

A SURVEY PAPER ON ULTRASONIC RADAR SYSTEM

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ABSTRACT

A rangefinder is a device that measures the distance from the target to the observer, for the purposes of surveying, determining focus in photography, or accurately aiming a weapon. In this survey paper, we make a simple radar using the ultrasonic sensor, this radar works by measuring a range from 3 cm 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.

Keywords: - rangefinder, photography, ultrasonic sensor and servo motor.

1. INTRODUCTION

RADAR is an object detection system which uses radio waves to determine the range, altitude, direction, or speed of objects. Radar systems come in a variety of sizes and have different performance specifications. Some radar systems are used for air-traffic control at airports and others are used for long range surveillance and early-warning systems. A radar system is the heart of a missile guidance system. Small portable radar systems that can be maintained and operated by one person are available as well as systems that occupy several large rooms. Radar was secretly developed by several nations before and during World War II. The term RADAR itself, not the actual development, was coined in 1940 by the United States Navy as an acronym for radio Detection and Ranging. The term radar has since entered English and other languages as the common noun radar, losing all capitalization. The modern uses of radar are highly diverse, including air traffic control, radar astronomy, air-defense systems, antimissile systems; marine radars to locate landmarks and other ships; aircraft anti-collision systems; ocean surveillance systems, outer space surveillance and rendezvous systems; meteorological precipitation monitoring; altimetry and flight control systems; guided missile target locating systems; and ground-penetrating radar for geological observations. High tech radar systems are associated with digital signal processing and are capable of extracting useful information from very high noise levels.

1.1 Objective and Aim of Work

The goal of this project is to create a working Ultrasonic radar system that is capable of monitoring a particular area. The ultra-sonic sensing technology since its emergence and some of these include home security systems, robotics applications, distance measurement, tank level measurement, in production lines, and proximity detection applications. These innumerable applications have made it possible to solve technical problems faster and cheaper without compromising safety, quality and stability.

2. LITERATURE SURVEY

The evolution and research efforts in radar have been enormously successful, and have vitally changed computing. Eventually the researchers working on radar to design and develop and improve security and user interfaces and capable enough fulfill the intended performance criteria desired in the different environment. Radar is an object detection system that uses electromagnetic waves to identify the range, altitude, direction, or speed of both moving and fixed objects such as aircraft, ships, motor vehicles, weather formations, and terrain and when instead of electromagnetic waves, we use ultrasonic waves, it is called an 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. This project aims on the use of Ultrasonic Sensor by connected to the raspberry PI board and the signal from the sensor further provided to the screen formed on the laptop to measure the presence of any obstacle in front of the sensor as well as determine the range and angle at which the obstacle is detected by the sensor.

In 1842, Christian Doppler effect is the apparent change in frequency or pitch when a sound source moves either toward or away from the listener, or when the listener moves either toward or away from the sound source.

In 2010, Milenko S. Andrić, Boban, P. Bondžulić, and Bojan M. Zrnić's paper the database of radar echoes from various targets has been described. The database is available for public download. The spectral analysis conducted in this paper is used to extract very basic information that could be used for classification.

In 2012, Alexander Angelov, Andrew Robertson, Roderick Murray-Smith, Francesco Fio's paper has presented results for classification problems in the automotive radar context using different neural network architectures.



Figure 1: RADAR system

3. APPLICATIONS

- Military Applications In air defense it is used for target detection, target recognition and weapon control (directing the weapon to the tracked targets). In missile system to guide the weapon. Identifying enemy locations in map.
- Air Traffic Control To control air traffic near airports. The Air Surveillance RADAR is used to detect and display the aircraft's position in the airport terminals. To guide the aircraft to land in bad weather using Precision Approach RADAR. To scan the airport surface for aircraft and ground vehicle positions
- Space To guide the space vehicle for safe landing on moon to observe the planetary systems to detect and track satellites to monitor the meteors.

4. FUTURE SCOPE

- This type of system proves to an effective tool for monitoring the prohibited area.
- This system can be used in industries for counting objects.
- This system can be used in driverless cars.
- In speed detection of mobile objects.
- In various military operations such as to guide automatic weapons.
- In aircrafts to warn them about any obstacle in the way.

5. CONCLUSION

The results can be carried out by testing the system. Various papers are referred to implement the code for this project. The result will be based on the study of all these papers. Radar is an electromagnetic system for detection location and sometimes for recognition of target objects, which operates by transmitting electromagnetic signals, receiving echoes from target object within its volume of coverage and extracting location and other information from the echo signals. The goal of this project is to create a working Ultrasonic radar system that is capable of monitoring a particular area. This system can be used in industries.

6. REFERENCES

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