

VEHICLE ACCIDENT PREVENTION SYSTEM

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Abstract - The emerge in Vehicle Accident Prevention System by using three methodologies that are collision warning detection in this system it recognizes the chances of collision and gives audio warning to driver using buzzer, car speed detector using IR sensor, LCD 16x2, arduino uno in this system it catches the over speeding for vehicles on the expressway. While passing through the ghat section we should take Precautions by alerting the vehicles coming from the other side using IR Sensor and LED's. Using all these methodologies we can prevent the accidents.

Key Words: IR Sensor1, LCD 16x22, Buzzer3, Ultrasonic sensor4, Arduino uno5.

1. INTRODUCTION

As per the survey reports of 2020 Road accidents in India claimed around 1.32lakh lives. The goal of this model is to take safety measures while driving on Ghat sections or on expressways. Using the methodologies The Collision warning detection system it consists of three zones using Arduino uno, Ultrasonic sensor, LED and Buzzer. Zone1 when the vehicle is not near to the car it will not give any warning Zone2 when the other vehicle comes near to the vehicle the system will give the visual warning using LED in Zone3 the system will provide both the audio and visual warning in this stage the driver has to take necessary action to avoid collision. Many of the expressways consists warning signs for drivers safety but some of them don't follow the rules. Therefore the Speed detector system was designed. The LCD displays the speed of the vehicle when it moves from IR sensor1 to IR sensor2. If the speed is 50km/hr it displays over speed if the speed is below 50 it displays Normal speed. This system is useful to the traffic police to detect the speed of the vehicle. The Signal Alerting system in Ghat Section alerts the vehicles using LED and Buzzer coming from the other side which is not visible from this side. The Red LED will glow and Buzzer will make beep sound when any vehicle is approaching from other side of the road. If the any vehicle is not approaching from the other side of the road the Green LED will glow which means when the vehicle is detected by the help of IR sensor on the road.

Automatic signal for curve roads on ghat and hill side road turns. Curve road sign with opposite or upcoming vehicle alert siren. Hairpin bend accidents occur mostly because of the driver unable to see the vehicle coming from the opposite sides of the road curves. This system uses sensors

to detect any vehicles reaching hair pin bend and alerts immediately on the other side vehicles by red signal and also producing alert sound. If hair pin bend road is clear green signal is produced. Thus this system provides safety for drivers to prevent hill side accidents and ride safely in hill side roads.

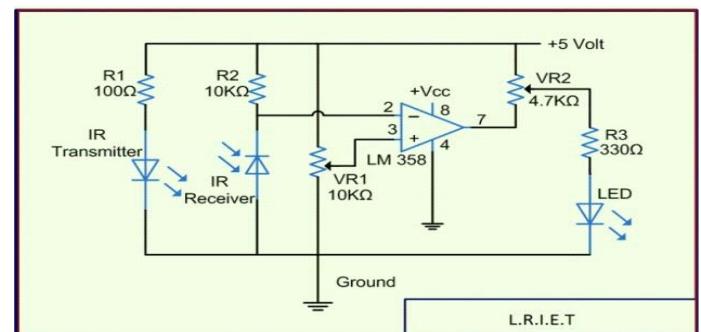


Fig -1: Circuit diagram of Vehicle Accident Prevention System at Ghat areas.

The above fig.1 represents the IR sensor circuit diagram for Vehicle Accident Prevention System at Ghat section roads. In this work, the transmitter section includes an IR sensor which transmits continuous IR rays to be received by an IR receiver module.

2. LITERATURE SURVEY

In [08] "Cloud based Accident Detection and Notification System", the research work aims at the development of robust Accident Detection and Notification System. One of the subsystems is Accident Detection System (ADS). Another subsystem is a Notification system. ADS is implemented on separate hardware and it is responsible for accident and estimation of severity and direction of an impact. The system also consists of a Raspberry Pi which acts as a central controller of the system and is connected to the ADS through Bluetooth. For the notification system, a GPS- GSM module and a web application connected with firebase cloud database are used. The web application developed fetches the data when received by the cloud database about the accident and displays it to emergency authorities.

In [14] "Blackspot Alert and Accident Prevention System", this paper gives the design and paradigm of a mobile application, thereby providing a solution to the accidents in black spot. A GPS based mobile application is developed to track the user's current location. Initially all black spot and

their speed limit are stored in the cloud database. While travelling the developed mobile application fetches the upcoming blackspot data from database and gives a voice notification before 500m to alerts the driver of blackspot. As soon the vehicle approaches the black spot, the micro controller which is integrated with the vehicles takes over the control of accelerometer and reduces the vehicles speed corresponding to the speed limit of the zone.

Authors	Paper	Components	Applications
Mrs Y. Lavanya, Dr. L .Bharathi, P.Raja, Y .Rajesh, M Sai Swaroop [1]	"Smart Road Safety And Vehicle Accident Prevention for Mountain Roads"	Buzzer, Arduino Microcontroller, IC, Capacitors	Here they used Arduino microcontroller to interface with IR sensor.
Ashutha, Aravinda, Deeksha, Chitralskshmi [2]	"Sensor Based Accident Prevention System"	RF Module, Arduino Uno Microcontroller, Ultrasonic Sensor	In this paper they have concluded that accident prevention in u-turn and silly roads.
R.Saranya, R.Arun Kumar [3]	"Vehicle Movement Control and Avoidance"	GSM Module, GPS Module, Level Controller	Using Drowsiness, Texting while driving these are the main reason for accidents.
Dr Madhu B K, Nikhil U, K Surabhi[4]	"Vehicle Collision Avoidance System"	Bluetooth Module, Hazard Warning, Motor Driver	In this paper the system takes action automatically without any driver input.
P. Swathi, Muzameel Ahmed[5]	"IOT Based Intelligent System For Vehicle Accident Prevention and Detection"	MQ-3 Sensor, Arduino Microcontroller, Accelerometer, Webcam	This Proposed system is efficient, cost-effective and minimizes the number of accidents.
Mubashir Murshed, MD Sanaullah Chowdhury[6]	"Car Accident Prevention System with Smart Brake Control"	Servo Motor, Raspberry Pi, LED, Buzzer	This system is made of Raspberry Pi to send E-Mail alerts message.

- Proximity Sensor
- Ultrasonic Sensor
- Jumper Wires
- Bread Board
- Batteries

• **Arduino Uno**



Arduino Uno is an open source microcontroller board which is use to interface with the computer. It consists of digital (14) and analog (6) input /output pins and is programmable with arduino IDE via a type B USB cable. From Arduino IDE we can verify, compile and upload the code to the arduino board. The code can be reset using the reset button it has a flash memory of 32kb, SRAM 2kb. The arduino IDE software contains various numbers of versions from them you can select according to your PC or Laptop. In this model the arduino uno is used in Speed Alerting System and in Collision Avoidance System.

• **Liquid Crystal Display 16 x 2**



The LCD is a kind of electronic display module used in various applications like mobile phones, TV sets, computers, cars etc. It contains 16 pins it is also a low-cost module simply programmable, animations and no limits for displaying custom characters and special characters etc. The LCD used in Speed Alerting system which displays the speed of the vehicle which is moving from IR sensor1 to IR sensor2.

• **Red and Green Led**



The Red will glow when a vehicle approaches from the other end and it alerts the driver that a vehicle is coming from other side of the ghat. The green LED will glow when a vehicle is not approaching from the other side. If the green led glows vehicle can easily pass from the ghat section.

3. METHODOLOGY/COMPONENTS

For this research work we are using different components those are listed below:

- Arduino Uno
- LCD 16x2 [Liquid Crystal Display]
- Red and Green LED

- Proximity Sensor



The Proximity sensor can detect the presence of nearby object without any physical contact. It emits the electromagnetic beam of electromagnetic field. This sensor is used in the speed alerting system and in ghat section when a vehicle approaches nearby this sensor it glows the white led.

- Ultrasonic Sensor



The ultrasonic sensor measures the distance to an object using ultrasonic sound waves. This sensor used in Car collision avoidance system in this model. When a vehicle approaches near to the car it gives the sound waves and starts beep sound to alert the driver. It uses a transducer to send and receive ultrasonic pulses.

4. RESULTS AND DISCUSSION



Fig -2: The Signal Alerting System

The Alerting System showing Red LED is glowing when a vehicle is approaching from the other side and the Green LED glows when vehicle is not passing from the other side. Simultaneously it works when a vehicle is approaching from the other side. This system can implement in real time using solar system to save the electricity.



Fig -3: The Speed Detector System

The Speed Detector System can detect the speed of the vehicle whether the vehicle is moving Over speed or Normal speed through this the traffic police can detect the over speeding and alerts the drivers. The LCD 16x2 screen display image showing information about speed i.e. Normal Speeding or Over Speeding.

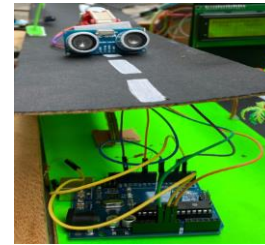


Fig -4: Collision Detection and Warning System.

The Collision Detection and Warning system alerts the driver when there is chance of collision and it gives visual and audio warning to driver through this driver can avoid the collision and can take necessary actions.

5. CONCLUSION

The objective of this model is to take necessary actions while driving. We can implement this in real time by using solar energy to save the electricity for future. The Collision warning Detection system, The Speed Detector system and The Alerting system by combining these three systems we can protect the thousands of lives. The outcome of this model is to take safety measures, precautions while driving and it is useful to the traffic police to detect the speed of rash driving. By implementing this idea according to this model we can save thousands of lives.

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