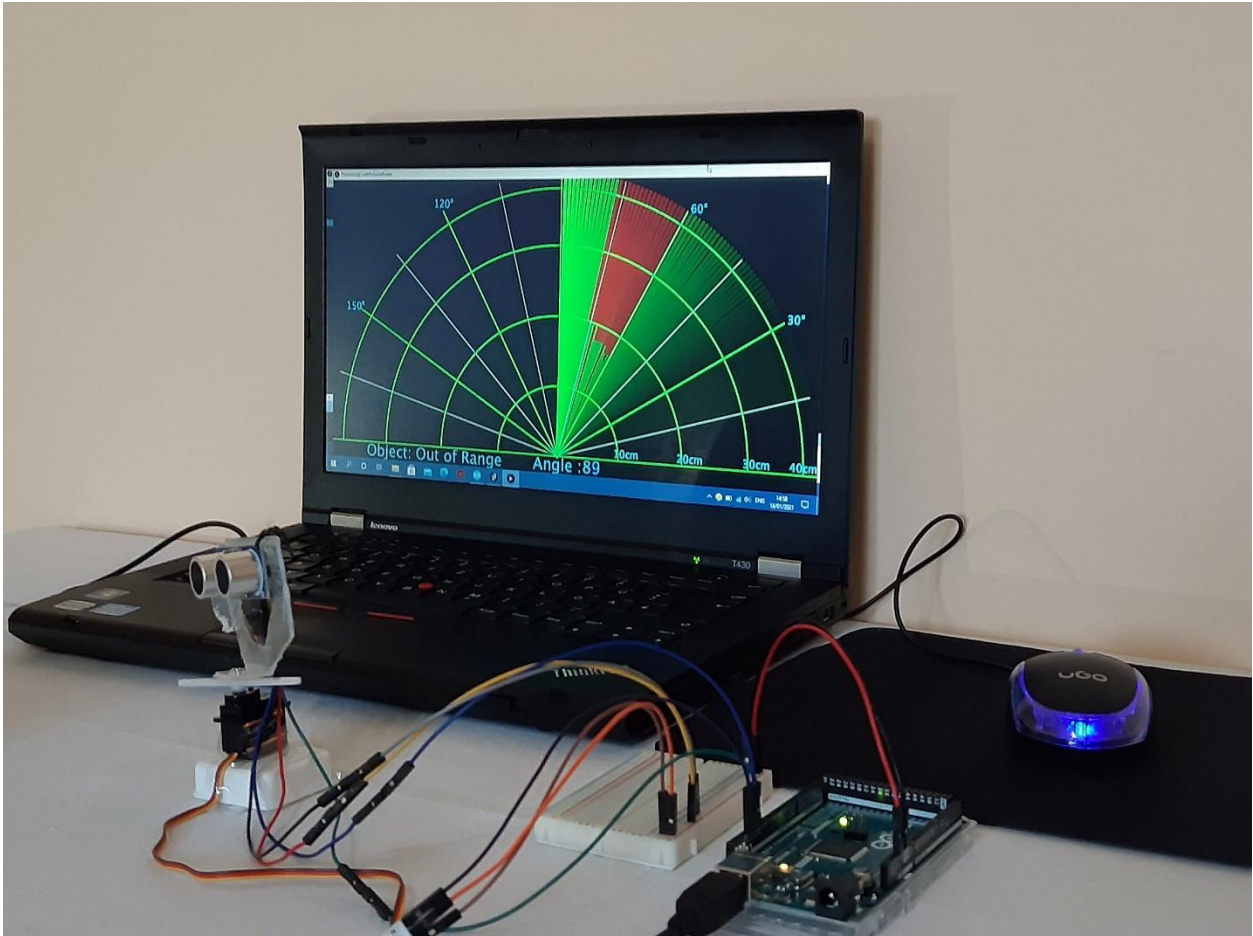


ARDUINO ULTRASONIC RADAR SYSTEM PROJECT GUIDE

➤ INTRODUCTION

This project demonstrates a simple radar system using an ultrasonic sensor and a servo motor. The servo rotates the sensor from one side to another while measuring distance. The data is sent to a computer where Processing software visualizes it as a radar display.



🌈 OBJECTIVE

- Learn how ultrasonic sensors measure distance.
- Understand how servo motors rotate to scan an area.
- Transmit data from Arduino to a computer using serial communication.
- Visualize sensor data using Processing software.

REQUIRED COMPONENTS

- Arduino board (Uno / Nano)
- Ultrasonic Sensor (HC-SR04)
- Servo Motor (SG90 or similar)
- Jumper wires
- Breadboard
- USB cable
- Computer/Laptop

SOFTWARE REQUIRED

- Arduino IDE (for uploading the Arduino code)
- Processing Software (for radar visualization)

HOW TO DOWNLOAD PROCESSING SOFTWARE

Students need to install Processing software to see the radar animation on their computer screen. Follow the steps below to download and install it:

- 1 Open your web browser (Chrome, Edge, etc.).
- 2 Go to the official Processing website.
- 3 Download the version suitable for your operating system (Windows / Mac / Linux).
- 4 After downloading, extract the ZIP file if required.
- 5 Open the Processing application and paste the radar visualization code.

Download Link: <https://processing.org/download>

ARDUINO IDE CODE

Code Link: <https://drive.google.com/file/d/1OzBuOLgYU-yKolQAdfSZP5XN-hQT0o5e/view?usp=sharing>

ARDUINO PROCESSING CODE

Code Link:

https://drive.google.com/file/d/1V11VcVL7XN9Z_RW6aRLN1yfhQ8VbDdPA/view?usp=sharing

WORKING PRINCIPLE

The ultrasonic sensor emits sound waves and measures the time taken for the echo to return. Arduino calculates the distance based on this time. The servo motor continuously rotates the sensor to scan different angles. The measured distance and angle are sent to the computer through serial communication. Processing software reads this data and draws a radar-style animation on the screen.

CIRCUIT CONNECTIONS

- Servo Signal → Arduino D5
- Servo VCC → 5V
- Servo GND → GND
- Ultrasonic Trig → Arduino D2
- Ultrasonic Echo → Arduino D3
- Ultrasonic VCC → 5V
- Ultrasonic GND → GND

APPLICATIONS

- Basic radar simulation learning
- Object detection systems
- Obstacle detection robots
- Educational electronics demonstrations

CONCLUSION

This project helps students understand the basics of sensors, servo motors, and real-time data visualization. It is a great beginner project for learning Arduino and simple radar-like systems.