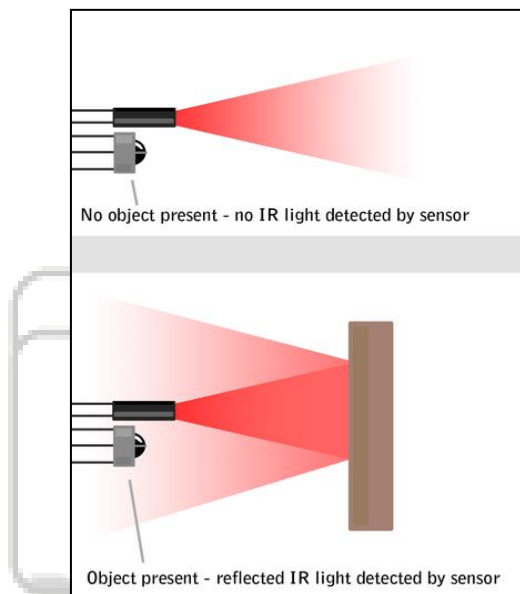


Fig. 1: Arduino Board

### 1) Features

- Microcontroller ATmega328
- Operating Voltage 5V
- Input Voltage (recommended) 7-12V
- Input Voltage (limits) 6-20V
- Digital I/O Pins 14 (of which 6 provide PWM output)
- Analog Input Pins 6
- DC Current per I/O Pin 40 mA
- DC Current for 3.3V Pin 50 mA
- Flash Memory 32 KB (ATmega328) of which 0.5 KB used by bootloader
- RAM 2 KB (ATmega328)
- EEPROM 1 KB (ATmega328)
- Clock Speed 16 MHz

### C. IR Sensor



IR beam can be designed to use low amounts of power. An off-the-shelf IR distance detector was used for this application. To send a constant signal from the one side of the helmet to the other side with the circuit the IR sensor was designed

### D. LIQUID Crystal Display

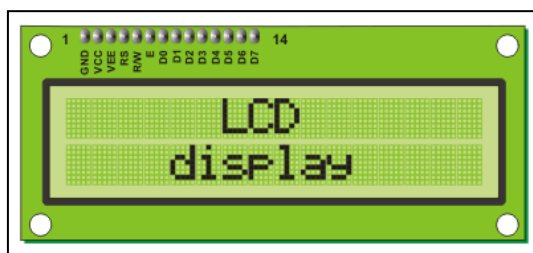


Fig. 2: LCD Module.

### E. Ultrasonic Sensor



Fig. 3: Ultrasonic Sensor

Ultrasonic sensors are devices that use electrical-mechanical energy transformation to measure distance from the sensor to the target object. Apart from distance measurement, they are also used in ultrasonic material testing (to detect cracks, air bubbles, and other flaws in the products), Object detection, position detection, ultrasonic mouse, etc. Ultrasonic waves are longitudinal mechanical waves which travel as a sequence of compressions and rarefactions along the direction of wave propagation through the medium.

### F. GPS

The Global Positioning System (GPS) is a space-based navigation system that provides location and time information in all weather conditions, anywhere on the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

### G. GSM

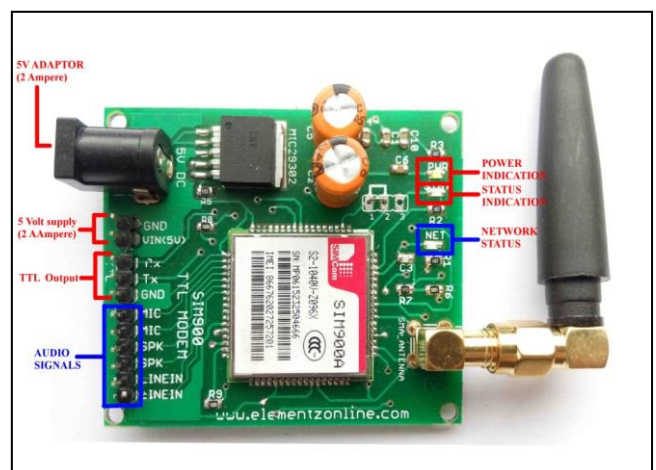


Fig. 4: GSM Module.

SIM900 GSM Module – This means the module supports communication in 900MHz band. If you are from another country, you have to check the mobile network band in your area. A majority of United States mobile networks operate in 850Mhz band (the band is either 850Mhz or 1900Mhz). Canada operates primarily on 1900 Mhz band.



## H. Camera



Fig. 4: USB Camera

## VI. ADVANTAGES

- 1) They reduce the risk of accidents.
- 2) (Special Drives for Drunken Driving, Over Speeds, Lane Cutting.)
- 3) It is easy to implement.
- 4) Solve Traffic Issues.
- 5) (Camps Road Safety Awareness for Auto Rickshaw, Taxi, Truck & other vehicle drivers.)
- 6) Reliable.(Automated action stops the vehicle.)
- 7) Low cost.
- 8) Easily adjustable to external environments.
- 9) (To provide information about current position.)
- 10) Simple to operate.
- 11) Traffic control by traffic police will be eliminated.
- 12) Used for ambulance in serious conditions.
- 13) Low power consumption.

## VII. RESULT

We design and implement the raspberry pi based secure iot based modern for accident prevention .Using rpi we get the result like quick and accurate results. Thus the project has been successfully designed and tested. To minimize the deaths and the severe conditions due to accidents the GPS and GSM technologies are used where immediate action would be take place by the ambulance/police service which might reduces the severity.

## VIII. CONCLUSION

The project has been successfully implemented. Thus the project has been successfully designed and tested. To minimize the deaths and the severe conditions due to accidents the GPS and GSM technologies are used where immediate action would be take place by the ambulance/police service which might reduces the severity. Since number of accidents on highways increases day by day so it is necessary to check speed of the vehicles on highways so as to remove accident cases and to provide a safe journey by controlling high speed of the vehicle. It also minimizes the difficulties of traffic police department and make ease to control the rash driving on highways. The police can perform their duties while sitting in control room and can provide their service with more ease and accuracy. This concept can be extended in future by integrating a

camera with the system which could capture the image of the number plate of the vehicle to send that to the traffic authorities. The speed checker for highways is an emerging field and there is a huge scope for research and development.

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