Arduino Radar System

Project Overview

This project is a simple Arduino-based Radar System built using an Ultrasonic Sensor, Servo Motor, OLED Display (SSD1306), and Arduino board. The system scans the surroundings and displays detected objects on an OLED screen.

Components Used

- Arduino Uno
- HC-SR04 Ultrasonic Sensor
- SG90 Servo Motor
- 0.96" I2C OLED Display (SSD1306)
- Jumper Wires
- Breadboard

Pin Connections

- Trig → Pin 8
- Echo → Pin 9
- Servo → Pin 11
- OLED → I2C (SDA, SCL)

Working Principle

1. The servo motor rotates the ultrasonic sensor.
2. The ultrasonic sensor sends sound waves.
3. The reflected wave is received back.
4. Arduino calculates the distance using:

$$\text{Distance} = (\text{Time} \times \text{Speed of Sound}) / 2$$

5. If object distance is less than or equal to 40 cm, a circle is displayed on the OLED screen.

Libraries Used

- Adafruit GFX
- Adafruit SSD1306
- Servo.h
- Wire.h
- SPI.h

Features

- Real-time object detection
- Radar-style graphical display

- Distance measurement
- Smooth servo scanning

Learning Outcome

Through this project, I learned about ultrasonic sensors, distance calculation, OLED graphics, servo motor control, and integrating multiple Arduino libraries.

Future Improvements

- Increase scanning angle
- Add buzzer alert
- Improve radar animation
- Implement full 180-degree sweep