SWE30011
THE INTERNET OF THINGS PROGRAMMING (HANOI)

Individual Assignment (Practical)

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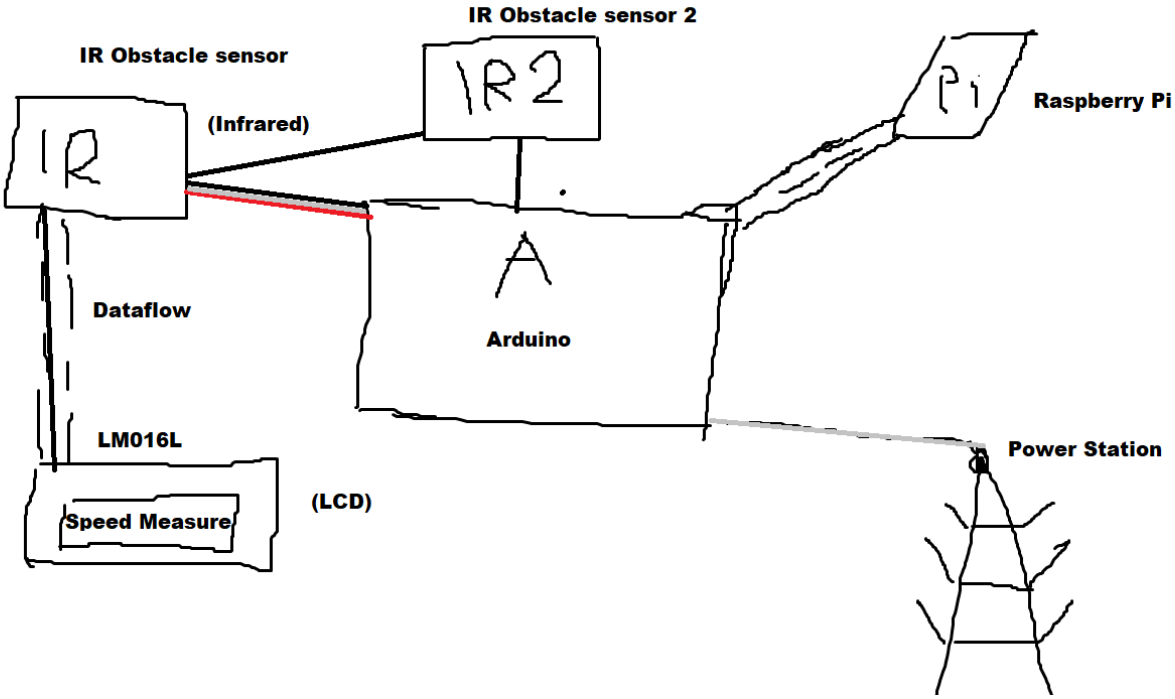
Introduction

Over-the-limit driving is a big problem for road safety, and it must be addressed in order to reduce the number of accidents. One-third of all fatal crashes are caused by drivers driving too fast. So, in this project, the internet of things (IoT) is used to measure the speed of moving vehicles, and this is referred to as speed detection and it called “car speed detection” . If a driver exceeds the posted speed limit, the system will alert the traffic police, who will then file an automatic report without the need for further complaint. Using this strategy, people will become more aware of their speed and hence reduce their speed, resulting in a more secure traffic environment.

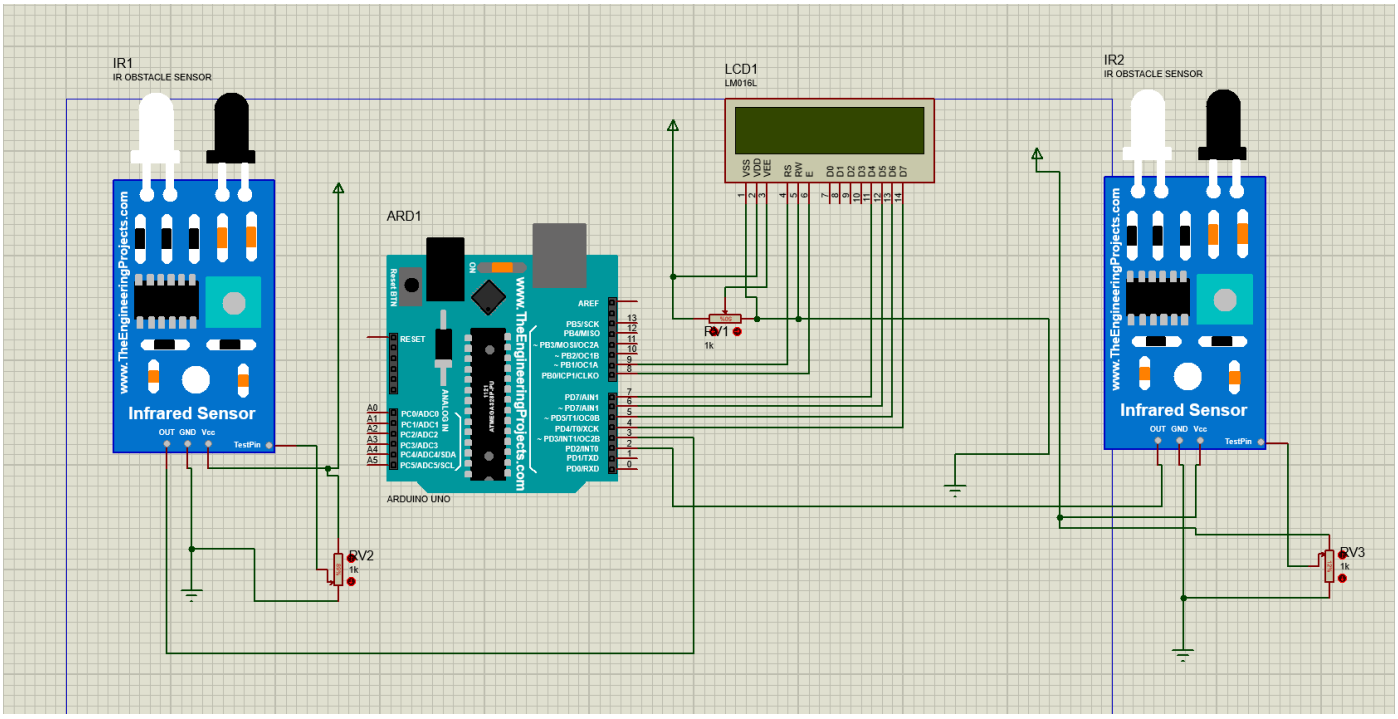
Proteus is used in this project to make a design for the Arduino Car Speed Detector Circuit. I use an Arduino Uno and 2 IR sensors in Proteus to figure out how fast a car is moving. Make a simple circuit that shows the speed of moving cars and how to use Arduino Uno and IR sensors by making a 16x2 LCD screen car speed detector circuit. This is how two IR sensors are set up on the Arduino board: sensor 1 is used as IR transmitter (IR LED), and the sensor 2 is used as an IR receiver (optical diode) and they are placed on the Arduino board. When any vehicle passes the sensors of the two vehicles, both IR sensors are connected to the Arduino's interrupt pin and determine the wave drop and time from triggering the Arduino's internal timer sensor. Then they took measurements of the speed and distance traveled by any moving object and show it on a digital monitor or on a 16x2 LCD screen that shows the information.

Conceptual design



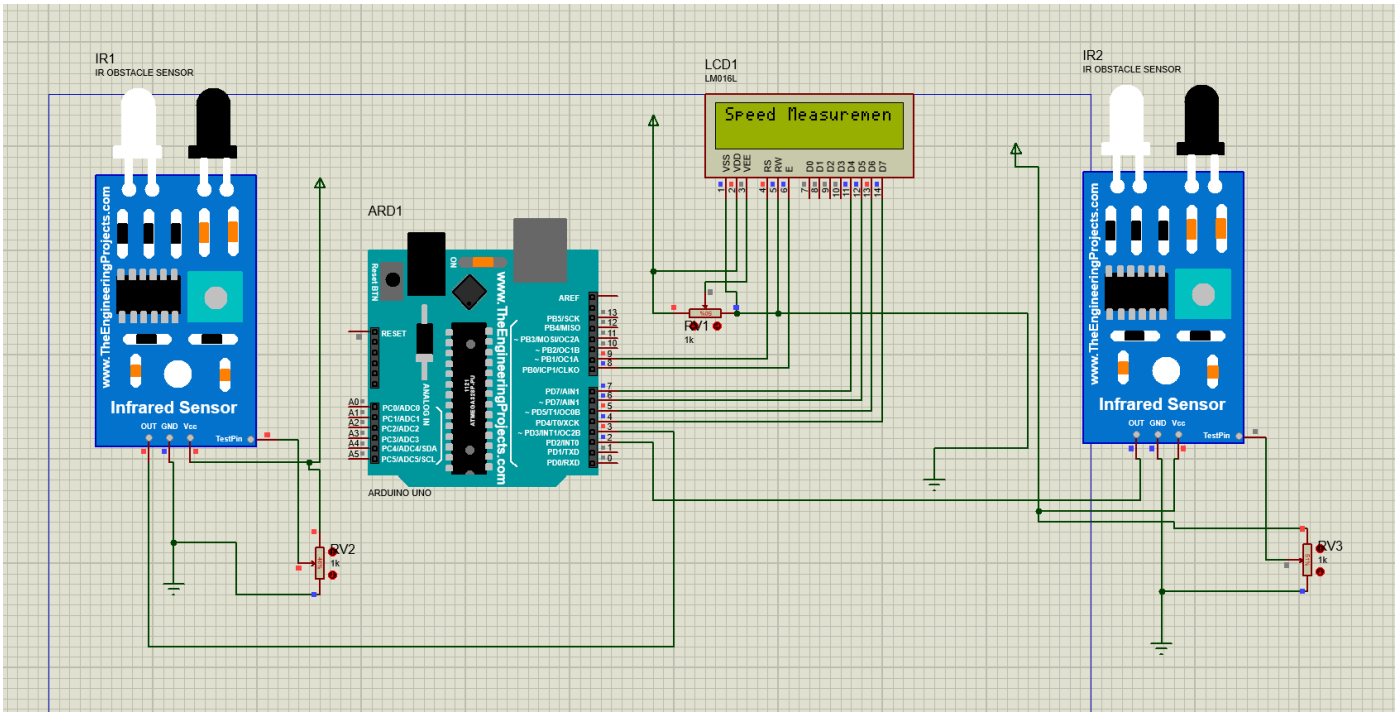
Implementation

The following are the components that were used in this project: Arduino UNO, IR sensors, 10k potentiometer, 16X2 LCD display module, connecting terminals, power supply.

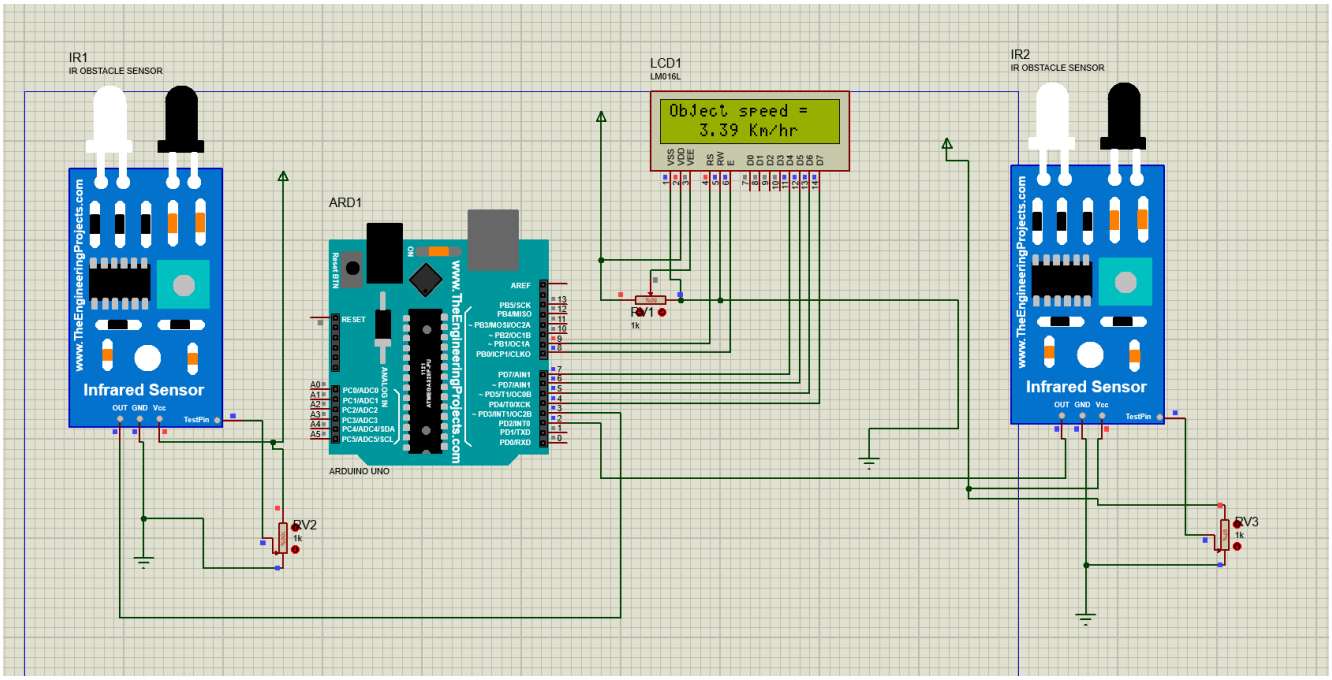


Firstly, we can read digital data out of the first IR sensor, which is connected to Arduino's digital PIN 9 (PIN 9). The second IR sensor is connected to Arduino's PIN 8. It's also common for another pin of the sensor to be connected to +5V volts and GND. Both IR sensors have the power connection they need.

Then we used 16x2 LCDs to see more information about the speed of the car. This is how we saw the speed. Its data pin e.g., d4 = Pin 5, d5 = Pin 4, d6 = pin 3, d7 = PIN 2. This means that the LCD RS and E pins are connected to the Arduino through 7 and 6 of its pins. The rest of the connections are shown in the circuit diagram.



In the next step, we will get the results, which show that Arduino is alerted when an object comes close to the first IR sensor. When the object comes out of the first IR sensor, it gets the time stamp from the Arduino board. Time is recorded again when the car comes to another IR sensor, which is where the time stamp is again.



Finally, Arduino calculates the speed by assuming there is a distance of 5 meters between two IR sensors. It then shows the effect of the 16x2 LCD display in Km/hour.

Resources

How to install Proteus 8 Professional - YouTube

How to Simulate Arduino Projects Using Proteus | Arduino | Maker Pro

IR Proximity Sensor Library for Proteus - The Engineering Projects

Arduino to 16*2 LCD Display Proteus - Arduino Proteus Simulation tutorial # 5 - YouTube

How to Interface | Use Infrared Sensor with and without Arduino in Proteus 8 - YouTube

Appendix

code_ar | Arduino 1.8.19

File Edit Sketch Tools Help

code_ar

```
#include <LiquidCrystal.h>// Import library for LCD Display
const int rs = 9, en = 8, d4 = 7, d5 = 6, d6 = 5, d7 = 4; // Define pin for LCD with 4bit mode
LiquidCrystal lcd(rs, en, d4, d5, d6, d7); // Initialize LCD with define pins
int sensorA = 3; // Initialize Pin 3 for IR sensor A
int sensorB = 2; // initialize pin 2 for IR sensor B
unsigned long t1 = 0; // Define Time1 Variable
unsigned long t2 = 0; // Define Time2 Variable
float speed;  // Define Speed variable
int i = 0;
void setup()
{
  lcd.begin(16, 2);// Start 16X2 LCD display
  lcd.setCursor(2, 0); // Set the cursor position for LCD to print
  lcd.print("Welcome to");
  lcd.setCursor(0, 1); // Set the cursor position for LCD to print
  lcd.print(" Swinburne Hanoi");
  delay(1000);
  lcd.clear();
  pinMode(sensorA, INPUT); // Define IR SensorA pin as Input
  pinMode(sensorB, INPUT); // Define IR SensorB pin as Input
  lcd.setCursor(0, 0);
  lcd.print("Speed Measurement");

}

void loop()
{

  while (digitalRead(sensorA)); // Read IR SensorA
  while (digitalRead(sensorA) == 0);
  t1 = millis(); // Record Time1
  while (digitalRead(sensorB)); // Read IR SensorA
  t2 = millis(); // Record Time2
  speed = t2 - t1;
  speed = speed / 1000; //convert millisecond to second
  speed = (5.0 / speed); //v=d/t
  speed = speed * 3600; //multiply by seconds per hr
  speed = speed / 1000; //division by meters per Km
  for (int i = 5; i > 0; i)
  {
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Object speed = ");
    lcd.setCursor(3, 1);
    lcd.print(speed);
    lcd.print(" Km/hr   ");
    delay(500);
```

Done Saving.

C:\\Program Files (x86)\\Arduino\\hardware\\tools\\avr/bin/avr-objcopy -O ihex -j .eeprom --set-sectio