

Smart Safety and Accident Prevention System 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, buzzers 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 before hand only.

Keywords— Proximity sensors, Arduino microcontroller, Counter, RGB LED

I. INTRODUCTION

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 life saving and its also on we humans how we take care of our own safety as safety comes along with us.

II. RELATED WORK

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 senses 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 IDEA

The mountain roads have numerous turns and blind spots. These spots are so dangerous at times that they cause

accidents if not manoeuvred 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 colour.

A. Workflow Diagram

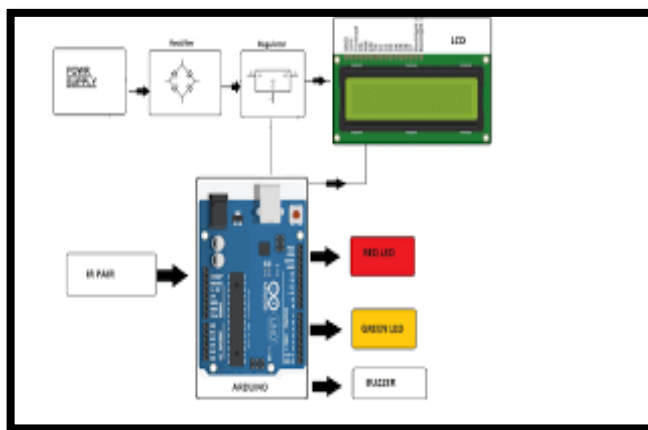


Fig.1 The workflow diagram.

HARDWARE REQUIREMENT

- Proximity Sensor
- RGB LED
- Resistors
- Transistors
- Diodes
- Push buttons
- IC
- Arduino Microcontroller
- Buzzer
- Capacitors
- Cables and Connectors
- PCB and Breadboard
- Transformers
- And Adapters
- Switch
- IC Socket

IV. METHODOLOGY

The system is installed at the curves and bends. The proximity sensor senses the distance of a vehicle approaching

or moving away from it. Based on its input from the proximity sensor, the counter and the signal will change their respective counts and colour to indicate the driver.

Now, for instance, we consider that five vehicles are coming down the hill, and two vehicles are moving up. The proximity sensor at the curve while going up the hill senses that two cars are approaching towards it, as a result, the counter on the other side shows a count of 2. On the other side of the curve, the other proximity sensor senses that five cars are coming towards it so the counter situated on the other side, displays 5. And the signals on both the sides have red signal, thus the drivers can be cautious and can slow down, and can safely manoeuvre.

As the vehicles go away from the sensor, the display will change and become zero and signal will become green. When there is only one car on either of the sides, the signal is green and the driver gets to know that there is no vehicle on the other side.

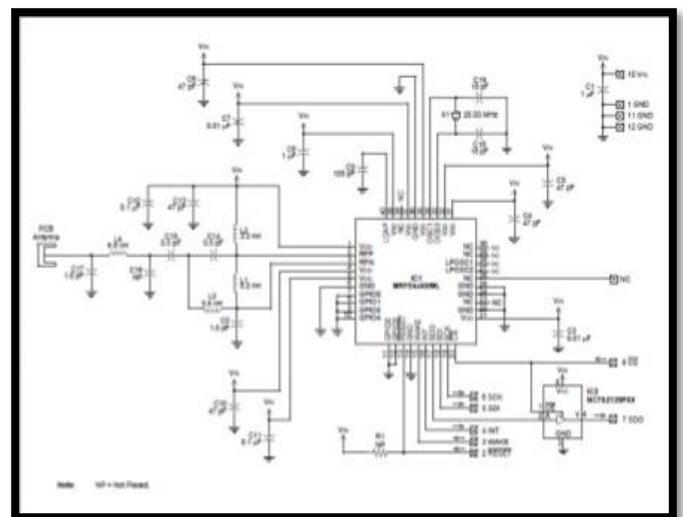


Fig. 2 circuit diagram of the proposed idea

V. RESULTS

By implementation of this smart accident prevention system, the number of accidents occurring in curves of hills have not only reduced but also there is signal providing information that vehicles are coming from the opposite side, hence alerting us. This is an innovative approach where we have also used counters to count the number of vehicles progressing from the opposite side, i.e. for example, if two cars are coming from right-side then the left side counter shows two and if three cars are coming from left side then right-side counter shows three. Moreover, there will be red signals alerting drivers to drive slow and consequently green signals to convey message that no vehicle is coming from the opposite side.

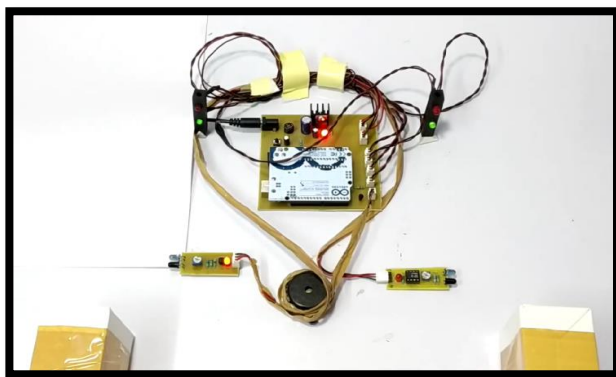


Fig.3 When no car is present on the opposite side

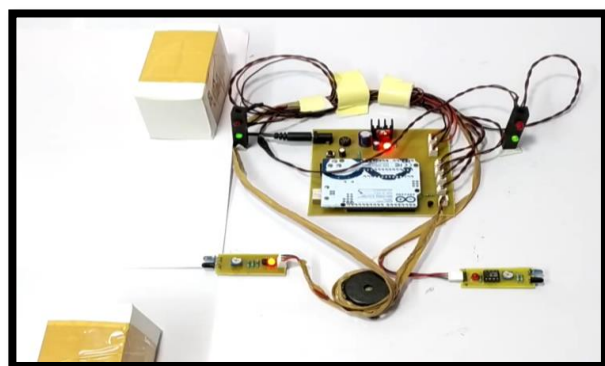


Fig.4 When one car is present on the opposite side

VI. 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.

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