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Car Speed Detector Using IR

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Abstract -

Today vehicles are being stolen on a large number and this is the reason why this system is being introduced. To prevent the theft from stealing vehicle, this system detects if the vehicle is in theft mode and if the status is in theft mode, this system sends SMS to the user. After which the user is supposed to send back the message. This message gives command to the vehicle to lock the engine. Whenever a person tries to steal a vehicle, the PIC microcontroller is being interrupted. After which the GSM modem is responsible to send SMS to the user indicating that his vehicle is being stolen. The next step is that the user is then required to send back a message indicating to lock the engine of the vehicle so as to stop it from being stolen. The microcontroller uses a mechanism to stop the engine. In order to indicate vehicle ON/OFF state the system makes use of motors. This project can be further enhanced by using a GPS which will also help to find the exact location of the vehicle. This information can then be sent to the user via SMS.

Key Words: GSM, GPS, Microcontroller.

1. INTRODUCTION

In many parts of the highway road, accidents found a major social problem. There are several reasons to why vehicle accidents. Most of accidents on the highway road cause by high speed driving. Some highway road has signboards signifying maximum speed limit permitted while driving such as 100 km/h for the driver's safety, but some people does not follow speed limit. Therefore, the vehicles keep a constant speed within the speed limit over a particular area. In this paper, speed detection system for vehicles is proposed. This system provides very effective in detection of over speed driving. This circuit is mainly consists of Arduino UNO, two IR sensors, LCD and buzzer. When a vehicle is passing between the first and second sensors, the two sensors sense the object and then microcontroller program will start counting. When it passes cross the second sensors, the microcontroller will stop counting and calculate the speed as kilometer per hour. If the car's speed is over speed (100 km/h), the buzzer will be alarmed and the LED will be blinked. Then, LCD displays the speed of vehicles. This paper intends to design a system of detection on highway road for vehicles. This system is to improve a device that detects over speeding of vehicle, gives warning using alarm and display vehicle's speed in LCD.

This system is design to detect an over speeding vehicle by computing the speed of the passing vehicle using the time taken to travel between two sensors at a fixed distance. In this system, IR Sensors are the main part of circuit design that detects the speed of the vehicles. The system keeps the time taken by the speed of the vehicle in crossing the fixed distance from two sensors. When the vehicle passes through the first IR sensor, this sensor gets activated. From this instant forward, a timer is initiated and will continue to keep time until the vehicle reaches the second IR Sensor. Then the microcontroller starts to count the time and calculate the speed of the vehicle as km/h and this speed is displayed on a 16X2 LCD Module. If the vehicle's speed is greater than the limited speed, the buzzer will be alarmed and LED will be blinked.

2. BLOCK DIAGRAM

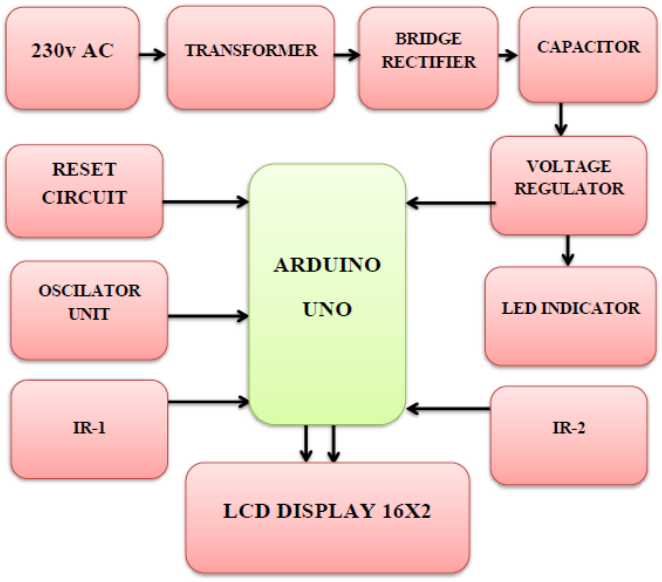

Fig.1: Block diagram

3. TECHNICAL SPECIFICATION

1. Atmega 328

The Atmega328 microcontroller, commonly used in Arduino boards, has a total of 28 pins. These pins serve various functions, including digital I/O (Input/Output) and analog input. The Atmega328 has a total of 14 digital pins labeled from 0 to 13. The Atmega328 has 6 analog input pins, labeled A0 to A5.

The Atmega328 has a reset pin labeled RESET. This pin is used to reset the microcontroller, restarting the program execution from the beginning. The reset pin can be pulled low by an external signal or by briefly connecting it to the ground.

The Atmega328 requires an external clock source to operate. It can be connected to an external crystal oscillator or

resonator, typically with a frequency of 16 MHz. The oscillator provides a stable and precise clock signal for the microcontroller, ensuring accurate timing for the execution of instructions and other operations.

Fig.2: Atmega 328

2. LCD Display

A 16x2 LCD display typically uses a parallel interface to communicate with a microcontroller or other devices. It requires a total of 16 pins to connect and operate. By controlling the appropriate pins and sending commands or character data through the data bus, you can display characters, numbers, and symbols on the 16x2 LCD display. The display allows for two rows, with each row capable of displaying up to 16 characters.

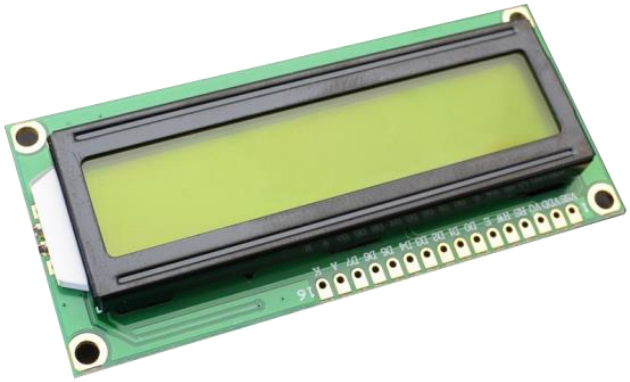

Fig.3: LCD display

3. IR Sensor

An IR sensor, or infrared sensor, is a device that detects and measures infrared radiation in its surroundings. It works based on the principle that objects emit infrared radiation as heat. The sensor can detect this radiation and convert it into an electrical signal, which can be further processed and used for various purposes. It operates on 5V dc.

4. WORKING

IR sensors are basically infrared sensors it consists of two main components one is the IR LED and the other is a photodiode. The IR LED is like a normal LED which will emit light but in the infrared spectrum. So therefore it is not visible to the naked eye and a photodiode which is also called a light-dependent resistor has a very high resistance in the absence of light and the resistance of the photodiode drops when light falls on it as the name itself indicate the resistance of the photodiode depends on the intensity of light falling on it. A photodiode is a semiconductor that has a PN Junction and it is operated in reverse bias. This is because it starts conducting the current in the reverse direction when light falls on it. I will explain about the IR LED photodiode and the working with the help of a circuit diagram. Vehicle Speed Detection or Vehicle Speed Measurement using IR Sensor and Arduino- In this tutorial, we will measure the speed of the vehicle using IR sensor, Arduino, and 16×2 LCD. In this project, we will use two IR sensors and place it at a certain distance. As we know that to measure the speed we need distance and time. In order to find time, we will use the logic that the first IR sensor will detect whether there is some vehicle is present in front of the sensor or not. Then the timer will start and will measure the duration up to the second IR sensor. The time we will get will be in milliseconds, so, in order to convert milliseconds into seconds, we will divide it by 1000. In this project, we have placed the two IR sensors at a distance of 20 centimeters which is equal to 0.2 meters. Now, we want our measured speed to be displayed in the kilometers per hour.

5. CONCLUSIONS

In conclusion, the Car Speed Detector Using IR is a valuable system for measuring and monitoring vehicle speed using infrared technology. It utilizes infrared sensors to detect the presence of vehicles and calculates their speed based on the time taken to pass between sensor points. This system offers benefits such as real-time speed monitoring, non-contact measurement, and the ability to enforce speed limits and enhance road safety.

The continuous detection system controls the speed of the oncoming vehicle. It reduces traffic problems and makes it easier to control car crashes / speeding on highways. So that the police can provide their services with ease and accuracy while sitting in the control room. In the future, the system can be expanded by combining a camera that can take a picture of a car's license plate number and send it to the traffic authorities or the corresponding car owner.

Advantages

- Traffic Data Analysis
- Real-Time Speed Monitoring
- Non-Contact Measurement

- Accurate Speed Measurement

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