WARNING SYSTEM FOR OVER-HEIGHT VEHICLES

[1]Milind Rane [2]Atharva Gajre [3]Harshada Harole [4]Janhavi Kanakdande [5]Pranjali Patil

[12345]Department of Electronics Engineering, VIT, Pune

Abstract

In this paper, we propose and demonstrate the design of a warning system for over height vehicles. The vehicle detection system uses an infrared sensor to monitor the vehicle. An audio and visual alarm is triggered when the overheight vehicle is detected by the sensor system.

The main and the most important aim of this project is to ensure there are adequate safety procedures implemented on roads and highways where there are tunnel entrances and over bridges where it may be difficult for over height vehicles to get in and avoid cluttering and accidents.

This is a prototype model used for demonstrating the future scope of this project and the advances that can be made for further implementation of tighter security measures to avoid road and traffic accidents at all costs.

Keywords:
Arduino, over height, vehicles, IR proximity sensor, LCD, resistor, potentiometer, battery, buzzer

I. INTRODUCTION

This circuit can be used to detect big over-height vehicles moving towards bridges, a tunnel entrance, and overhead structures, and warn the drivers. It can be developed for monitoring a truck or a big trolley driving towards a bridge at night. If the height of the vehicles is bigger than what can pass under the bridge, the prototype model will be useful in making it known to the driver and possibly avoiding a freak accident.

The vehicle detection system uses an infrared sensor to monitor the vehicle. When the vehicle enters the range of the sensor and it is over-height an audio-visual alarm is activated, indicating the driver it is dangerous to approach.

Forex, a truck loaded with hazardous gases colliding with an overhead bridge can be dangerous. If a vehicle is too high to safely drive under the overbridge, the sensor triggers an alarm placed at a distance ahead on the route. The alarm warns the driver to alter the course or stop before colliding with the structure.

II. METHODOLOGY/EXPERIMENTAL

Components/Circuit Diagram

Hardware used was an Arduino UNO, an IR proximity module, 5mm LED, 9V Battery, Resistors, Piezo Buzzer, 3-pin Berg Connector, 10K ohm pot, 16x2 LCD.
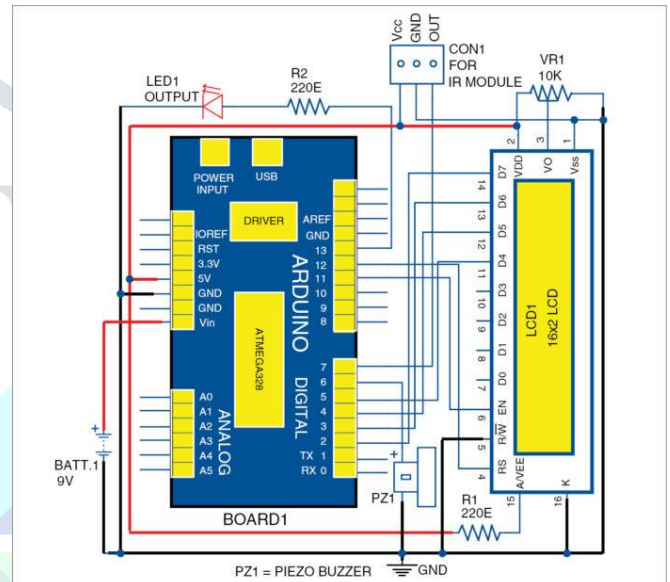

Figure 1- Circuit Diagram

IR Proximity Module

This module incorporates an IR transmitter and an IR receiver/detector in one package (Figure 2). It transmits an IR beam continuously. Whenever an object or an over-height vehicle is detected, the IR beam reflected from the object/vehicle is detected by the inbuilt IR receiver.

Whenever the reflected Infra-Red beam is detected, the vehicle detection system generates an audio and visual alert informing the driver to stop the vehicle, as it may not be safe to continue. LED1 is used as a visual (red light is visible) alert whenever an over-height vehicle is detected. Sensing range can be adjusted using an inbuilt variable resistor in the IR module.
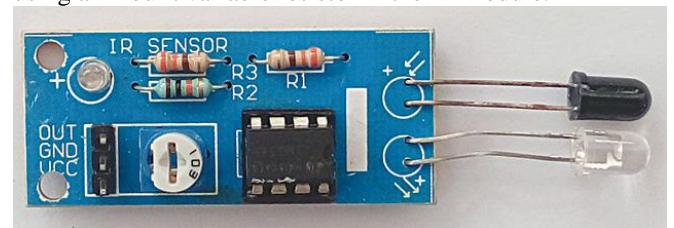

Figure 2 - IR proximity module

Arduino Uno

Arduino Uno that has an ATmega328 microcontroller (MCU) is used in the project. It consists of 14 digital input/output (I/O) pins, six analog inputs, 16MHz crystal oscillator, USB connection, a power jack, ICSP header and reset button. The output of the sensor module is analog. It gets converted to digital through the inbuilt A/D converter of Arduino Uno**.**

The Programming of Arduino is done using Arduino IDE software. The program is written in Arduino programming language.

Figure 3 – Arduino Uno

Potentiometer

A 10kilo-ohm pot (VR1) is a three-legged electronic component used to vary the resistance in a circuit. Here, it is used to control the contrast of the LCD.

Figure 4 - !0k Preset

LCD

A 16-pin JHD162A LCD module is used in this project as a warning display. It is a two-lines and 16-characters LCD module, which can be replaced with a large LCD display (with some modifications in the circuit) for actual use.

III. WORKING

Make the connections as they are given in the circuit diagram. If an object or vehicle is not detected by the sensor, a message such as 'Path is clear' displayed on LCD. If a vehicle is detected, the message is displayed as 'Please Stop!!' as shown in (Figure 5). At the same time, LED glows and the buzzer sounds an alarm. The circuit can be wired on a breadboard with jumper wires for testing.

This vehicle detection system can also be implemented using a laser sensor, speaker and bigger display, instead of a proximity sensor, buzzer and 16×2 LCD, respectively. The sensor and display should be directed along the path of the vehicle before it approaches the bridge so that the driver gets notified of the warning message well in time and can alter the route as he/she wishes.
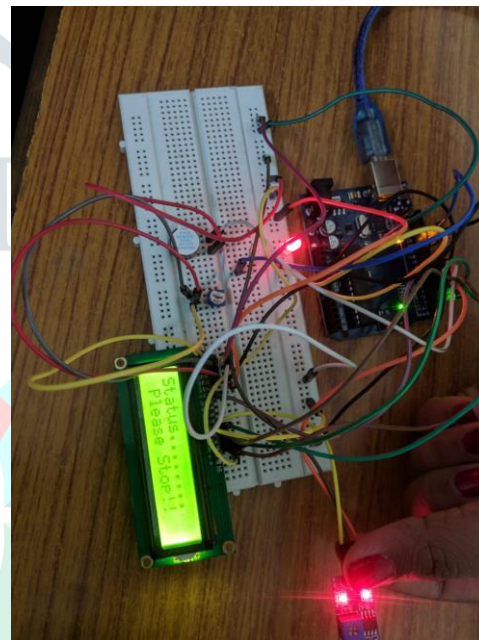

Figure 5 - Warning message on LCD

IV. APPLICATIONS

Provide overheight warning detection for:
• Overpasses
• Traffic tunnels
• Bridges
• Warehouse entrances

V. CONCLUSION

Road safety is integral to every person traveling anywhere in the world, especially for those driving in over-height vehicles like a truck or a trailer. While traveling near a compact tunnel or bridge, it is important for them to know whether the vehicle can pass under or not. Not knowing this can be a matter of life or death for them and for anyone else traveling on the same road. Thus, this system helps them understand the appropriate height near an entrance and if they are over height or can pass through. In the future, this prototype can be further advanced using the advancements in technology.

VI. REFERENCES

https://electronicsforu.com/electronics-projects/vehicle-detection-system