

Arduino Radar Detector

Project Report

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1. Project Overview

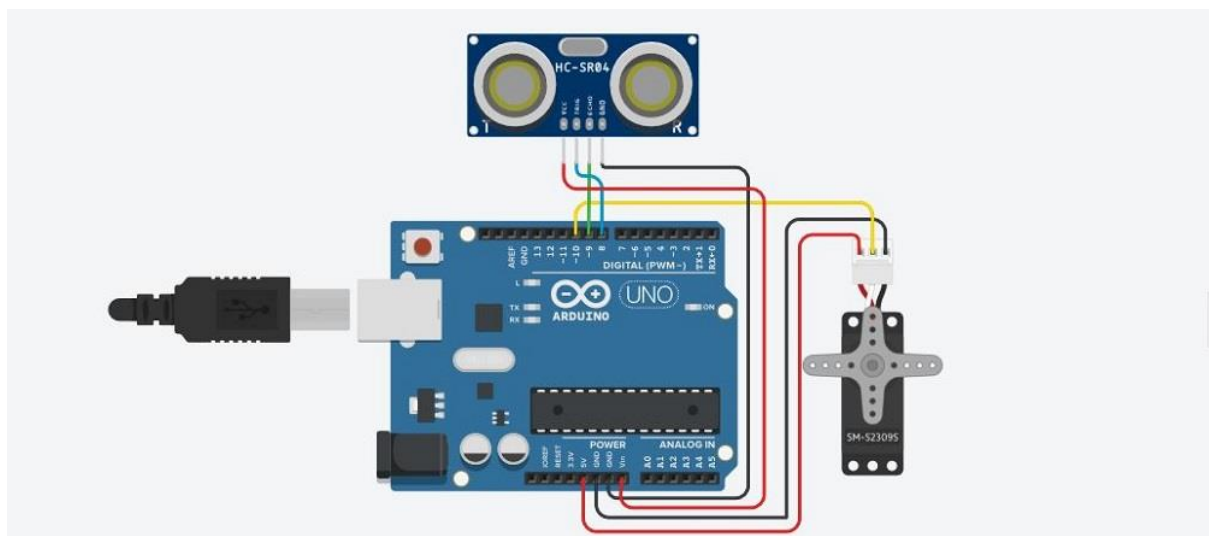
The Radar detection system is an innovative project that utilizes Arduino and ultrasonic sensors to detect objects in its vicinity. This technology has the potential to revolutionize the way we approach safety and security. The system uses a combination of hardware and software to accurately detect objects within a specified range. The use of ultrasonic sensors allows for precise measurements, while the Arduino microcontroller provides real-time data processing.

2. Components

The hardware components of the Radar detection system include

- Arduino-Uno microcontroller
- Ultrasonic sensor HCSR04
- 180° Servo Motor SG90
- Breadboard for circuit prototyping
- Jumper cables

3. Circuit Diagram



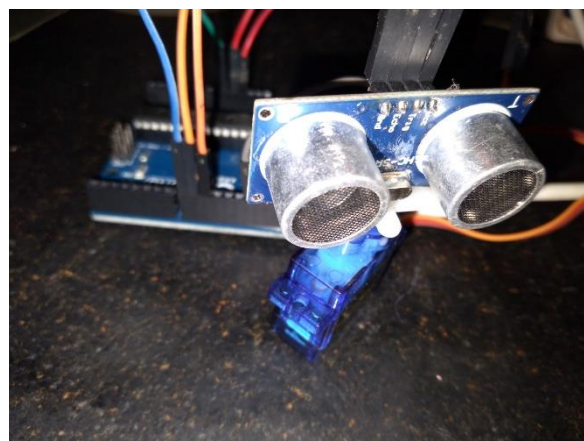
4. Code Snippets of Important Sections

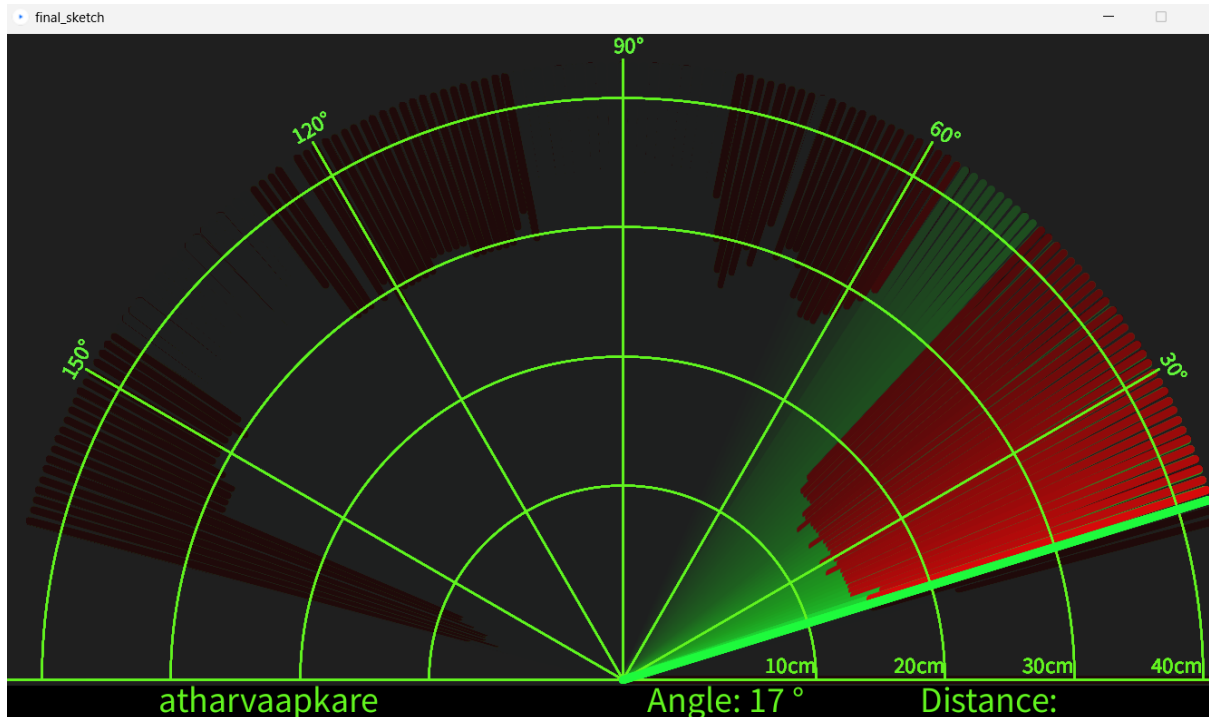
Code snippets

```
1 // include <Servo.h>
2 const int trigPin = 8;
3 const int echoPin = 9;
4 // defining time and distance
5 long duration;
6 int distance;
7 Servo myServo; // Object servo
8 void setup() {
9   pinMode(trigPin, OUTPUT); // trigPin as an Output
10  pinMode(echoPin, INPUT); // echoPin as an Input
11  Serial.begin(9600);
12  myServo.attach(10); // Pin Connected To Servo
13 }
14 void loop() {
15   // rotating servo i++ depicts increment of one degree
16   for(int i=15; i<=165; i++){
17     myServo.write(i);
18     delay(5);
19     distance = calculateDistance();
20
21     Serial.print(i);
22     Serial.print(", ");
23
24     String myObject;
25     float plusDistance;
26     int iAngle, iDistance;
27     int index1=0;
28     int index2=0;
29     float arcFont;
30     void setup() {
31
32     size (1366, 768);
33     smooth();
34     myPort = new Serial(this, "COM1", 9600); // change this accordingly
35     myPort.bufferUntil('.'); // reads the data from the serial port up to the character '.'. So actually it reads this: angle,distance.
36   }
37   void draw() {
38
39     fill(0, 240, 32);
40     // simulating motion blur and slow fade of the moving line
41     noStroke();
42     fill(0, 4);
43     rect(0, 0, width, height-height*0.005);
44
45     fill(0, 240, 32); // green color
46     // calls the functions for drawing the radar
47     drawRadar();
48     drawLine();
49     drawObject();
50     drawText();
51   }
52 }
53 void serialEvent (Serial myPort) { // starts reading data from the Serial Port
54   // reads the data from the Serial Port up to the character '.' and puts it into the String variable "data".
55   data = myPort.readStringUntil('.');
56   data = data.substring(0, data.length()-1);
```

5. Working

- The ultrasonic sensors are mounted on a rotating platform, allowing for a 180-degree field of view.
- The Arduino microcontroller is responsible for receiving the sensor data and processing it in real-time.
- It then sends this data to a connected computer running the Processing software, which displays the results in a user-friendly interface.





- On the Processing software interface, the detected object is shown on the screen with an estimate of its closeness.
- The red lines on the screen indicate the detected object.
- The distance of the object from the sensor is indicated by the length of the red lines

6. Uses

1. **Object Detection and Collision Avoidance:** Radar systems can be used to detect objects in the vicinity of a moving vehicle or robot. We can measure the distance to objects and detect potential collisions and is useful in autonomous vehicles, drones, or even automated warehouse systems.
2. **Parking Assistance:** Radar-based parking systems can help drivers park their vehicles safely. By using ultrasonic sensors, the Arduino can measure the distance to obstacles behind or in front of the vehicle and provide feedback to the driver.
3. **Weather Monitoring:** Arduino-based radar systems can be utilized for weather monitoring, especially for detecting precipitation. By analysing the echoes from ultrasonic waves bouncing off raindrops or snowflakes, the system can estimate the intensity and movement of the weather patterns. This information can be valuable for meteorological purposes.

7. Conclusion

The Radar detection system is a groundbreaking project that has the potential to change the way we approach safety and security. By utilizing Arduino and ultrasonic sensors, this technology provides a reliable and accurate method for detecting objects within a specified range.

The system's ability to create a 2D/3D map of the surrounding environment and display this information in a user-friendly interface makes it an invaluable tool for a variety of applications, from home security to autonomous vehicles.

8. References

- Blog reference:
[Instructables Arduino Radar](#)
[Arduino Project Hub : Ultrasonic Radar with Arduino](#)
- Video References:
[Indian LifeHacker Video Tutorial](#)