Accident Avoiding System In Mountains Using Sensor

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Abstract- *This paper presents an Accident avoiding system designed to assist people in checking their route at the hairpin turns and no vision zones in mountain using Infrared sensors and an Arduino microcontroller. The sensors are placed at an specific place from where it will give accurate judgement about the vehicles. This system is very useful. It will save lives of people whose accident people. It is cheaper and less battery consuming so it will be an effective way to reduce the no of accident s. It includes infrared sensor which works on the reflection principle. It has a specific range of transmitting IR radiation. The system was programmed using the C language and tested for accuracy by visually impaired individuals, proving to be an effective tool for improving mobility and safety at the mountains. Our aim is to decrease the numbers of accident due to no vision in mountains.*

I. INTRODUCTION

The leading cause of mortality in developing nations is accident. All of the world's perilous routes are mountainous and winding if we're talking about them. On curving roadways, the number of fatalities is more intense. There will be curvy, narrow roads in the mountainous areas. When this happens, the driver of a car cannot see cars coming from the other side. Each year, hundreds of lives are lost as a result of this issue. while we are talking about mountain roads here other side might be led to a cliff. Notifying the driver of a car approaching from the side is the solution to this issue. In this project, one solution is put out. By putting an infrared sensor on the side of the road before the curve and keeping an LED light on the other side, we can warn drivers. If a car approaches from one end of the curve, the sensor will detect it, and the LED light will glow red on the other side. The driver can become attentive and reduce the speed of the car by staring at the red LED light.. In this project there is a speed detection circuit which will help drivers to judge when to slow down and when they can proceed for their journey. This project will show the speed of vehicles. If the speed of vehicle is under 50 then it will display normal speed and when it is more than 50 it will display over speeding. It will help the drivers and number of accidents will decrease

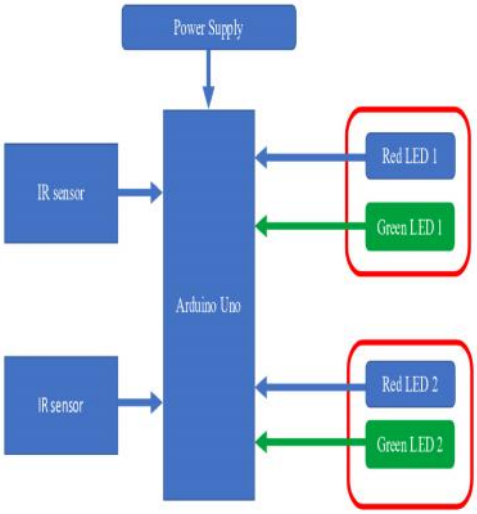
II. IMPLEMENTATION SET UP

1. Components required: Hardware

- IR module
- 2N2222A
- Buzzer
- 7805 Regulator
- 220-ohm resistor
- Red LED
- Green LED
- 16x2 LCD
- Arduino Uno board

2. Components required: Software

- Arduino IDE



Signaling system block diagram

The proposed Accident avoiding system for the drivers in the mountain is a circuit equipped with sensors to provide information about the vehicles to the opposite side of the corners and bends. The system integrates traffic signaling with pre-programmed speed detection circuit to allow the user to get the accurate information about vehicles of the opposite side of the roads. The system includes infrared sensors, LED lights, Arduino Uno, a LCD display, 7805 Regulator, transistors, resistors, buzzer, meter belt wire, fuse wire and a battery. The source code for the Arduino Uno was developed using Arduino IDE software. The proposed system aims to provide an affordable and effective navigation aid for the drivers in the hill areas who goes through hairpin corners and

no vision bends through signaling system and displays. The performance of the prototype was evaluated with two obstacle scenarios, including two hills, two toy vehicles, remote controls and setup. The proposed solution is a moderately priced navigational aid for the drivers in hill areas. In terms of hills and mountains, it provides accurate details of the vehicles distance and speed which are coming towards them. The prototype showed good results in detecting Vehicles placed or moving at a distance and at a random speed in front of the user.

III. METHODOLOGY

The proposed system is made up of the Infrared sensor, which is interfaced to the microcontroller, codes written with the Arduino sketch, and the traffic signal system, which is connected to the Arduino. It has 14 digital outputs and inputs pins, of which 6 can be used as PMW outputs, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, and an ICSP reset button. The RF transmitter was interfaced with the microcontroller as codes were written with the Arduino sketch, and the RF receiver was connected to the microcontroller. The LCD was interfaced with the microcontroller connected to pins, and all codes were written with the Arduino sketch. The system will allow the drivers to freely navigate to their desired destination. It is also user-friendly.

Arduino uno

It comes with 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, and an ICSP header for programming the microcontroller with an external programmer. The digital pins on the Arduino Uno can function as either inputs or outputs, allowing you to control various electronic components such as LEDs and motors. Meanwhile, the analog inputs enable you to read values from sensors, including temperature and light sensors. To program the board, you can use the Arduino programming language, which is based on C++. The software for the Arduino, which is free to download, includes a user-friendly integrated development environment (IDE) that simplifies the process of writing and uploading code to the board.

Buzzer

An Arduino buzzer, also known as a piezo buzzer, is a small speaker that can be directly connected to an Arduino. We may configure the buzzer to sound at a certain frequency by utilising the “tone ()” function. The buzzer operates based on the reverse piezoelectric effect and can produce sounds of various frequencies. To use the function, we only need to specify the pin to which the buzzer is connected and the desired frequency in Hz.Because the buzzer only requires a small amount of current.

Infrared sensor

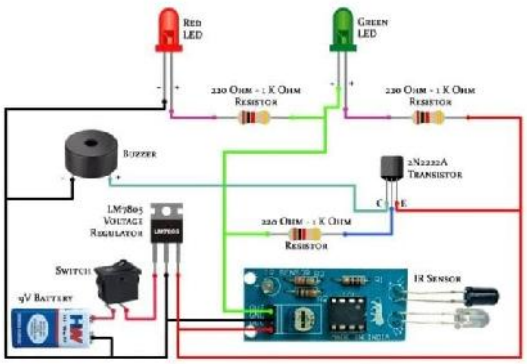
The IR sensor, also known as an infrared sensor, is a type of electronic part that emits or detects IR radiation to identify certain features in its environment. The visionary senses used by humans to identify barriers are similar to this type of sensor. The two components of an infrared sensor, the emitter and the receiver (transmitter and receiver), are collectively referred to as an optocoupler or a photo-coupler. In this case, an IR LED is employed as an emitter and an IR photodiode as a receiver.

LCD display

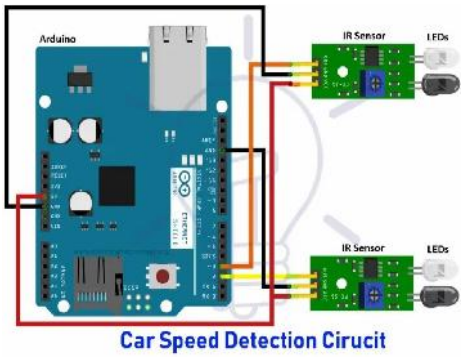
The LCD 162 is a type of electronic display that shows information and messages. As the name suggests, it includes 16 Columns & 2 Rows so it can display 32 characters (16×2=32) in total & every character will be made with 5×8 (40) Pixel Dots. Therefore, 32 x 40 or 1280 pixels may be used to compute the total number of pixels in this.HD47780 controller. LED used are green and blue.

IV. MODELING AND ANALYSIS

An electrical gadget known as an IR sensor emits light in order to detect nearby objects. An IR sensor may detect movement in addition to tracking the heat of an item. Typically, all items emit some kind of heat radiation in the infrared range. Although these kinds of radiations are undetectable to the human eye, infrared sensors can pick them up. When the sensor releases radiation receiver captures the radiation gives output according to it. When we test the IR sensor module its capacity to send radiations is nearly 2 feet.



Signaling Circuit diagram



Car Speed Detection Cirucit

V. RESULTS AND DISCUSSION

Once it was confirmed to be intact on the breadboard, it was transferred to a Vero board.The resistors, transistor, diodes, and connecting terminals were then carefully connected using a soldering iron and soldering flux to avoid damage to the integrated circuit IC sockets that were used. Care was taken to minimize component damage due to excessive heat from the soldering iron during the process.

VI. CONCLUSION

It is worth mentioning that the aim of this study, which was the design and implementation of a signal and speed detection circuit for drivers, has been fully achieved. The circuit serves as a basic platform for the next generation of aiding devices that can help the drivers in no vision zones and blind turns. It is both effective and affordable, yielding good results in detecting vehicles within a range of some meters. Furthermore, wireless connectivity between the system components can be implemented to increase the range of the infrared sensor and determine the speed of approaching vehicles. Developing such an empowering solution for drivers in mountain regions in developing countries as a top priority is crucial. The device constructed in this work can detect only vehicles.

REFERENCES

[1] Treat, John R. "A study of precrash factors involved in traffic accidents." *HSRI Research review* (1980).
[2] Vidhya, K., and A. Bazila Banu. "Density based traffic signal system." *International Journal of Innovative Research in Science, Engineering and Technology* 3.3 (2014): 2218-2222.
[3] Mirchandani, Pitu, and Larry Head. "A real-time traffic signal control system: architecture, algorithms, and analysis." *Transportation Research Part C: Emerging Technologies* 9.6 (2001): 415-432.
[4] Ashutha K., Shetty Arpitha., ET. Al "Novel wireless data communication for fisherman", International journal of computer science and mobile computing (IJCSMC), Vol. 5, Issue 4, pp. 511- 517, April 2016.
[5] Ashutha K., Ankitha K., "Error Minimization in BCH Codes", International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering (IJIREEICE), Vol. 4, Issue 5, pp. 402-405, May 2016.
[6] Ashutha K., Ankitha K., "Error Minimization in BCH Codes", International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering (IJIREEICE), Vol. 4, Issue 5, May 2016.
[7] World Health Organization, "Global status report on road safety 2015,"
[8] World Health Organization, "Decade of Action for Road Safety 2011-2020 seeks to save millions of lives,"
[9] Wegman, "The future of road safety: A worldwide perspective," IATSS Research, vol. 40, no. 2, pp. 66–71, 2017. View at Publisher · View at Google Scholar ·