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Arduino Based Collision Detection and Avoidance System

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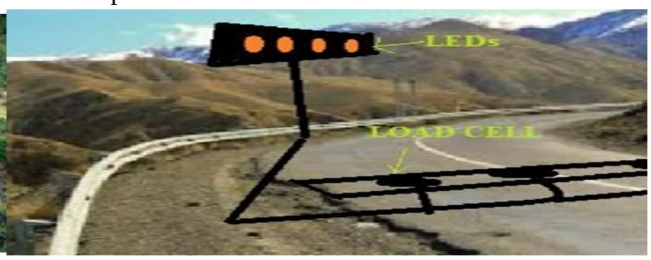
Abstract: ***In many developing countries the usage of vehicles is increasing. Vehicles became the basic need of people now a days. Approximately 24% of land area on the earth is covered with hills and mountains. As people can't make straight roads in mountains, they are curvy. In the upgrading countries accident is the major cause of death. If we talk about dangerous roads in the world then all of them are mountain roads and curve roads. The intensity of the deaths are more in curved roads. In the mountain roads there will be narrow roads with tight curves. In such kinds of situations the driver of a vehicle cannot see vehicles coming from other side. Because of this problem thousands of people lose their lives each year. while we are talking about mountain roads here other side might be lead to a cliff. The solution for this problem is alerting driver about the vehicle coming from other side. One of the solution is proposed in this paper. We can alert driver by placing Ultrasonic Sensor in one side of the road before the curve and keeping LED light other side of the curve, so that if vehicle comes from one end of the curve sensor will sense the vehicle and LED light glows at the opposite side as Red. By looking at the Red LED light driver can become alert and can slow down the speed of the vehicle. And still if an accident occurs we can save the life of victim by giving medical assistance immediately. This can increase the survival chances of victim. but this can happen only when we know the exact location of accidental place. This project presents an inexpensive but intelligent framework that can identify and report an accident to the family member***

Keywords: Arduino controller, solar panel orientation, Sun tracking, Light sensors, Stepper motors, microcontroller programming, solar tracking algorithms, solar energy optimization, renewable energy system.
Keywords: Mountainous roads, Tight curves, Narrow roads, Hair- pin bends, Ultrasonic sensors, Glowing LED light, alerting the driver, Slow down the speed, Saves more lives.

I. INTRODUCTION

In the mountain roads there will be tight curves and the roads will be narrow. In these kinds of situations the driver of a vehicle cannot see vehicles coming from opposite side. Thousands of people lose their lives each year because of this problem. The mountain roads might lead to a cliff. The solution for this problem is alerting the driver about the vehicle coming from opposite side in the hair-pin bends. That can be performed by placing the ultrasonic sensor on the road in one side before the road curve and then will keep the LED light after that curve, thus the vehicle which comes from the one end of the curve, the sensors which is present in that curve will sense and makes the LED light glows also vehicle speed is displayed at the opposite side. By looking at the LED light on the signal driver can become alert and can also slow down the speed of the vehicle. Thus it saves more lives.



II. LITERATURE

In the developing countries accident is the major cause of death. The top 10 dangerous roads in the world are mountain roads and curve roads. In the mountain roads there will be tight curves and the roads will be narrow. In these kinds of situations the driver of a vehicle cannot see vehicles coming from opposite side. Thousands of people lose their lives each year because of this problem. The mountain roads might lead to a cliff.

The solution for this problem is alerting the driver about the vehicle coming from opposite side in the hair-pin bends. That can be performed by placing the ultrasonic sensor on the road in one side before the road curve and then will keep the LED light after that curve, thus the vehicle which comes from the one end of the curve, the sensors which is present in that curve will sense and makes the LED light glows along with that buzzer sound and also vehicle speed is displayed at the opposite side. By looking at the LED light on signal driver can become alert and can slow down the speed of the vehicle. Thus it saves more lives.

III. DESIGN METHODOLOGY

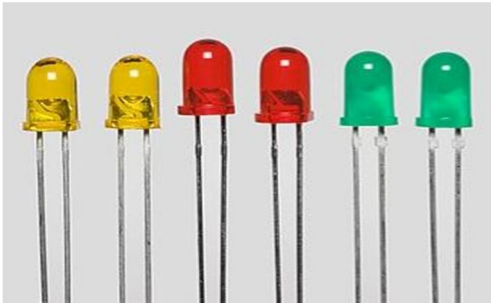
This method can place at the mountain roads, curve roads, and bends. When vehicles is approaching the IR sensor will sense the vehicle. supported the IR sensor instruction the LED changes its respective colours. to point the motive force coming back from the opposite end. If vehicle moving far from the sensor, the sensor will sense the vehicle and therefore the green LED will glow. If vehicle present at either side the LED turns to red colour which indicates to manoeuvre slowly.

A. Components Used

1) Ardunio uno

The operating voltage is 5V. The recommended input voltage will range from 7v to 12V. The input voltage ranges from 6v to 20V. Digital input/output pins are 14. Analog i/p pins are 6. DC Current for each input/output pin is 40 mA. DC Current for 3.3V Pin is 50 mA. Flash Memory is 32 KB.

2) LED's

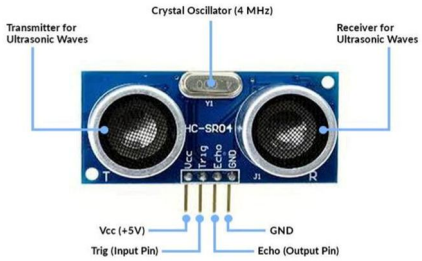


Green and Red LEDs: Green and red LEDs are used to indicate the presence or absence of a vehicle. When a vehicle is detected, the green LED lights up, and the red LED turns off. When no vehicle is detected, the red LED lights up, and the green LED turns off.

3) Jumper Wires

Jumper wires are electrical wires with connector pins at each end. They are used to connect ultrasonic sensor & LEDs to arduino .

4) Ultrasonic Sensor



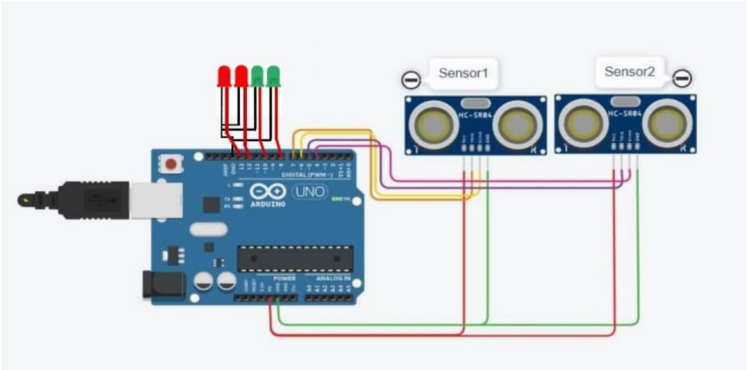
An Ultrasonic sensor is used to detect the presence of a vehicle. It emits waves and measures the amount of waves that is reflected back to the sensor. When a vehicle passes by, the amount of reflected waves changes, and the sensor detects this change. This is necessary to ensure that the signal is strong enough to be process

IV. WORKING PRINCIPLE

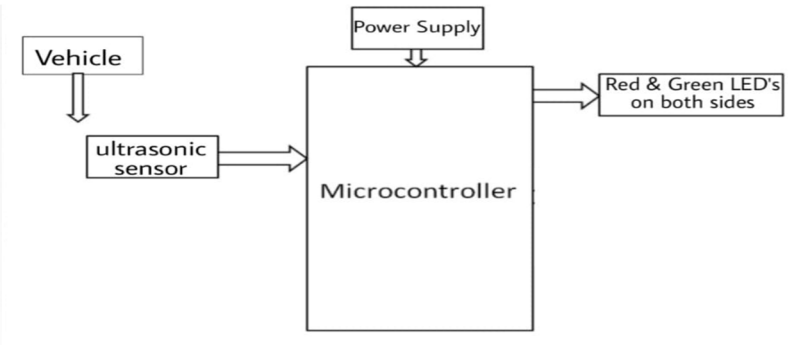
The ultrasonic sensors senses the vehicle coming, this message is sent to the ardunio and then it is indicated by the LED lights.

V. WORKING

In the below figure, first we will give power supply to the rectifier and rectifier will rectify and it converts ac to dc signal again it is connected to the regulator. Regulator is a three terminal voltage that are input, output and ground. In this ground and output pins are connected to the Arduino UNO R3 board. Here we have two sensors and we divided into two parts first is IR pair 1 and secondly IR pair 2. The first IR sensor is connected to the pin number 10 second IR sensor is connected to pin number 11 and we are placing two poles at either side of the road to indicate the driver that vehicles are arriving at other end. Here we are using two LED's the first is red LED and another one is green LED same as to another pole. Red LED is use to stop the vehicle and green LED is used to move the vehicle.The first pole pin numbers are the red LED is connected to the pin number 5 and the green LED is connected to the pin number 6. In another pole pin number for red led is connected to the pin number 8 and green led is connected to the pin number 9 and finally we connected buzzer to the pin number 4. These are the pin details and connections of block diagram.



Circuit Connections



Block Diagram Of The System

VI. FUTURE SCOPE

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.

VII. CONCLUSION

Implementation of this system at a local level like societies, educational institutes, etc. can reduce the burden on the local authorities. The automatic waste segregator is one small step towards building an efficient and economic waste collection system with a minimum amount of human intervention and also no hazard to human life. Using a conveyor belt makes the system far more accurate, cost- effective and also easier to install and use at a domestic level. Segregating all these wastes at a domestic level will also be time-saving. While implementing our system we came across many problems like the sensing range of inductive proximity sensor, the accuracy of the moisture sensor, adjusting the range of IR sensors and some more, but using some modifications we tried the make the system as reliable as possible but not completely perfect.

VIII. ACKNOWLEDGEMENT

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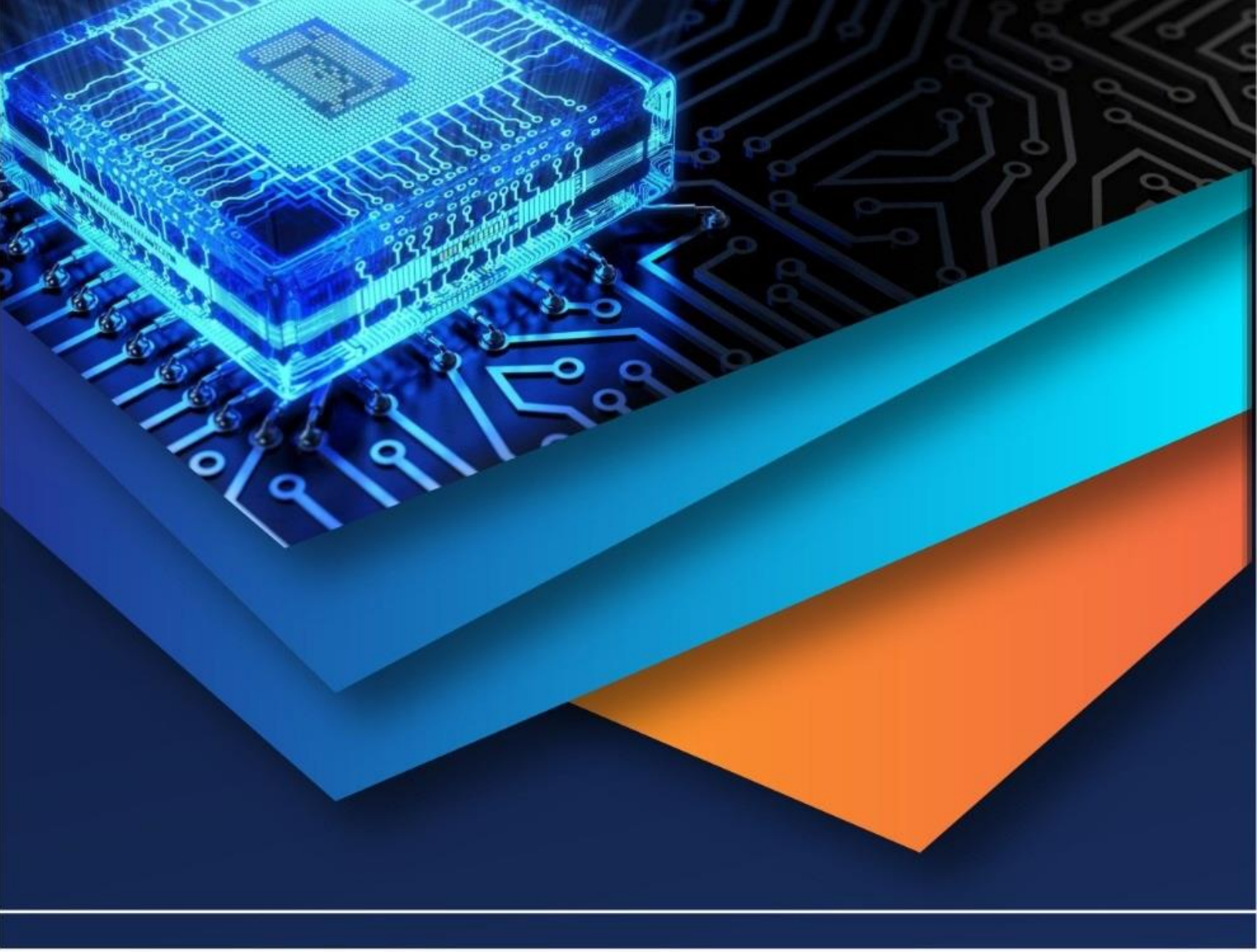

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