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CLASH AVOIDANCE AT HAIRPIN BENDS USING IR SENSOR

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Abstract - *People don't care enough to stay safe while driving on road. During a long travel accidents and deaths caused by them are the most serious issues now-a-days. Research in this paper includes the main issues like ghat road accidents and their impacts, causes of this accident, effect of accident, preclusion and control so that we can improve this state. It is not safe now-a-days to drive through the ghat areas while turning in the hairpin bends. The percentages of accidents in ghat sections are increasing day by day. Severity of these accidents is non-reparable. So firstly it is important to control this situation and have some safety measures in hairpin bends. This paper includes some solutions and ideas to improve protection in ghat sections.*

***Key Words*: Road safety, hairpin bend, ghat sections, accident.**

1. INTRODUCTION

The current technology Internet of things (IOT) has brought good changes into every part of our life. There are many situations these technologies can be used to avoid accidents in roads; mainly it can be used in ghat sections. With the active changes in the models of the vehicles the roads need to have same capability to face them. Today's roads have become stagnant paths which have no capability for assistance [1]. There are many risky roads and bends in the world like mountain roads, narrow curve roads, hairpin bends. The problems in these hairpin bends are that the drivers are not able to see the vehicle or obstacles coming from opposite side of the curve. If the vehicle is in high speed, then it is difficult to control and there are chances of falling to face. The solution for this problem is alerting the drivers about the obstacle or vehicle upcoming. Usually convex mirrors or horns are used for this purpose but it is not valid. To avoid these problems in curve roads or hairpin bends we are introducing sensor based accident prevention system. That is we are keeping two IR sensors in one side of the road before the curve and keeping a LED light after the curve [2].

Fig.1 Hairpin Bend

2. METHODOLOGY

Ghat Roads are access routes into the mountainous with the number of hairpin bends, which is very risky as compared to normal routes. So chances of accidents in ghat sections is more because of narrow road width, sharp bends, improper camber, valley side etc. We plan to overcome this problem by placing an IR sensor on one side of the roads and alerting the driver about the obstacle or vehicle in Ghat sections. When the signal is green it indicates that it is safe to take turn which means there is no vehicle coming in the opposite direction. These two IR sensors can give input to the Arduino and this Arduino will send data to the LED lights which directs for vehicle.

3. COMPONENTS REQUIRED

3.1. ARDUINO UNO

The Arduino Uno is a microcontroller board which is open source used to insert the code as input using USB and can get the excepted output.This platform consists of physical programmable path board or IDE(Integrated Development Environment) that runs on computer, used to mark and upload computer code to the physical board. The ATmega328 on the board comes preprogrammed with a boot loader that allows uploading new code to it without the use of an outside hardware programmer. Arduino board design uses a mixture of microprocessors and controllers. The boards are set with digital and analog input/output (I/O) pins that may be interfaced to a choice of development boards or breadboards (For prototyping) and other circuits. The microcontrollers can be programmed using C and C++ programming languages [3].

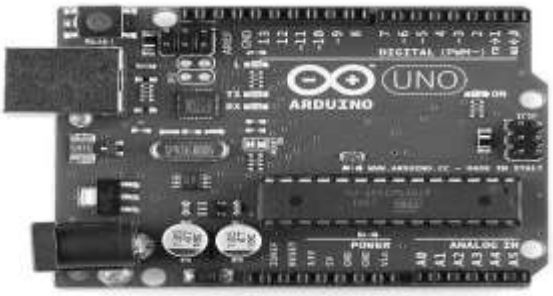

Fig.2 Arduino Uno

3.2. IR SENSOR

Infrared sensors are being used as proximity sensors and they can be passive or active. Passive infrared sensors are basically Infrared detectors. These sensors do not use any infrared source and detects energy emitted by obstacles in the field of view. The active infrared sensors consist of two elements which are infrared source and infrared detector. Infrared source includes an infrared laser diode. Infrared detectors include photodiodes or phototransistors. The energy emitted by the infrared source is reflected by a purpose and falls on the infrared detector. An IR sensor consists of an IR LED then an IR Photodiode; mutually they are called as Photo – Coupler or Opto – Coupler. When the IR transmitter emits radiation, it reaches the thing and some of the radiation reflects reverse to the IR receiver. Based on the force of the reception by the IR receiver, the output of the sensor is defined [4].

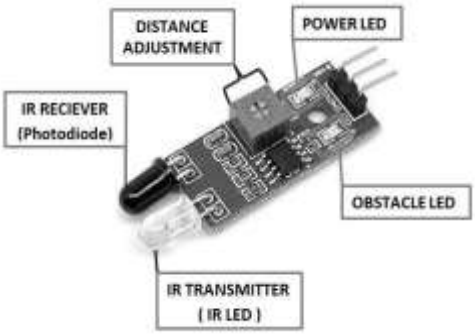

Fig.3 IR Transmitter and Receiver Sensor

3.3. LED LIGHTS

A Light Emitting Diode (LED) is an electronic device of a semi-conductor source that emits light when an electrical current is passed through it. The early LEDs are to produce only red light, but the current LEDs can produce several different colors, including red, green, and blue (RGB) light. The recent advances in LED technology have made it probable for LEDs to produce white light as well. LEDs are generally used for indicator lights (such as power on/off lights) on electronic devices. They also have few other applications, with electronic signs, clock displays, and flashlights. You can typically identify LEDs by a series of small lights that make up a bigger display. The capable nature of LEDs allows them to produce brighter light than other types of bulbs while using less energy [5].

Fig.4 LED Lights

3.4. ARDUINI IDE

The Arduino Integrated development environment (IDE) is open-source software and it is a cross -platform application for Windows, macOS, Linux that is written in function from C and C++ languages. It can be used to write and upload programs to arduino board. The source code for the IDE is released below the general public license (GNU), version 2. The languages C and C++ using particular rules of code structuring. The arduino IDE supplies a software library from the electric wiring project, which provides many general input and output procedures. The Arduino IDE employs are argued to convert the program from executable code into a text file in hexadecimal encoding that is laden into the Arduino board by a loader program in the board's firmware [6].

4. SYSTEM DESIGN

4.1. BLOCK DIAGRAM

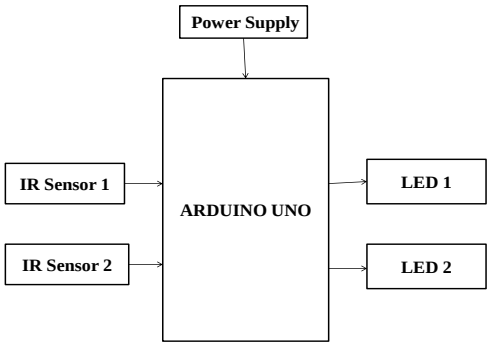

Fig.5 Represent the block diagram.

4.2. SCHEMATIC DIAGRAM

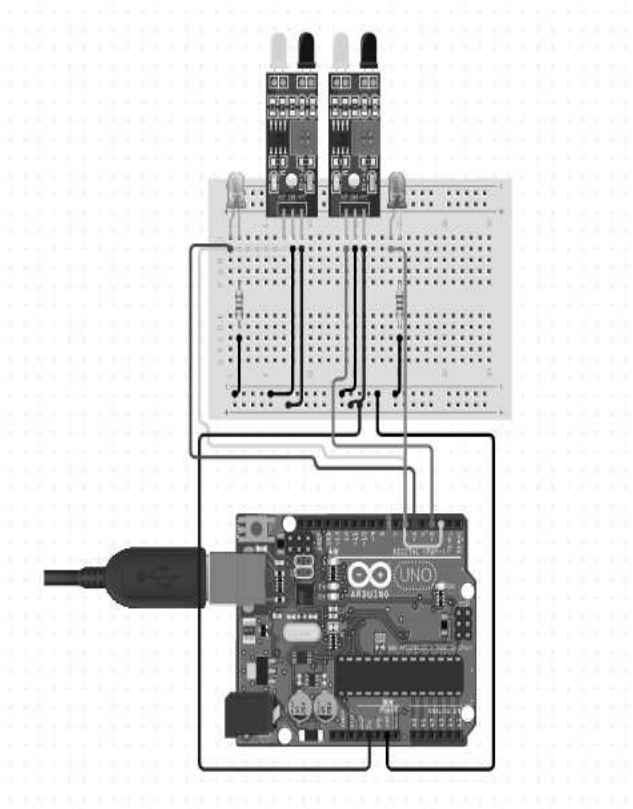

Fig.6 Represents the Schematic diagram

5. WORKING PRINCIPLE

This paper proposes a simplistic System to avoid accidents in hairpin bends on a hilly track, Ghats, or zero visibility turns using proximity sensors. It uses two IR sensors, which are placed on one side of the hairpin bend. These two IR sensors are senses by the side of the downhill section of the road. The sensors are mutually exclusive and are connected to ATmega328P microcontroller through wires. Based on the output of sensors, position of vehicles on other side of the bend is detected which is provided as an input to the microcontroller. The microcontroller which works on a power supply of 9V runs a Priority algorithm which triggers the warning LEDs to glow and thereby intelligently controlling the movement of vehicles at the bend. Warning LEDs are placed at the side of the uphill section of the hairpin bend.

6. RESULT AND DISCUSSION

The experiment are started with sensor, it senses the vehicle with the help of IR Sensor. In this project we are alert the driver by blinking. The clash avoidance at hairpin bend is able to transmit data which is sensed from other side of the road. The system is completely integrated and can give alert to the driver by using LED. This system helps to detect the vehicles by Using their IR Sensor. This system provides the information about the vehicles coming from the opposite side of the vehicles in the Ghats section. This system is useful when the driver can't see the vehicle in the opposite side of the vehicle because of long curve roads in the Ghats section. Thus the system offers the safety and security to the driver.

7. CONCLUSION AND FUTURE WORK

The purpose of this paper is to reduce the number of accidents in curve roads. This is done by warning the driver by means of LED light which glows when vehicle comes from the other side of the curve. The vehicle is detected by the help of IR Transmitter and Receiver sensor which is interfaced to the microcontroller arduino Uno. In this we can save thousands of lives in the curve roads on the ghat section. We recognize the causes and effect of accidents and then find out a solution introducing a new technique to avoid such accident. The new technique consists of two IR sensors to alert the vehicle of the opposite road. We have not done anything to safeguard from accidents in the Ghats section. Hence we can add GSM module if driver meets with an accident in the Ghats section it will send messages directly to police stations and hospitals.

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