NATIONAL INSTITUTE OF TECHNOLOGY ANDHRA PRADESH
(An autonomous Institute under the aegis of Ministry of Education, Government of India)

DEPARTMENT OF ELECTRICAL ENGINEERING

III B. Tech. II Semester, A.Y. 2023-24
End Evaluation - Poster Presentation
EE399 - Mini Project- II
Date: 03-05-2024 (10:00 A.M. to 01:00 P.M.)
Venue: 102, ABJ Laboratory Complex

UltraSonic Radar System

Abstract:

This project introduces an ultrasonic radar system designed to detect unauthorized objects, enhancing security measures. By utilizing ultrasonic waves, the radar system effectively detects and tracks objects within a specified area. Upon identifying unauthorized objects, the system promptly alerts relevant authorities, facilitating swift response to potential security threats. Advanced detection algorithms ensure high accuracy and reliability in identifying unauthorized entities, thereby contributing to improved security surveillance and threat prevention. With its real-time alerting capabilities, the ultrasonic radar system serves as a valuable tool in enhancing security protocols and safeguarding against unauthorized intrusions.

Keywords:

Radar system, Transmitter, Receiver, Signal processing, Target detection, Doppler processing

Introduction

Radar technology has revolutionized various fields, from military defense to weather forecasting and aviation safety. Understanding the fundamental principles of radar systems is crucial for engineers and enthusiasts alike. In this project, we embark on a journey to design and implement a mini radar system, offering an opportunity to delve into the intricacies of radar technology.

Problem Statement

Range and Resolution Optimization: Designing radar systems to maximize detection range while maintaining high resolution for target identification.
Signal Processing Efficiency: Developing efficient signal processing algorithms to extract target information from radar returns in real-time with minimal latency.

Objectives

Detection and Tracking: Develop a radar system capable of accurately detecting and tracking objects within a specified range, providing real-time information on their position, velocity, and trajectory.

Block Diagram
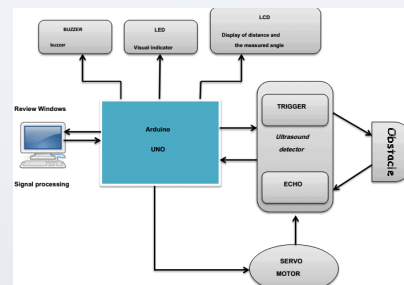
Proposed Methodology

System Setup: Configure the Arduino Uno microcontroller as the central processing unit for the radar system. Connect the Ultrasonic sensor to the Arduino Uno board using appropriate wiring.
Servo Motor Control: Interface a servo motor with the Arduino Uno to enable the radar system to scan its surroundings. Program the Arduino Uno to control the servo motor's rotation, allowing the radar to sweep across a predefined angular range.

Results
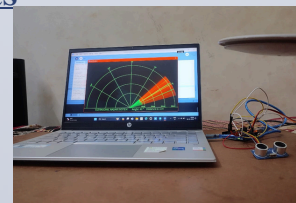
As shown in figure The radar system would detect objects within its field of view using the Ultrasonic sensor. When the ultrasonic pulses emitted by the sensor encounter an object, they are reflected back to the sensor. The system measures the time taken for the pulse to return, allowing it to calculate the distance to the detected object.

Conclusions

The radar system for detection of object is designed and implemented.The radar can be used for a variety of purposes, including self-driving vehicles, keeping away from impediments and impacts between vehicles. The system is designed to used for detect the object, different object detect are used in experimentation

References

https://nevonprojects.com/ultrasonic-radar-project/

https://ieeexplore.ieee.org/document/10101352

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