



PREMIER UNIVERSITY CHATTOGRAM

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Lab Report

| | | |
|--|---|------------------|
| COURSE NAME | Microcontrollers Laboratory | |
| COURSE CODE | CSE3816 | |
| REPORT NO | 05 | |
| REPORT NAME | Distance Measurement using Arduino and Ultrasonic Sensor. | |
| DATE OF REPORT | 25-05-24 | |
| SUBMITTED TO | | |
| MOHAMMED SAIFUDDIN MUNNA ASSISTANT PROFESSOR DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING | | |
| REMARKS | SUBMITTED BY | |
| | NAME | Rimjhim Dey |
| | ID | 0222220005101039 |
| | SEMESTER | 4th |
| | BATCH | 42 |
| | SESSION | Spring 2024 |
| | SECTION | A |

Experiment Name:

Distance Measurement using Arduino and Ultrasonic Sensor.

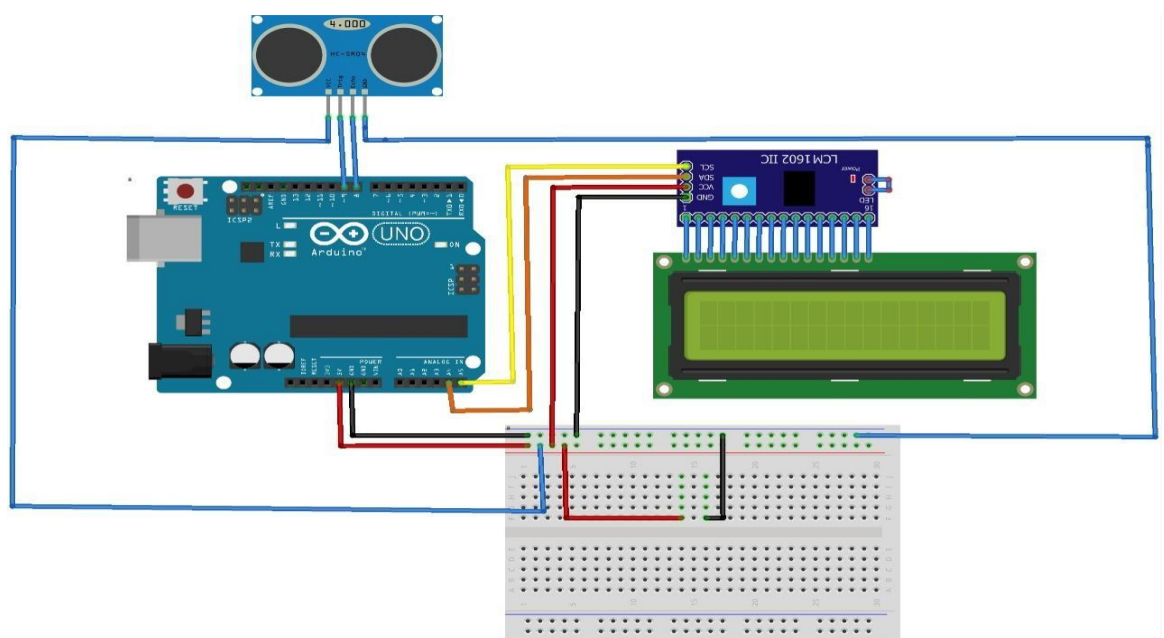
Objective:

The objective of this project is to create a distance measuring device using an Arduino microcontroller, an ultrasonic sensor, and a 16x2 I2C LCD display. The device will measure the distance to an object in front of the sensor and display the value on the LCD screen in real-time.

Instruments Required:

- Arduino Uno
- Ultrasonic Sensor (HC-SR04)
- 16x2 LCD Display with I2C interface
- Breadboard
- Jumper wires

Circuit Diagram:



Source Code:

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);

const int trigPin = 9;
const int echoPin = 10;

void setup() {

    lcd.init();

    lcd.backlight();

    lcd.setCursor(0, 0);
    lcd.print("Distance: ");

    pinMode(trigPin, OUTPUT);
    pinMode(echoPin, INPUT);
}

void loop() {

    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);

    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);

    long duration = pulseIn(echoPin, HIGH);

    float distance = duration * 0.034 / 2;

    lcd.setCursor(0, 1);

    lcd.print(distance);
    lcd.print(" cm");

    delay(1000);
}
```

Output:

The LCD will display the measured distance in centimeters. The display will be updated every second to reflect the current distance reading from the ultrasonic sensor.

Discussion:

In this experiment, we implemented a distance measuring device using an Arduino Uno, an HC-SR04 ultrasonic sensor, and a 16x2 LCD with an I2C interface. This setup provides an efficient way to measure and display the distance to an object. The HC-SR04 sensor emits ultrasonic pulses and measures the time taken for the echo to return, which is then used to calculate the distance.

Using an I2C interface for the LCD simplifies the wiring and code, reducing the number of connections needed between the LCD and the Arduino. This makes the project more accessible and easier to implement, especially for beginners.