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## SMART ROAD SAFETY AND VEHICLE ACCIDENT PREVENTION FOR MOUNTAIN ROADS

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*Abstract:* Accidents are more common now a days and prevention of accidents is really a great concern of people. So, an accident prevention system is of great help and so our paper deals with a smart road safety and prevention system to avoid road accidents. Here, sensors are used along with Arduino and for indication purposes IR sensors and RGB LED light are used. Here we are using a counter to keep the count of vehicles passing through the road. To overcome the accidents due to curve and narrow roads this safety system is preventive. The main purpose of this paper is to make a safety road system to reduce the number of road accidents due to curvy and narrow roads. This indication system gives indication to the vehicles that other vehicles are coming from the other side so that they can take the safety measures beforehand only.

*IndexTerms* – Infra Red (IR) Sensor, Arduino UNO.

### I. INTRODUCTION

The dangerous roads in the world are either mountain roads, narrow curve roads or T roads. The most dangerous mountain roads are very narrow and it has many curves. For example: North Yungas road in Bolivia, Three level Zigzag road in Himalayas, 99-bend road in China, Tsugaru Iwaki skyline in Japan, Los Caracoles in Chile, Lacets de Mont Vernier in France. Sometimes there will be the chances of animals on the road in rural areas which is also a major issue in hilly roads. The major issue in curve roads is that the other end of the curve road cannot be seen by the driver Because of the obstacles like trees or rocks present in the middle which causes number of accidents Because of presence of unexpected obstacles. According to Million Death Study (MDS) about 2.3 million people die in India per year. In that 137 thousand is because of road accidents. That is about 377 people per day. In that 3.7% because of failed to look the road. The main reason for the accident in the curve roads is because drivers are not able to see the vehicle or obstacles coming from the other end of the curve. Due to very speed it is difficult to control the vehicle and chances of falling to cliff increases.

We all are living in 21st century now and the population growth is increasing in a sharper rate. As the population is increasing day by day the chances of accident occurring is also increasing. Prevention of this meeting accidents are of great concern today. The main cause of all these accidents are negligence, negotiation of safety measures etc. As technology is getting advanced in a greater speed safety measures also being modified but still accidents are still happening. Earlier various steps were taken to prevent those accidents but still accidents were occurring at a higher rate. GPS (Global Positioning System) and GSM (Globalization Management System) were introduced but both of these were useful after accidents had happened as GPS is used to give information regarding the location and GSM is useful for sending messages from the users mobile to indicate the authority that accident happened. GPS and GSM are used for indicating that accidents occurred but our proposed model is an exception to all this as it prevents the accident from occurring and thus saving lives. Our proposed model is an indication system that indicates accident may occur so that we can take necessary measures to avoid these accidents. Thus, this is a one step towards lifesaving and it's also on we humans how we take care of our own safety as safety comes along with us.

## II. EXISTING SYSTEM

There are many existing plans towards safety against road accidents like due to advanced technology GSM and GPS were introduced so that they are helpful in tracking the vehicles that met with an accident but they are not preventive for avoiding the accidents. Arduino based vehicle accident detection system was proposed as an approach towards avoiding road accidents. In this proposed model Arduino, GSM, GPS, LCD, vibration sensors were used.

In this system vibration sensor is used as an input source to system which is analyzed by the Arduino and when the sensor reading exceeds the normal or threshold appropriate action starts taking place as it will direct the GSM to send messages from the user mobile to the authority as they can send immediate help to the accident victims. Next approach was made by accident control system using ultrasonic sensor.

Ultrasonic sensors were used along with controller and Arduino to prevent the accident from occurring. Buzzers and lamps are placed on both the side of the roads along with controller and ultrasonic sensors. The ultrasonic sensors sense from where the vehicles are coming and accordingly the controller sends signals and accordingly buzzers will ring and the lamps will glow to indicate that vehicles are coming from the other sides and thus saving the vehicles from meeting with an accident. Various measures were also taken by the government to reduce the chances of accidents on the turnings by providing glasses so that vehicles coming from the other sides are aware of coming vehicles.

## III. PROPOSED SYSTEM

The mountain roads have numerous turns and blind spots. These spots are so dangerous at times that they cause accidents if not maneuvered properly. Our system is such a system which will be beneficial in roads like these and will also reduce the number of accidents that occur often. Here we are considering hairpin curves where the driver of a vehicle has no idea whether there is any other vehicle coming from the other side or not. Thus, our system when fixed at these dangerous curves will have proximity sensors, signals (RGB LED) and a counter, to aid the drivers. The proximity sensor senses the vehicles, and the counter keeps the count of vehicles present in that particular turn, coming from a particular direction. Based on the data of the counter, the signal will change its color.

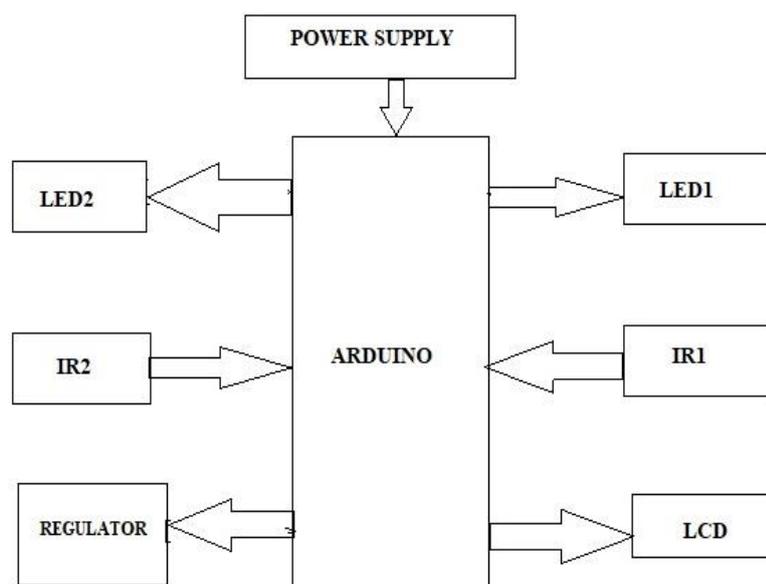


Fig (a): Block Diagram

## IV. WORKING PRINCIPLE

It uses two IR sensors, which are placed on either side of the turn. One sensor ir1 is installed by the side of the uphill section of the road, similarly one sensor ir2 is installed by the side of the downhill section of the road. The sensors are connected to Arduino UNO through wires. Based on the output of sensors, position of vehicles on either side of the bend is detected which is provided as an input to the Arduino. IR sensor has pins +5V VCC, GND, IR emitter led and IR receiver led. IR sensor sends the signal in the form of pulses from emitter led. When this signal hit the object it will get reflected back and is received by the echo receiver led. From echo the signal is sent to Arduino UNO. Arduino UNO processes this data and operates the LED which is connected to output pin of the Arduino UNO. LED is operated according to the command i.e. LED will glow if the signal is reflected back. In the absence of the object the signal will not reflect back. Hence the LED will not glow.

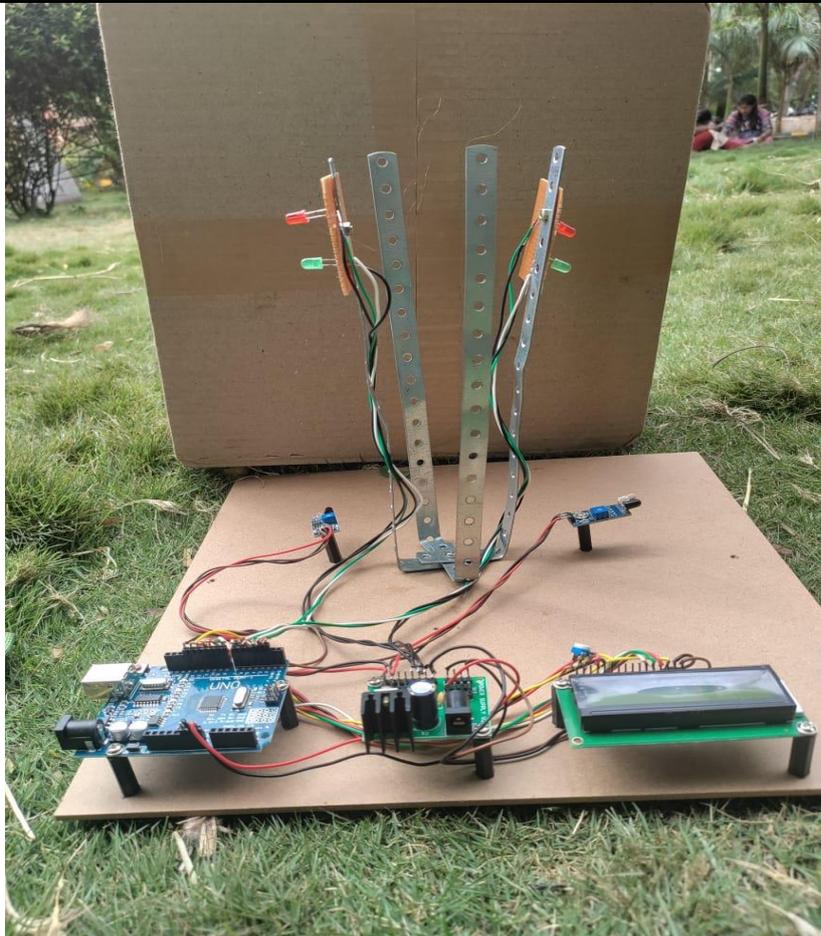


Fig (b): Output Model

**CASE 1:** Whenever vehicle comes from right side then the IR sensor senses the vehicle and gives signal to Arduino then Arduino makes Red LED will glow and buzzer rings on the opposite side of the U-turn in order to alert the driver. This will reduce accidents on the curved roads.

**CASE 2:** Whenever vehicle comes from left side then the IR sensor senses the vehicle and gives signal to Arduino then Arduino makes Red LED will glow and buzzer rings on the opposite side of the U-turn in order to alert the driver. This will reduce accidents on the curved roads

## V. CONCLUSION

This smart accident prevention system can also be implemented using ultrasonic sensors but here we used proximity sensor to critically detect the distance between the vehicles and avoid accidents. This can be installed at the junction of two or more roads even in plain areas, but we implemented it only in case of hilly curves which are even more dangerous than normal junctions, and are more prone to accidents. This project can be successfully implemented in future to be installed in road junctions and have a great future scope.

## VI. ADVANTAGES

- Avoid accidents in curve roads, mountain roads and hill roads.
- Save thousands of lives.
- Easily implementable
- Fully automated (No person is required to operate).
- Installation Cost is very less

## VII. FUTURE SCOPE

- Arrangements to protect the sensor from being damaged in critical places.
- Decrease the size of unit so that it occupies small place and easily kept in narrow roads.
- Implementing the system to detect number of vehicles and velocity of vehicle.

## VIII. ACKNOWLEDGMENT

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