Experiment-2.1

Student Name: Himanshu
UID: 20BCS7944
Branch: CSE
Section: 905/A
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Subject Name: IOT Lab
Subject Code: 20CSP-358

1) Aim:

To measure the distance of an object using an ultrasonic sensor.

2) Objective:

Learn about the ultrasonic sensor and how to use it..

3) Apparatus / Simulator used:

- 1 × Ultrasonic sensor
- 1 × Aux cable
- 1 × Arduino Uno R3
- 3 × Jump wires

4) Theory:

An ultrasonic Sensor is a device used to measure the distance between the sensor and an object without physical contact. This device works based on time-to-distance conversion.

Ultrasonic sensors measure distance by sending and receiving the ultrasonic wave. The ultrasonic sensor has a sender to emit the ultrasonic waves and a receiver to receive the ultrasonic waves. The transmitted ultrasonic wave travels through the air and is reflected by hitting the object. Arduino calculates the time taken by the ultrasonic pulse wave to reach the receiver from the sender.

5) Code:

```
#define echoPin 9 // attach pin D2 Arduino to Echo pin of Sensor module

#define trigPin 7 // attach pin D3 Arduino to Trig pin of Sensor module long

duration; // Declare variable to store echo time duration

int distance; // Declare variable to store the result (distance)

void setup() { // initialize digital pin 13 as an output.
```

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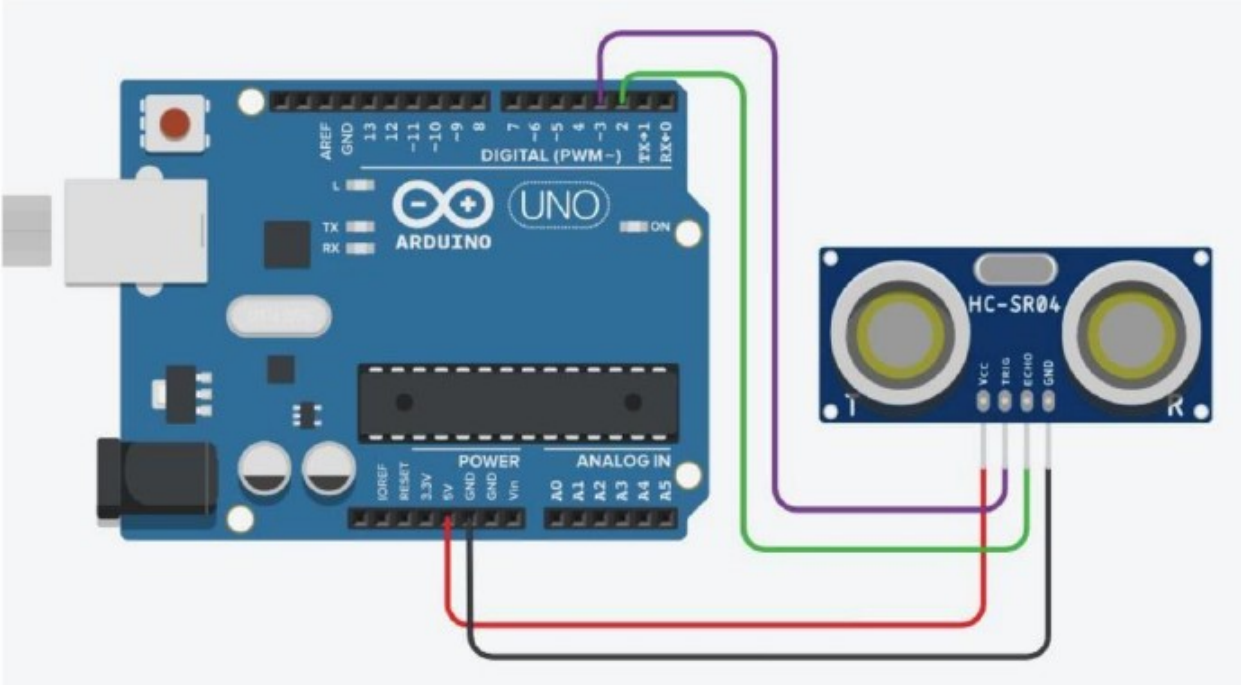
```
pinMode(trigPin,OUTPUT); // Sets the trigPin as an OUTPUT

pinMode(echoPin, INPUT); // Sets the echoPin as an INPUT

Serial.begin(9600);

} void loop() { digitalWrite(trigPin,

LOW); delayMicroseconds(2);

digitalWrite(trigPin, HIGH);

delayMicroseconds(10);

digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH);

distance = duration * 0.0344 / 2;

Serial.print("Distance: ");

Serial.print(distance);

Serial.println(" cm");

}
```

6) Output:




```
#define echoPin 9 // attach pin D2 Arduino to Echo pin of Sensor module
#define trigPin 7 // attach pin D3 Arduino to Trig pin of Sensor module

long duration; // Declare variable to store echo time duration
```

Output Serial Monitor ×

Message (Enter to send message to 'Arduino Uno' on '/dev/cu.usbmodem2101') New Line 9600 baud

```
Distance: 9 cm
Distance: 8 cm
Distance: 8 cm
Distance: 8 cm
Distance: 8 cm
Distance: 80 cm
Distance: 2291 cm
Distance: 13 cm
Distance: 13 cm
Distance: 12 cm
Distance: 11 cm
Distance: 11 cm
Distance: 11 cm
Distance: 11 cm
Distance: 11 cm
Distance: 12 cm
Distance: 12 cm
Distance: 12 cm
Distance: 14 cm
```