

Vehicle speed detection using Arduino and IR sensors

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Abstract:

Over speeding of vehicles has become one of the major causes for accidents and killing many lives to overcome this problem we designed a proposed system. The project aims in providing a user friendly, reliable system to detect the speed of vehicle using IR sensors and display the vehicle speed on LCD (Liquid Crystal Display) and also the system gives the alert through Buzzer if the system detects over speed.

Keywords:

Power supply, Arduino UNO, IR sensors, LCD display, BUZZER.

1. Introduction:

Rash driving is the cause of many road accidents all over the world. More than 140,000 people were killed on India's roads last year, according to figures released by the government. The traffic population has increased considerably in India as there is no means to control or monitor the speed of vehicles running on roads. This system proves highly effective in detection of over speed driving.

In this project, two IR sensors, IR transmitter (IR LED), one IR receiver (photo diode) are placed on the Arduino board. When any vehicle crosses the two-car sensors, both IR sensors are connected to the interrupted pin of Arduino and identify the fall wave and the time between activating the Arduino's internal timer sensor. And then they measure the speed display on a digital monitor or on a 16x2 LCD screen.

2. LITERATURE SURVEY:

Vishal Pande et.al [1] has proposed a framework for autonomous speed control of over speeding vehicle using Radio Frequency to design a controller to control vehicles speed and display to monitor the zones which can run on an embedded system platform.

Monika Jain [2] presented a device to detect the rash driving and alerts the traffic authorities in case of any violation. This frame of reference intends to design a system aimed at early detection and alerts vehicles driving patterns which is related to rash driving. The speed limit is by the police at very location who uses the system depending on the traffic. This device reports, displays and data base system for over speed violation management.

Ni Hlaing et.al [3] designed a system that detects the speed of the vehicle in the roads, main highways and the places where the drivers over speed. If the speed exceeds the limit, the information will be sent to PC (Personal Computer) which starts the camera which captures the vehicle of over speed.

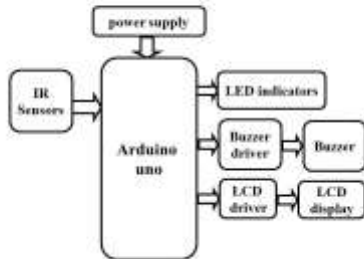
Amarnarayan et.al [4] developed speed estimation system that alerts drivers about driving conditions, robust and reliable and helps to avoid joining traffic jams is an important problem that has attracted lots of attention recently.

Nehal Kassem et.al [5] introduced a novel RF-based vehicle motion and speed detection system which can detect vehicle motion estimates the vehicle speed in typical streets with an accuracy of

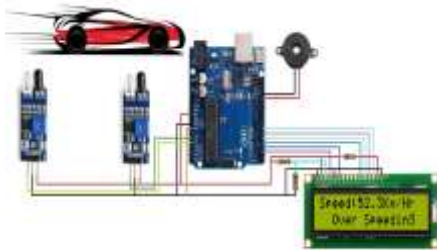
90% and detects motion with an accuracy of 100%.

3. Implementation:

Vehicle speed detection using Arduino and IR sensors



3.1 Block diagram of Vehicle speed detection using Arduino and IR sensors



3.1 circuit diagram of Vehicle speed detection using Arduino and IR sensors

The main controlling device of the project is an ARDUINO UNO. IR sensors, LCD display and buzzer are interfaced to the Arduino. The Arduino continuously read the data from IR sensors and display the vehicle speed on LCD module and also active the buzzer if the Arduino get high speed from sensors. To perform the task, Arduino UNO is loaded with an intelligent program written in embedded 'C' language.

4. Related Work:

The brief introduction of different modules used in this project is discussed below:

4.1. Arduino:



Fig: ARDUINO UNO

Arduino is a most commonly used physical computing platform and an interactive developing environment. It is a standalone platform that interacts with arduino software on the computer. The arduino software consist of an arduinoIDE (Integerated Development Environment).Arduino IDE is used for programming. Arduinio uno is the most frequently used development board though it is not a first board in the market. Arduino uno is a microcontroller based on ATmega328p. It consists of crystal oscillator, voltage regulator, communication protocol etc. It has 14 digital input/output pins, out of which 6 can be used for PWM and 6 analog pins.

4.2. IR sensors:



Fig: IR sensor

The IR sensor module consists mainly of the IR Transmitter and Receiver, Opamp, Variable Resistor (Trimmer pot), output LED in brief. IR LED Transmitter. IR LED emits light, in the range of Infrared frequency. IR light is invisible to us as its wavelength (700nm – 1mm) is much higher than the visible light range.

4.3. Buzzer:



Fig: Buzzer

Basically, the sound source of a piezoelectric sound component is a piezoelectric diaphragm. A piezoelectric diaphragm consists of a piezoelectric ceramic plate which has electrodes on both sides and a metal plate (brass or stainless steel, etc.). A piezoelectric ceramic plate is attached to a metal plate with adhesives. Applying D.C. voltage between electrodes of a piezoelectric diaphragm causes mechanical distortion due to the piezoelectric effect.

4.4 LCD display:



Fig: LCD display

Liquid crystal display is very important device in embedded system. It offers high flexibility to user as he can display the required data on it. 16*2 means 16 characters per line by 2 lines respectively. The vehicle speed will display on LCD.

5. CONCLUSION:

The existing model presents an Integrating feature of all the hardware components which has been used and developed in it with Arduino. The Presence of each and every module has been reasoned out and placed very carefully. Hence the contributing to the best working unit for “**Vehicle speed detection using Arduino and IR sensors**” has been designed perfectly. The device provides an automated solution to continuously monitor the vehicle speed and display the vehicle speed on

LCD module and the system able to give the over speed alerts through buzzer. Thus the project has been successfully designed and tested. By using this project we can reduce the road accidents. In future, this system can be extended by integrating a camera which could capture the image of the number plate of the vehicle and sends to the traffic authorities or the corresponding vehicle owner.

6. ACKNOWLEDGEMENT

We would like to thank all the authors of different research papers referred during writing this paper. It was very knowledge gaining and helpful for the further research to be done in future.

7. RESULTS:

The project **Vehicle speed detection using Arduino and IR sensors** was designed to detects the vehicle speed with the help of IR sensors and monitor the speed on LCD display and active the buzzer if the vehicle speed was high.



Fig: project output image

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