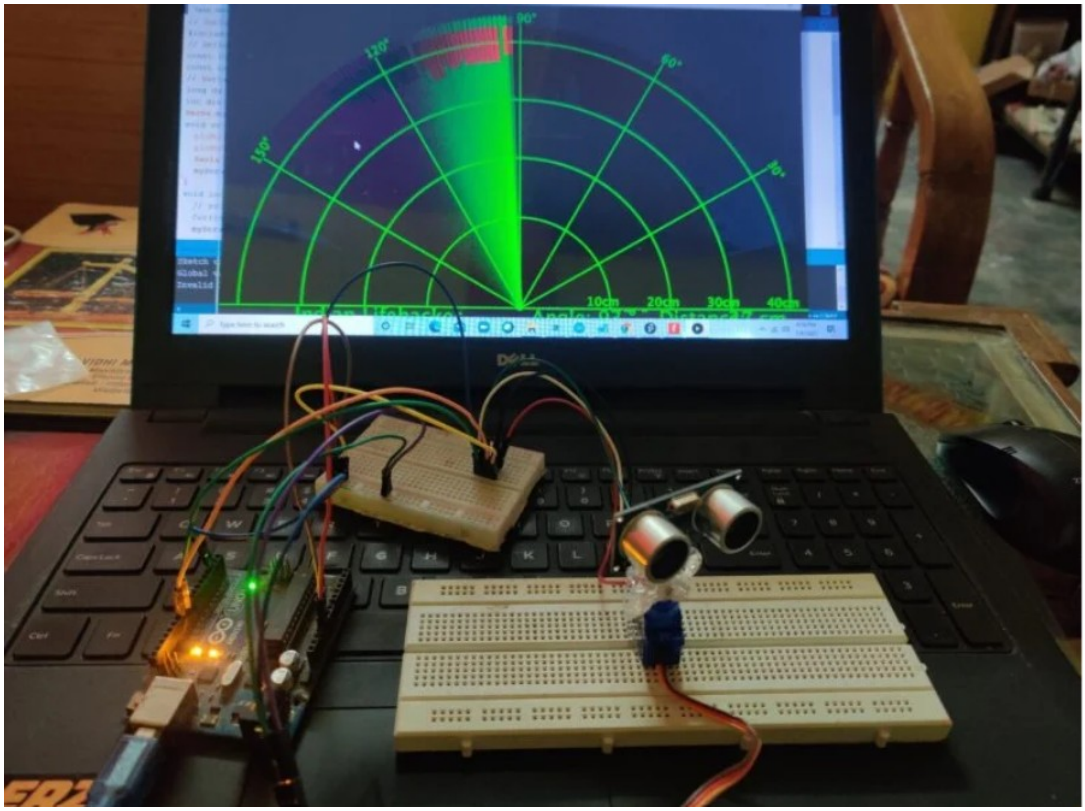
Ultrasonic Radar System using NodeMCU

This project demonstrates an Ultrasonic Radar System built using NodeMCU ESP8266 and HC-SR04 ultrasonic sensor. It detects nearby objects by measuring distance using ultrasonic waves and displays real-time radar-like output on a web interface using HTML, CSS, and JavaScript.



Components Required:

- 1. NodeMCU ESP8266
- 2. HC-SR04 Ultrasonic Sensor
- 3. Servo Motor (SG90/MG90S)
- 4. Breadboard and Jumper Wires
- 5. Micro USB Cable

Circuit Connections:

HC-SR04 Connections:

- VCC -> 3.3V
- GND -> GND
- TRIG -> D5

- ECHO -> D6

Servo Motor Connections:

- VCC -> 5V (external power)

- GND -> Common GND

- Signal -> D4

Arduino Code:

```
#include <ESP8266WiFi.h>
#include <Servo.h>

const char* ssid = "YourWiFi";
const char* password = "YourPassword";
WiFiServer server(80);
Servo myservo;
#define trigPin D5
#define echoPin D6

void setup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  myservo.attach(D4);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) { delay(500); }
  server.begin();
}
void loop() {
  WiFiClient client = server.available();
  if (!client) return;
  String req = client.readStringUntil('\r');
  client.flush();
  if (req.indexOf("/data")!=-1) client.print(getDistance());
  else sendHTML(client);
}
int getDistance(){
  digitalWrite(trigPin,LOW); delayMicroseconds(2);
  digitalWrite(trigPin,HIGH); delayMicroseconds(10);
  digitalWrite(trigPin,LOW);
  return pulseIn(echoPin,HIGH)*0.034/2;
}
```

Working Principle:

1. NodeMCU hosts a local web server.

2. HC-SR04 measures distance and sends data to NodeMCU.

3. Servo motor rotates sensor from 0° to 180° for scanning.

4. Web interface displays radar-like visualization in real-time.