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Radar System for Detecting Object

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Abstract: *This research paper presents the design and implementation of a low-cost radar system using Arduino. The system utilizes a Doppler radar sensor to detect and track moving objects, and an Arduino microcontroller to process and display the radar data. The system consists of a radar sensor, an Arduino board, and a display unit. The radar sensor emits a high-frequency signal and detects the reflected signal, which is then processed by the Arduino board to determine the velocity and distance of the moving object. The system is capable of detecting objects within a range of 10 meters and tracking their movement. The project demonstrates the feasibility of using Arduino to develop a low-cost radar system for various applications, including robotics, surveillance, and automation.*

Keywords: Radar system, Arduino, Doppler radar sensor, low-cost radar, object detection, tracking

I. INTRODUCTION

A radar system is a device that uses radio waves to detect and track objects. It works by emitting a high-frequency signal, which is then reflected off the target object and detected by the radar system. The radar system then uses the reflected signal to determine the velocity, distance, and direction of the target object.

II. LITERATURE REVIEW

Several studies have demonstrated the feasibility of using Arduino to develop radar systems. For example, a study by presented a low-cost radar system using Arduino and a Doppler radar sensor. The system was capable of detecting moving objects within a range of 10 meters.

III. METHODOLOGY

The proposed radar system using Arduniois developed using a modern technology stack, including:
Hardware: Arduino Board,Radar Sensor, Ultrasonic Sensor, Breadboard and Jumper Wires,Power Supply.
Backend: java,c,css.
Maps Integration: Google Maps API
Authentication: Secure login with OAuth (Google, Facebook)
Payment Gateway: Razorpay/Stripe for premium listings
The system follows an MVC (Model-View-Controller) architecture to ensure a structured and scalable development approach. The website is designed with responsive UI/UX principles to enhance usability across different devices.

IV. IMPLEMENTATION

The device consists of following steps:

- Connect the Radar Sensor and Servo Motor.
- Connect the LCD Display and Keypad.
- Write the Arduino Sketch.
- Implement User Management.

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V. RESULT AND DISCUSSION

Result:

- The system can detect objects within a range of 2-400 cm.
- The servo motor's rotation allows for a wide scanning angle.
- The system can be used for various applications, such as obstacle detection, navigation, and security systems.

Discussion:

- The radar system using Arduino demonstrates the potential for DIY projects to achieve complex tasks. The combination of the ultrasonic sensor and servo motor provides a robust and accurate detection system. However, there are limitations to the system, such as the range and accuracy of the sensor, which can be improved with more advanced sensors and algorithms.

VI. CONCLUSION

The radar system using Arduino is a successful implementation of a low-cost and efficient radar system. The system utilizes an ultrasonic sensor and a servo motor to detect objects within a certain range and display the distance and angle of detection on a radar-like interface.

the radar system using Arduino is a groundbreaking project that showcases the potential of DIY innovation in the field of robotics and sensor systems. The system's accuracy, range, and affordability make it suitable for various applications, including obstacle detection, navigation, security systems, and environmental monitoring. Future work can focus on improving the system's accuracy, range, and performance, as well as developing advanced algorithms and integrating the system with other systems.

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