EE-337

Microprocessor Lab Project

Car Over-Speeding Detection using Arduino Microcontroller

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Aim

To calculate the speed of a passing by car and detect if it is over speeding.

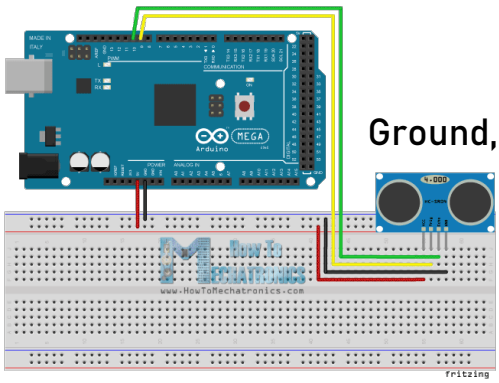
Equipment Used

- Arduino Mega Microcontroller
- 2 HC-SR04 Ultrasonic Sensor
- LCD Display (16×2)
- Breadboard
- I/O Board for Arduino
- Jump Cables
- Battery

Explanation

HC-SR04

HC-SR04 is an Ultrasonic Ranging Module which provides 2 cm – 400 cm non-contact measurement function and the ranging accuracy can reach to 3 mm. It emits an ultrasound at 40 000 Hz which travels through the air and if there is an object or obstacle on its path It will bounce back to the module.

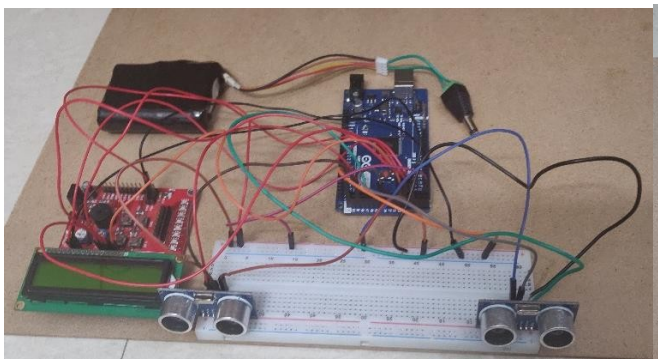


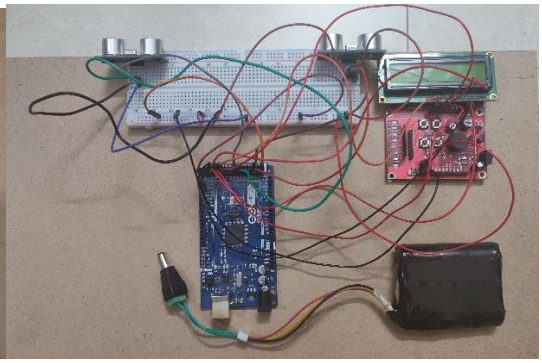
The HC-SR04 Ultrasonic Module has 4 pins, Ground, VCC, Trig and Echo. The Ground and the VCC pins of the module needs to be connected to the Ground and the 5 volts pins on the Arduino Board respectively and the trig and echo pins to any Digital I/O pin on the Arduino Board.

Working of the System

2 HC-SR04 sensors are placed 15 cm apart. When an object passes through the range 2-30 cm in front of the first sensor, a timer starts and

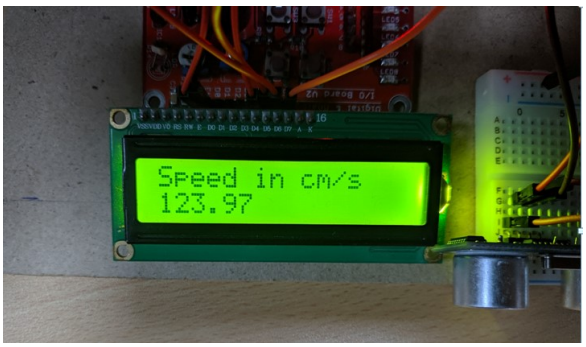
starts counting time until the object passes the second sensor. The distance of 15 cm is divided by the value in the timer to calculate speed which is displayed on the LCD. The critical speed has been set at 100 cm/s.





Result

Whenever the speed of the object crosses the critical speed (100 cm/s), an alert message is displayed on the LCD along with the speed of the object and the system resets for the next object. If object speed is within speed limit, the LCD just displays the speed.



Problem faced during project

Since the default range of the HC-SR04 sensor is approximately 4 metres, we were getting garbage speed values displayed on LCD due to multiple objects in range.

Actions taken to solve the problem

We restricted the range of the sensor in the code to 30 cm so that the speed of only the desired object is displayed.

Further Improvements

A system can be implemented in the future to click a picture of the vehicle's license plate and be stored/sent to the traffic police's database and make the system to levy fines completely automated.