

“ARDUINO BASED RADAR SYSTEM”

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Abstract - A Radar / Rangefinder is a device that measures the distance between the target and the observer for surveying, focusing on photography, or targeting a weapon accurately. In this technical project, we use the ultrasonic sensor to make simple radar, this radar works by measuring a range from 3 cm to 40 cm as non-contact distance, with angle range between 15 and 165 cm. The movement of the sensor is controlled using a small servo motor. "Processing Development Environment" software will use the information received from the sensor to illustrate the result on a PC screen.

Key Words: Rangefinder, Sensor, Servo Motor, Processing Development Environment.

1. INTRODUCTION

Rangefinder/Radar is an object detection system which uses electromagnetic waves to find the range, altitude, direction, or velocity of moving and fixed objects. We call it ultrasonic radar when we use ultrasonic waves instead of electromagnetic waves. The ultrasonic sensors are the main components in any ultrasonic radar. Ultrasonic sensors work on a radar or sonar-like principle that evaluates target attributes by interpreting echoes of radio or sound waves. The information of Radar will appear in various ways. Basic and old radar stations used sound alarm or LED, modern radar uses LCD display to display detailed object information. To display the information (distance and angle) we use the computer screen.

2. PROBLEM STATEMENT

In day to day life it is vital to be connected with the technologies to make our lives better and easier. The technology is developing every single day and it has a huge impact on our lives. The main aim of this is to use the Ultrasonic Sensor connected to the Arduino board (self-made) and the signal provided by the sensor to the laptop screen to measure the presence of any obstacle at the front of the sensor and to determine the range and angle at which the sensor detects the obstacle. The RADAR which we are making is the cheaper and efficient and it mirrors all the potential techniques that radar comprises. The main thing about the radar that it is a multipurpose object detection system.

3. METHODOLOGY

The aim is to design ultrasonic RADAR, in which the components used are ultrasonic sensor, servo motor and an Arduino board. Ultrasonic sensor is for detecting the objects. Servomotor is included for rotating the sensor and Arduino board is used here for controlling servomotor and sensor. Ultrasonic sensor is connected to the servomotor using jumper wires. After this Ultrasonic sensor and servomotor are linked to the Arduino board. The code is uploaded to the Arduino board that will allow the communication between the Arduino and the Processing IDE. According to the code the servomotor rotates and this made ultrasonic sensor to detect the presence of any obstacle. Then the sensor measures the distance and angle at which the obstacle is located. The values for angle and distance measured are received from the Arduino board. Using the specific function written in the code that reads the data from the serial port, this information is passed into the Processing IDE. This gives the detected objects information. This means that the signal given to the screen from the sensor determines the presence of any obstacles in front of the sensor as well as the range and angle at which the sensor detects the obstacle.

4. LITERATURE REVIEW

[1] **RFID technology for IoT-based personal healthcare in smart spaces Sara Amendola, Rossella Lodato, Sabina Manzari, Cecilia Occhiuzzi, Gaetano Marrocco IEEE Internet of things journal 1 (2), 144-152, 2014**

The present development of the customary restorative model towards participatory drug can be helped by the Internet of Things (IoT) worldview including sensors (ecological, wearable and embedded) spreading in household conditions to screen the client's wellbeing and enact remote help. RF ID innovation (RFID) is presently develop in giving piece of the physical IoT layer with ease, vitality self-ruling and expendable sensors for individual medicinal services in keen conditions.

[2] **Arduino based wireless intrusion detection using IR sensor and GSM Prakash Kumar, Pradeep Kumar International Journal of Computer Science and Mobile Computing 2 (5), 417-424, 2013**

Intrusion detection systems (IDS) aim to capture intrusion of the computer system and use any data collection and analysis. Wireless IDSs collect all local wireless transmissions and generate alerts either based on predefined signatures or anomalies. These remote IDS are fit for checking and breaking down client and framework exercises of known assaults, recognizing anomalous system movement and distinguishing arrangement infringement. Location frameworks for interruption (IDSs) should be intended to

encourage the discovery of endeavoured and genuine unapproved passage into assigned zones and should supplement the security reaction by instantly telling the security power of the identified action from which the appraisal can be led and starting a reaction. We needed to maintain a strategic distance from access and monitor the endeavors and intensions of the gatecrasher. An unmistakable and developing new banking and instalment channel is versatile. A key test with portable banking and installment embraced by gaming clients is the absence of certainty of the client in administration security.

[3] **Arduino and virtual reality for a light-free mapping of indoor environments** Antonio Tedeschi, Stefano Calcaterra, Francesco Benedetto *IEEE Sensors Journal* 17 (14), 4595-4604, 2017

The scholarly world and industry have as of late centered around making new mapping and investigation frameworks for obscure spaces to make propelled control frameworks for robots and individuals with handicaps. Specifically, investigating obscure or potentially dangerous spaces that are inaccessible to people by misusing the advantages of ultrasonic innovation are the most well-known applications. This work goes for planning an extraordinary failure cost framework utilizing ultrasonic radar framework to indiscriminately outline.

5. APPLICATION

- To monitor precipitation and wind, meteorologists use radar. It has become the primary tool for weather forecasting in the short term and watching for severe weather like thunder storms, tornadoes, winter storms, types of precipitation, etc.
- Geologists use ground-penetrating radars to map Earth's crust composition.
- Radar guns are used by police forces to monitor road vehicle speeds.
- Ocean and surface water altimetry are also applied to the radar interferometer.
- Using of Ultrasonic sensor in parking system for getting information of available parking slots.

6. CONCLUSIONS

We mentioned in this review paper that our radar system has been implemented for measuring range. This system is aimed at scanning the object's range and angle. And to graphically represent the scanned information on the screen of the laptop. That means its output will be represented in a graphical form through processing software. It can be used in many different applications. Because of the security

capacity, the project has a lot of future scope. This project can also be modified depending on demand and needs in the future.

REFERENCES

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