

A study of Smart Road Safety Using Sensor Technology

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Abstract:

According to several studies, there are thousands of people died or injured in accidents in every year. In developing countries like India, accidents are the major cause of death. There are many dangerous roads at mountain places/ hill areas which are single line narrow curved roads. At those curved places, the drivers aren't able to see the vehicle or obstacles coming from the other end of the curve and if the vehicle isn't in good condition then it is difficult to control those curved places. In order to minimize these accidents, we proposed a project to prevent accidents at U-turns by altering the driver about the vehicle coming from the opposite side. This is done by keeping an IR sensor on both sides of the U-turn and so that if vehicle comes from one end of the curve then sensor senses and this IR sensor gives signal to Arduino and Arduino gives command to Buzzer, LED lights and Buzzer rings on the other side in order to alert the driver.

Keywords: Proximity sensors, Arduino microcontroller, Counter, RGB LED, Buzzer, IR sensor.

1. 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 lifesaving and it's also on we humans how we take care of our own safety a safety comes along with us.

2. LITERATURE SURVEY

Aravinda B, Chaithralakshmi C, Deeksha, Ashutha K[1] from their report, it is concluded Accident prevention in U-turn, S-turn, hilly Ghats and mountain roads using modern sensor technology, Which uses Aurdino UNO, Ultrasonic sensor, RF module LED etc Accidents may takes place in various factors drunk and driving, Texting while driving, Speeding, Distractions, Sleeping while driving. Among Drowsiness is reason for most of the accidents. While driving at the speed of 100km/hr.driver falls sleepy within 4 seconds the buzzer will enables.

Ranga Sreedhar Galla [3] has studied the basic aim of their paper is to reduce accidents on hilly and slippery roads. In curve roads the other road end of vehicle cannot seen by driver. At night time accidents may happens by intensity ofhead light from opposite side of vehicles. Also, the light intensity problem occurs both curved roads and mountain roads; Thousands of people lose their lives. The solution for this problem is alerting the driver about the vehicle coming from opposite side. This is done by keeping an ultrasonic sensor in one side of theroad before the curve and keeping aLED light after the curve, so that if vehicle comes from one end of the curve sensor senses and LED light glows at the opposite side.

Kartik Venkata Mutya, Sandeep Rudra [4] has studied that road traffic accidents are being recognized as a major public health problem in numerous countries with alarmingly increasing fatalities in developing countries. Careless driving as a result of excessive waiting and blind corners is attributed as one of the most important factor for all road accidents. An estimated 1.2 million people lose their lives in road traffic crashes every year, and another 20 to 50million are injured. A docile, economical mechanism top revent these road accidents is the need of the hour. It is hoped that the mechanism presented in this article would help in alleviating this

concern especially in correspondence with large vehicle accidents on highways by being easily implemented in low and middle income countries.

3. 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 start 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.

4. PROPOSED SYSTEM

The mountain roads have numerous turns and blind spots. These spots are so dangerous at times that they cause accidents if not maneuverer 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.

WORKFLOW DIAGRAM

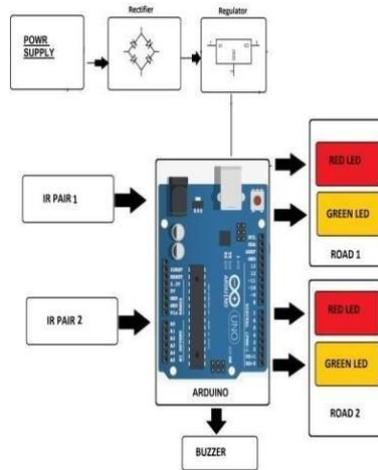


FIG 1: THE WORKFLOW DIAGRAM

5. 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

CIRCUITDIAGRAM

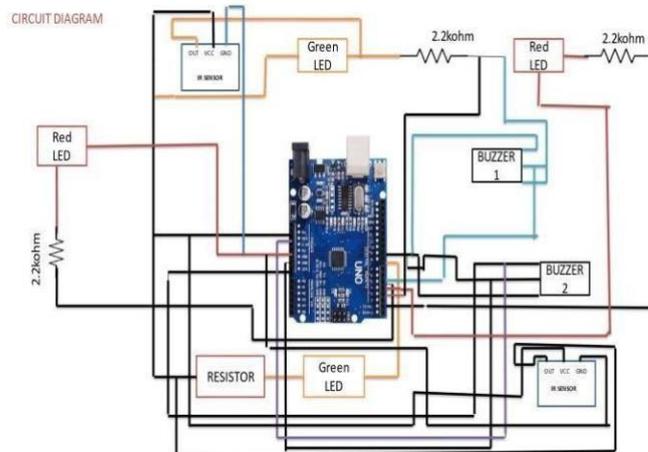


FIG 2: CIRCUIT DIAGRAM OF THEPROPOSED IDEA

6. WORKING PROCEDURE

- **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.

7. RESULT ANALYSIS

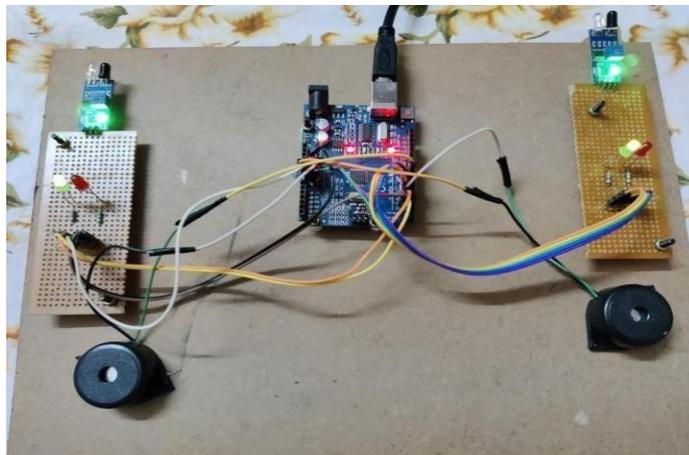


FIG 3: When no vehicle is present on the opposite side

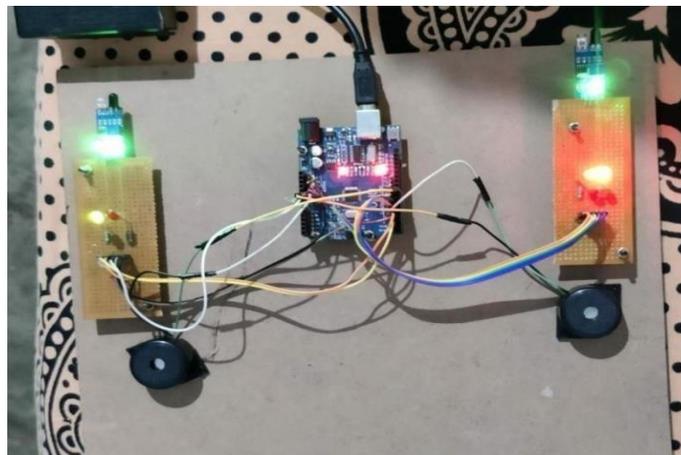


FIG 4: When vehicle comes from right side



8. 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

9. CONCLUSION AND FUTURE SCOPE CONCLUSION

The purpose of this project is to save thousands of precious lives and decrease the number of accidents in curve roads. This is possible by alerting the driver by means of LED light which glows when vehicles comes from the other side of the curve. The vehicle is detected by the help of IR sensor which is interfaced to microcontroller arduino UNO. By this we can save thousands of lives in the curve roads.

10. FUTURE SCOPE

- Arrangements to protect the sensor from being damaged critically.
- 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.

REFERENCES

1. Published in: 2017 International Conference on Intelligent Computing and Control Systems (ICICCS) INSPEC Accession Number: 17487357, DOI:10.1109/ICCONS.2017.8250761 Publisher: IEEE

2. Published in: 2018 1st International Conference on Computer Applications & Information Security (ICCAIS)INSPEC Accession Number: 18043292,DOI: 10.1109/CAIS.2018.8441951Publisher: I EEE
3. Published in: 2017 IEEE Region 10 Humanitarian Technology Conference (R10-HTC), INSPEC Accession Number: 17579777, DOI: 10.1109/R10-HTC.2017.8288908, Publisher: IEEE
4. Published in: 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA), Accession Number: 18617740, DOI: 10.1109/ICCUBEA.2018.8697663, Publisher: IEEE
5. Published in: 2019 International Conference on Innovative Trends in Computer Engineering (ITCE), INSPEC Accession Number: 18473398, DOI: 10.1109/ITCE.2019.8646591, Publisher: IEEE
6. Published in: 2017 3rd IEEE International Conference on Computer and Communications (ICCC) INSPEC Accession Number: 17651929, DOI: 10.1109/CompComm.2017.8322721, Publisher: IEEE
7. Published in: 2017 International Conference on Computer Communication and Informatics (ICCCI), INSPEC Accession Number: 17392872, DOI: 10.1109/ICCCI.2017.8117791, Publisher: IEEE
8. Published in: 2016 Online International Conference on Green Engineering and Technologies (IC-GET), INSPEC Accession Number: 16864673, DOI: 10.1109/GET.2016.7916857, Publisher: IEEE
9. Published in: 2016 International Conference on Advances in Electrical, Electronic and Systems Engineering (ICAEES) INSPEC, Accession Number: 16776775DOI: 10.1109 /ICAEES.2016. 7888006 Publisher: IEEE
10. Published in: IEEE Transactions on Intelligent Transportation Systems (Volume: 12 , Issue: 1 , March 2011)Page(s): 15 - 24INSPEC Accession Number: 11834565DOI: 10.1109/ TITS.2010.2050060 Publisher: IEEE