



**Ahmedabad
University**

ENR 305 Sensors Instrumentation and Experimentation

Project Title: Radar System

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Section 3

Group 25

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● Objectives of Radar System

1. The primary objective of our radar system is to detect objects in a stipulated range of the system.
2. The system uses radio waves to determine the distance, angle of the object in range.
3. Aircrafts/Submarines can be equipped with radar to show other incoming aircrafts or other obstacles which maybe in or approaching their path.
4. Radars are especially useful for landing in aircrafts when there is foggy weather and there is no visibility for the pilot so as to land the aircraft.
5. Distance can be measured by calibrating the radar on a certain scale.

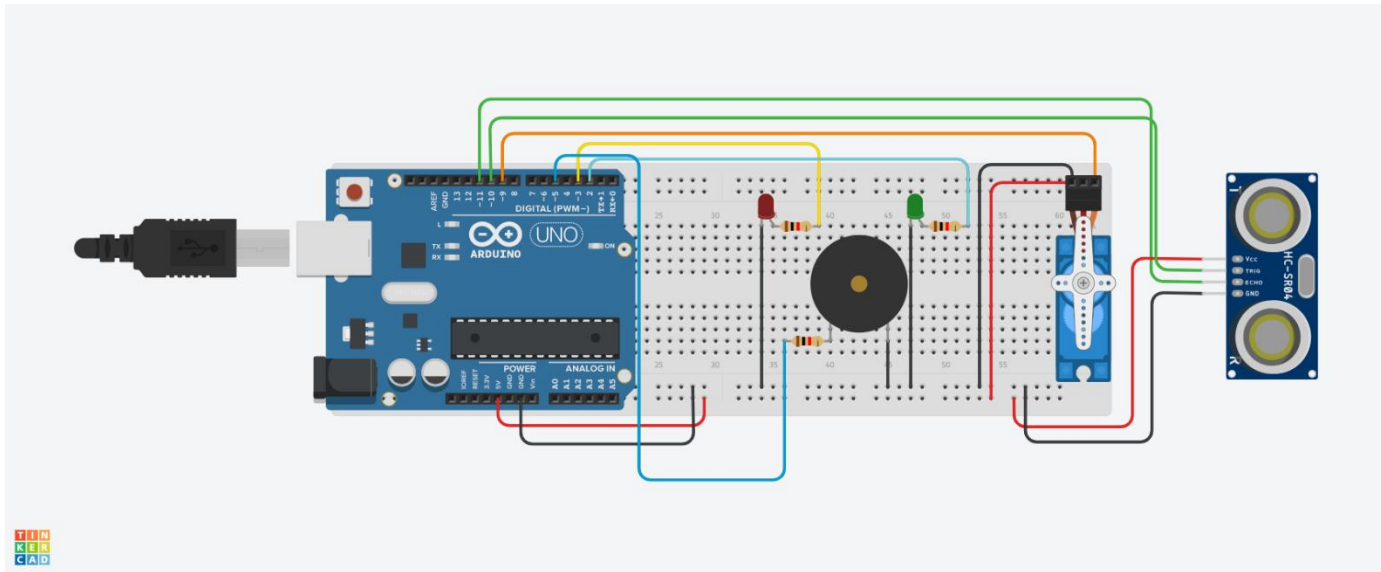
● Final Outcomes

The final outcome of this project is visualised as a scanning system in which a line rotates bidirectionally in the angular range from 15 to 180 degrees. When there is no object in the radar system, the line is green as well as a GREEN LED on the system is on indicating an absence of object in the range of the sensor.

As soon as an object is in the range, the sensor traces its position as well as the angle. The line in the output screen soon becomes red which indicates that the sensor has detected an object. The buzzer in the circuit continuously makes sound till the object is in the range of the system and a RED LED turn on indicating the same.

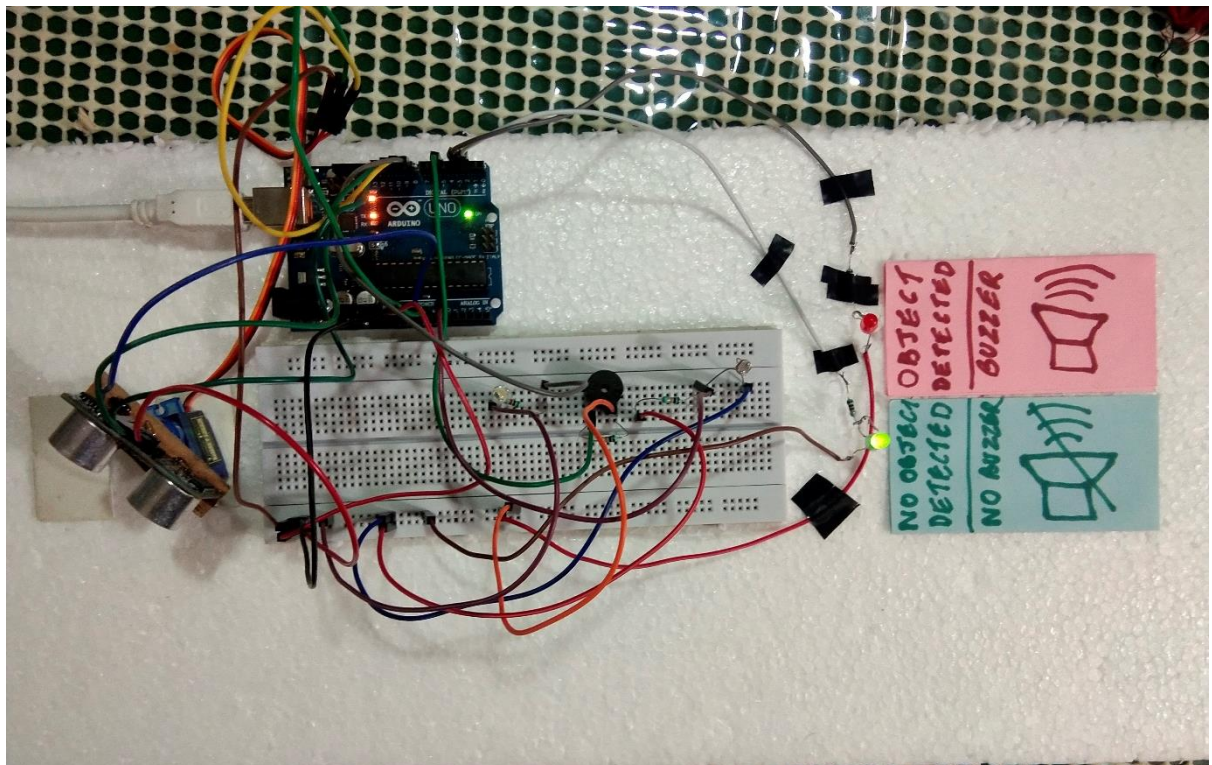
To summarize, this radar system is able to identify the presence of any object within its range and can alert the user by producing sounds and light.

- Circuit / Block Diagram

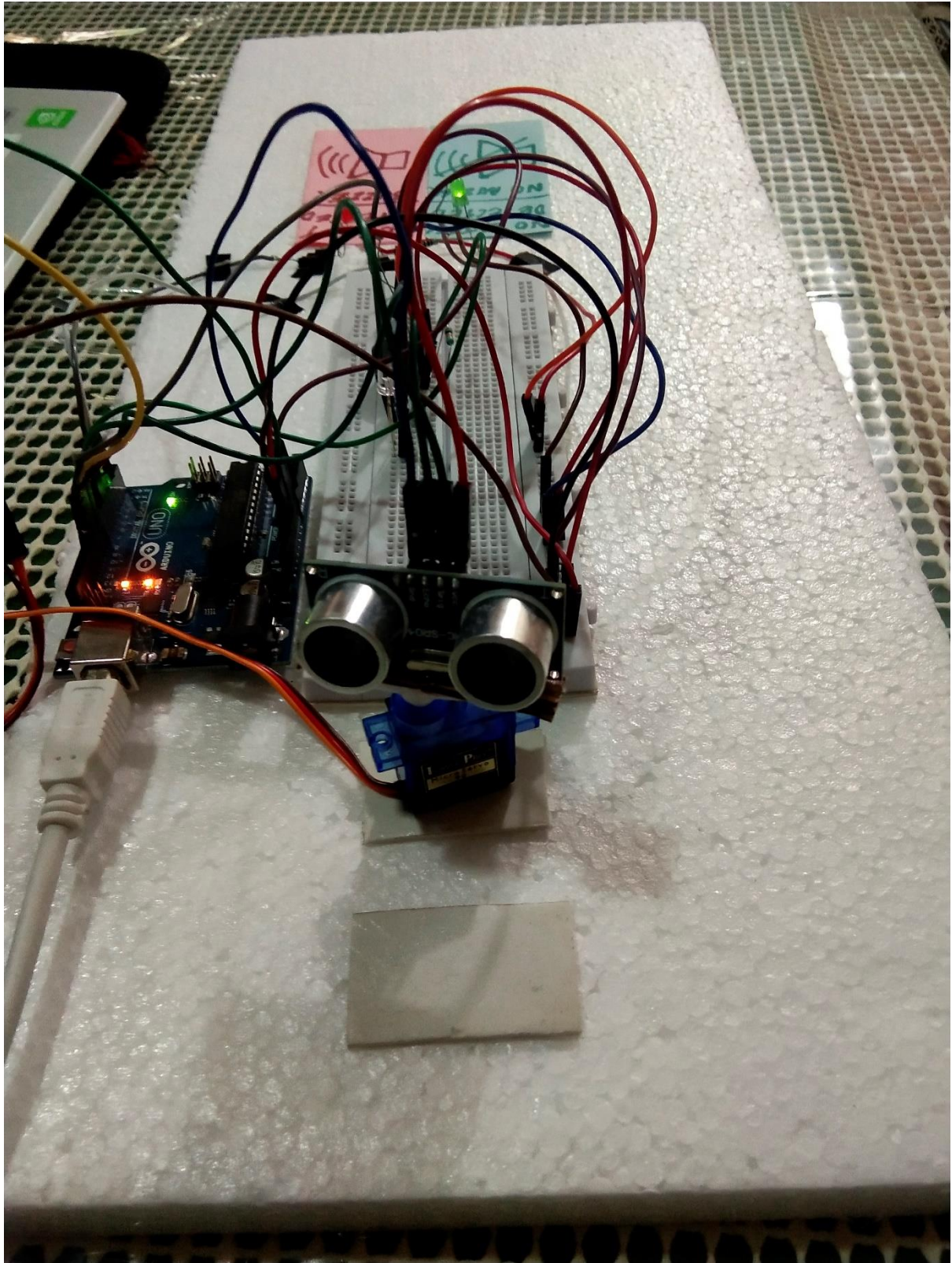


- Images of actual Project

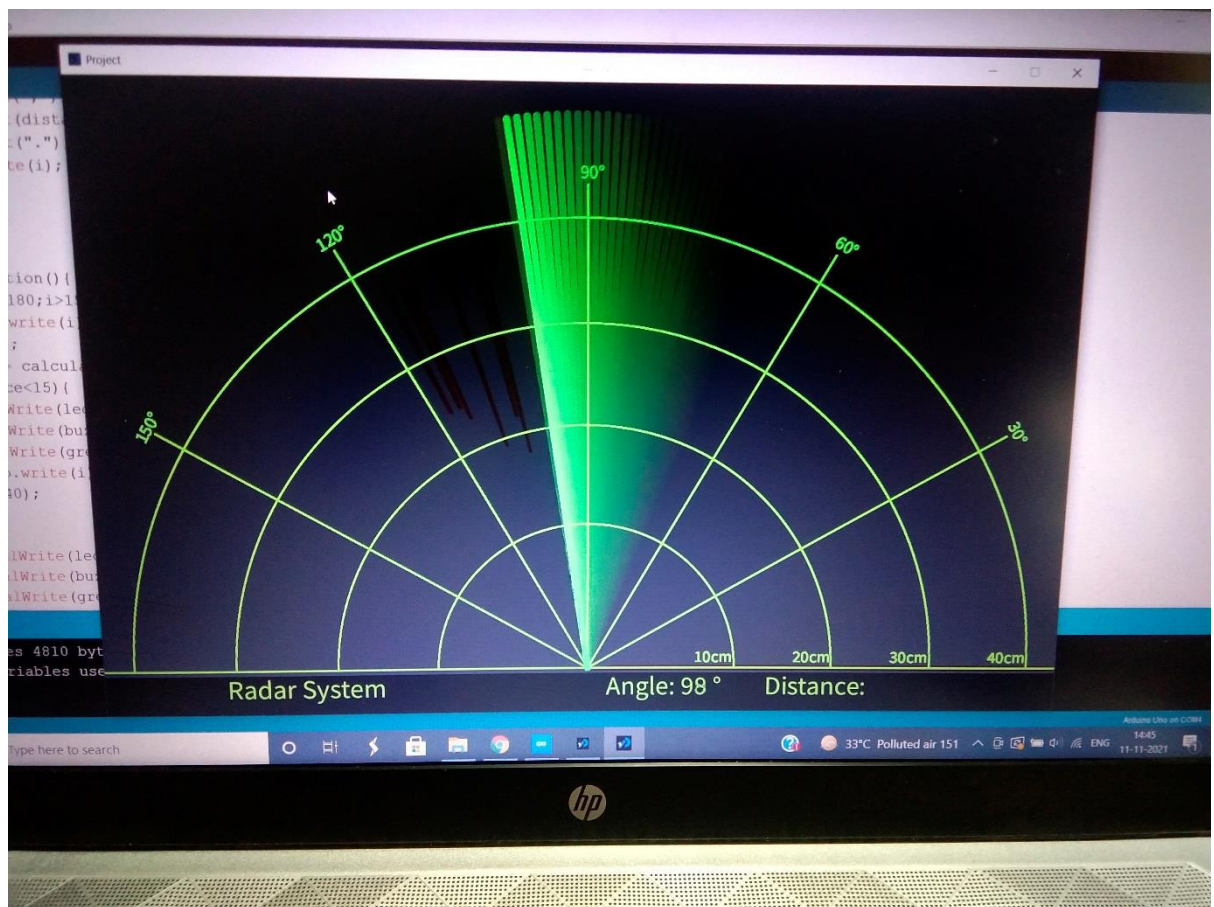
- Top View of the Circuit



○ Side View of the Circuit



- Image of Output Generated on Processing Software



- Code for the Project

- Ardunio Code

```
#include <Servo.h>
```

```
Servo ServoMotor; // New Servo Object
```

```
int led = 3;
```

```
int buzzerSound = 5;
```

```
int trigger = 1;
```

```
int echo = 11;

int noObject = 2;

long timeElapsed;

long objectDetected;

void setup()
{

    pinMode(trigger, OUTPUT);

    pinMode(echo, INPUT);

    pinMode(led, OUTPUT);

    pinMode(buzzerSound, OUTPUT);

    pinMode(photoLED, OUTPUT);

    pinMode(noObject, OUTPUT);

    Serial.begin(9600);

    ServoMotor.attach(9);
}
void loop()
{

    firstRotation();

    lastRotation();
}

int computeTheDistance()
{

    digitalWrite(trigger, LOW);
```

```

delayMicroseconds(2);

digitalWrite(trigger, HIGH);

delayMicroseconds(20);

digitalWrite(trigger, LOW);

timeElapsed = pulseIn(echo, HIGH);

objectDetected = (timeElapsed * 340) / 2;

objectDetected = objectDetected / 1000;

return objectDetected;
}

int firstRotation()
{
    // Rotating the motor from left to right
    for (int i = 15; i < 180; i++)
    {

        objectDetected = computeTheDistance();

        if (objectDetected < 40)
        {

            digitalWrite(led, HIGH);

            digitalWrite(buzzerSound, HIGH);

            digitalWrite(noObject, LOW);

            ServoMotor.write(i);

            delay(40);
        }
        else

```

```

{

    digitalWrite(led, LOW);

    digitalWrite(buzzerSound, LOW);

    digitalWrite(noObject, HIGH);

    ServoMotor.write(i);

    delay(30);
}

Serial.print("Presence of an object at angle ");

Serial.print(i);

Serial.print("with distance being ");

Serial.print(objectDetected);

ServoMotor.write(i);

delay(30);
}
}

int lastRotation()
{
    // Rotating the motor from right to left
    for (int i = 180; i > 15; i--)
    {

        ServoMotor.write(i);

        objectDetected = computeTheDistance();

        if (objectDetected < 40)
        {

```



```
digitalWrite(led, HIGH);

digitalWrite(buzzerSound, HIGH);

digitalWrite(noObject, LOW);

ServoMotor.write(i);

delay(40);
}
else
{

digitalWrite(led, LOW);

digitalWrite(buzzerSound, LOW);

digitalWrite(noObject, HIGH);

ServoMotor.write(i);

delay(30);
}

Serial.print("Presence of an object at angle ");

Serial.print(i);

Serial.print("with distance being ");

Serial.print(objectDetected);

ServoMotor.write(i);

delay(30);
}
}
```