



IOT ACTIVITY BASED LEARNING REPORT  
ON  
Radar system using arduino and processing software

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**Aim** - To build a radar using arduino and processing software

**Software Required**- Arduino IDE ,Processing4

**Hardware Required** - 1. Arduino UNO R3 board

2. Servo Motor(SG-90)
3. Ultrasonic Distance Sensor(HC-SR04)
4. Jumper wires
5. Laptop

## Theory

We are using an ultrasonic distance sensor which is mounted on a top of a servo motor and the whole system is called a radar

A radar is an electromagnetic sensor used for detecting, locating, tracking, and recognizing objects of various kinds at considerable distances. It operates by transmitting electromagnetic energy toward objects, commonly referred to as targets, and observing the echoes returned from them.

## Circuit Diagram

### Servo

Red wire - 5V

Brown - GND

Yellow - 12 pin

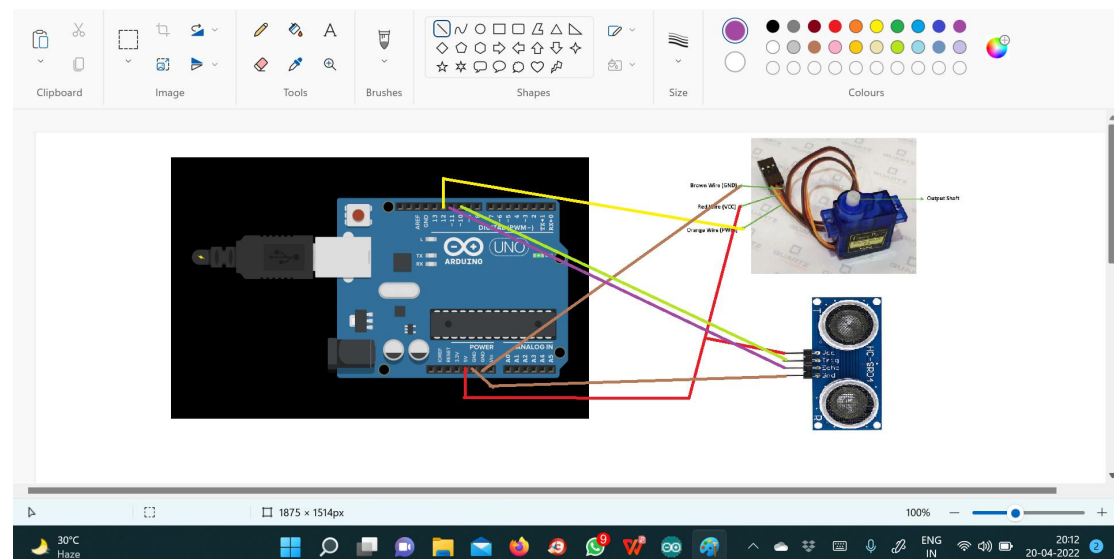
### Ultrasonic Distance Sensor

Vcc - 5V

GND - GND

Trig- pin 10

Echo - 11



# ARDUINO CODES

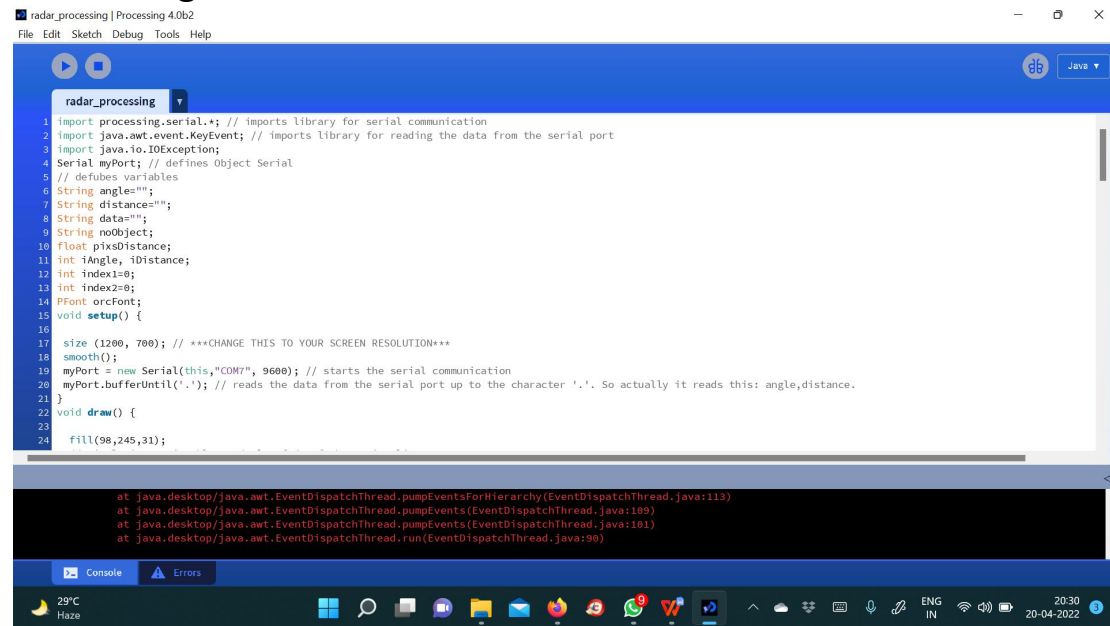
```
sketch_apr20a | Arduino 1.5.5-r2
File Edit Sketch Tools Help

sketch_apr20a.g
1 #include <Servo.h>.
2 const int trigPin = 10;
3 const int echoPin = 11;
4 // Variables for the duration and the distance
5 long duration;
6 int distance;
7 Servo myServo;
8 void setup() {
9   pinMode(trigPin, OUTPUT);
10  pinMode(echoPin, INPUT);
11  Serial.begin(9600);
12  myServo.attach(12);
13 }
14 void loop() {
15   // rotates the servo motor from 15 to 165 degrees
16   for(int i=15;i<=165;i++){
17     myServo.write(i);
18     delay(30);
19     distance = calculateDistance();
20
21     Serial.print(i);
22     Serial.print(",");
23     Serial.print(distance);
24     Serial.print(".");
25   }
26 }
```

```
sketch_apr20a | Arduino 1.5.5-r2
File Edit Sketch Tools Help

sketch_apr20a.g
25 }
26 // Repeats the previous lines from 165 to 15 degrees
27 for(int i=165;i>15;i--){
28   myServo.write(i);
29   delay(30);
30   distance = calculateDistance();
31   Serial.print(i);
32   Serial.print(",");
33   Serial.print(distance);
34   Serial.print(".");
35 }
36 }
37 // Function for calculating the distance measured by the Ultrasonic sensor
38 int calculateDistance(){
39
40   digitalWrite(trigPin, LOW);
41   delayMicroseconds(2);
42   // Sets the trigPin on HIGH state for 10 micro seconds
43   digitalWrite(trigPin, HIGH);
44   delayMicroseconds(10);
45   digitalWrite(trigPin, LOW);
46   duration = pulseIn(echoPin, HIGH); // Reads the echoPin, returns the sound wave travel time in microseconds
47   distance= duration*0.034/2;
48   return distance;
49 }
```

# Processing Code



```
radar_processing
1 import processing.serial.*; // imports library for serial communication
2 import java.awt.event.KeyEvent; // imports library for reading the data from the serial port
3 import java.io.IOException;
4 Serial myPort; // defines Object Serial
5 // defines variables
6 String angle="";
7 String distance="";
8 String data="";
9 String noObject;
10 float pixsDistance;
11 int iAngle, iDistance;
12 int index1=0;
13 int index2=0;
14 PFont orcFont;
15 void setup() {
16
17   size (1200, 700); // ***CHANGE THIS TO YOUR SCREEN RESOLUTION***
18   smooth();
19   myPort = new Serial(this,"COM7", 9600); // starts the serial communication
20   myPort.bufferUntil('.'); // reads the data from the serial port up to the character '.'. So actually it reads this: angle,distance.
21 }
22 void draw() {
23
24   fill(98,245,31);
```

at java.desktop/java.awt.EventQueueDispatcher.pumpEventsForHierarchy(EventDispatcherThread.java:113)  
at java.desktop/java.awt.EventQueueDispatcher.pumpEvents(EventDispatcherThread.java:109)  
at java.desktop/java.awt.EventQueueDispatcher.pumpEvents(EventDispatcherThread.java:101)  
at java.desktop/java.awt.EventQueueDispatcher.run(EventDispatcherThread.java:98)

Rest of the code give in seprate binary file.....

## Observation

Video clip attatched

## Conclusion

Radar system using arduino and processing 4 software was successful.