Primeasia University

A mission with a vision

Lab Report-3(Final)

Course Code : **CSE402**
Course Title : **Computer Interface(Lab)**
Project Name : **Mini Radar**

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1. Introduction:

Radar is an object detection system that uses electromagnetic waves to identify range, altitude, direction, or speed of both moving and fixed objects such as aircraft, ships, vehicles, weather formations, and terrain. When we use ultrasonic waves instead of electromagnetic waves, we call it ultrasonic radar .

The main components in any ultrasonic radar are the ultrasonic Sensors. Ultrasonic sensors work on a principle similar to radar or sonar which evaluates attributes of a target by interpreting the echoes from radio or sound waves respectively.

Radar's information will appear in different ways. Basic and old radar station used sound alarm or LED, modern radar uses LCD display to show detailed information of the targeted object. We use Computer screen to show the information (distance and angle).

In this technical project, we make a simple radar using the ultrasonic sensor, this radar works by measuring a range from 3cm to 40 cm as non-contact distance, with angle range between 15˚ and 165˚.The movement of the sensor is controlled by using a small servo motor. Information received from the sensor will be used by "Processing Development Environment" software to illustrate the result on a PC screen.

2. Motivation for the project:

We have chosen this "Mini Radar" project because now a days we are very concern to safety issue. A radar can help us to be protected from the danger zone by seeing a LCD display where will shown the information like angle, distance and object situation with red color.

Our Mini Radar is just a demo of A Radar System by this processing we can develop a big radar that can have a big range coverage capacity.

Let, a danger zone where general person is not allowed and if we want to protect personas we have to appoint a person for safety guard and for this persona we have to pay salary. If we can coverage a danger zone by a radar system and show a big LCD display with message and red signal then people can understand that this place is not secure they should have kept distance.

Radar System is not a too much costly system. For this reason we can easily effort this and we can easily use it where we thik need a security.
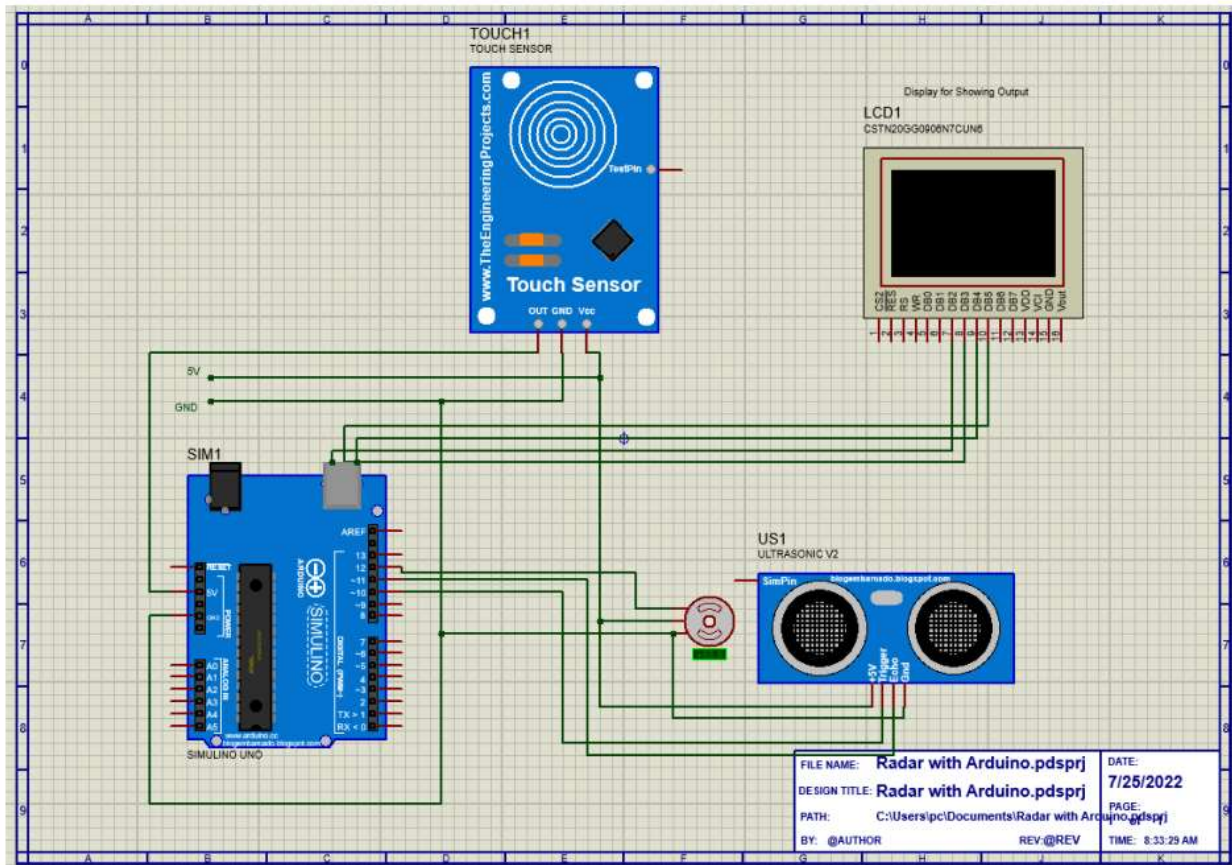
3. Circuit diagram:

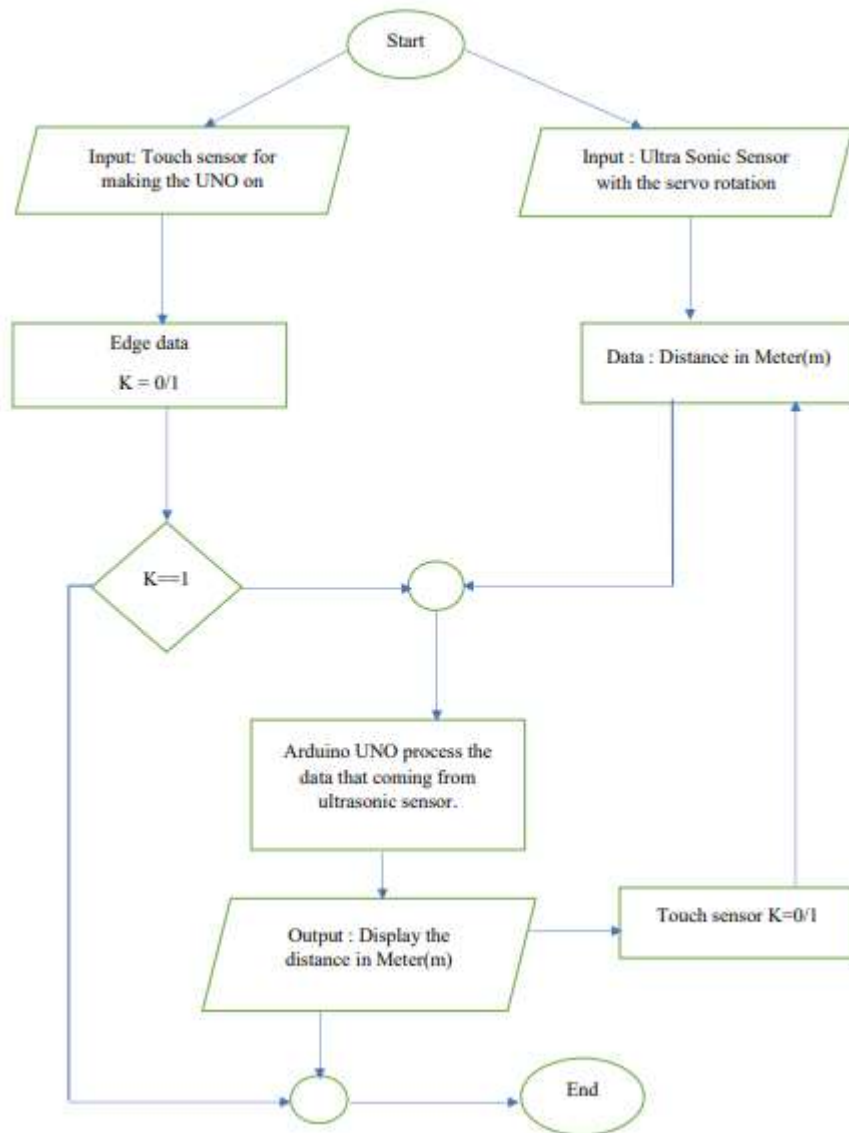**Figure:** Mini Radar Diagram in Protius Software

4. Working diagram:

Figure: Flowchart of Mini Radar Project

5. Sensor details:

Sensor – 01 : Touch Sensor.

Figure: Touch Sensor.

Specifications :

Genre : This allows for touch sensing with only a single pin!

Here are its specifications:

Operating Voltage: 3 ~ 5.5V.

Model : HW -139.

Metric : switching or providing voltage (3 ~ 5.5V).

Application: Touchpad Laptop, Android/Mobile phone, Tablet computers.

Reason to choose: Touch sensors are more sensitive, and are often able to respond differently to different kinds of touch. But we choose touch sensor to provide the voltage (3 ~ 5.5V) to Arduino .

Sensor – 02 : Ultra Sonic Sensor.

Figure: Ultrasonic Sensor.

Specifications :

    Genre : It can measure the distance of object .

    Model : HC-SR04.

    Metric : Detect the object distance in meter(Unit : m)

Application:

    • Stacking height control

    • Loop control

    • Liquid level control

    • Full detection

    • Counting people/people detection

    • Presence detection

Reason to choose: Detect the object distance.

6. Budget plan:

Sl no.	Equipment	Price
1.	Arduino Uno R3 With USB cable	1,200 tk
2.	Prototype Breadboard 16.5X5.5 CM 830 Holes	200 tk
3.	HC-SR04 Ultrasonic Wave Detector Ranging Sensor	100 tk
4.	Servo Motor	150 tk
5.	TTP223 Ultra Small Digital Touch Sensor	50 tk
6.	Jumper wire	200 tk
7.	Hot Glue Gun	200 tk
8.	5V Relay 1CH 1 Channel Module	100 tk

Total : 22,00 tk

7. Limitations:

RANGE DISCRIMINATION:
      It is the ability of the RADAR set to clearly distinguish two small targets on the same bearing at slightly different ranges.

MINIMUM RANGE:
      THE PULSE LENGTH : This radar works by measuring a range from 3cm to 40 cm as non-contact distance, with angle range between 15˚ and 165˚.

8. Conclusion:

Radar is normally used to determine velocity, range, and position of an object. In this technical project, we read the distance and angles of detected objects in order to convert these data into visual information. The performance of our project is so good. It works smoothly to detect objects within the designed range. The screen shows the information clearly with enough delay for the user to read it. This project could be helpful for object avoidance/ detection applications. This project could easily be extended and could be used in any systems may need it.