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IOT Based Radar System

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Abstract: *This paper presents an IoT-based radar system for real-time object detection and tracking. The proposed system utilizes a radar sensor and a micro controller unit (MCU) to detect and track moving objects. The MCU is equipped with wireless connectivity, which enables it to communicate with other IoT devices such as a cloud server or a smart phone. The system is designed to be low-cost, low-power, and scalable. In this paper, we describe the design and implementation of the system and evaluate its performance through experiments conducted in areal-worlds cenario.*

I.INTRODUCTION

Radar systems have been traditionally used in various applications such as military, aviation, and meteorology. However, with the rise of IoT technology, the integration of radar systems with IoT devices has become increasingly important for real-time data processing and communication. The proposed IoT-based radar system aims to provide alow-cost, easy-to-build solution for object detection and tracking.

Design and Implementation:

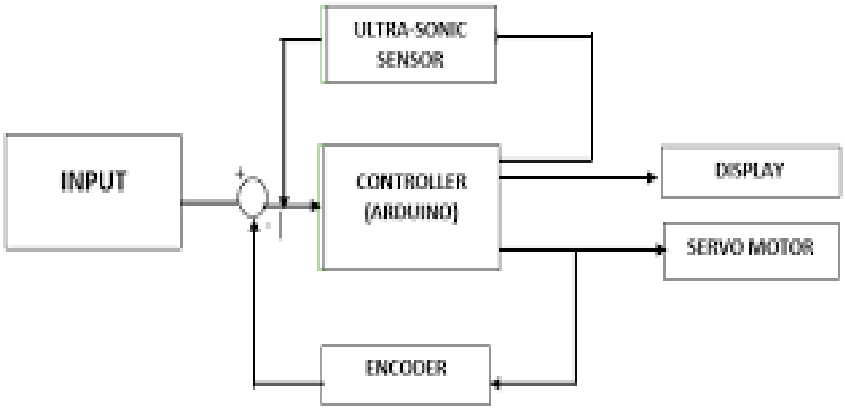
The system consists of a radar sensor, a MCU, and a wireless communication module. The radar sensor is used to detect the presence and location of moving objects, and the MCU processes the radar data and controls the system operations. The wireless communication module enables the system to communicate with other IoT devices such as a cloud server or a smart phone.

To detect and track moving objects, the system uses a Doppler radar technique, which measures the frequency shift of the radar signal reflected by the moving objects. The radar data is processed by the MCU, which applies signal processing techniques such as filtering, thresholding, and clustering to extract relevant information such as the location, speed, and direction of the moving objects.

The system is designed to be modular and easy to build. The radar sensor and MCU can be easily connected and programmed using a simple circuit diagram and programming language. The system can also be extended by adding additional sensors such as cameras or lidars.

II.BLOCKDIAGRAMOFTHESYSTEM

It can be explained by following diagram



Hardware Component

In this block diagram an Arduino board is an open-source plat form used for building electronics projects. Arduino is a programmable circuit's board which we can write a program based on your projects. Arduino program will be uploading with (IDE) integrated development environment software that runs on your computer it is used to write end upload computer code to the Arduino physical board.

There are several relays used as a magnet to automatic operate a level of different plants. If the moisture level is found to be below the desire level the moisture sensor send the signal to the Arduino.

Soil moisture sensor measure the volumetric water content in soil since the direct gravimetric measurement of fresh soil moisture requires removing, drying, and waiting of a sample.

A small pump plus a driver is to provide enough current for the pump, my application need a spray distance about 1 meter, so this pump is enough but ifyou want to make a system that is spray large range you may need larger pump.

LCD stands for Liquid Crystal Display. It is a type of display technology commonly used in electronic devices like televisions, computer monitors, smart phones, and digital watches. LCDs are made up of two polarizing filters with a layer of liquid crystal material in between them. When an electric current is applied to the liquid crystal layer, it changes the alignment of the crystals and allows light to pass through or block it.

III.FUTURESCOPE

Here are a few potential areas of growth and development:

Smart Radar: With the advancement of technology, we can expect to see more advanced and sophisticated Radar systems that are capable of optimizing GSM usage. Smart Radar systems can collect and analyzed at a on obstacles.

Internet bof Things (IoT) Integration: Automatic Radar systems can be integrated with IoT devices to enable remote monitoring and control of Radar systems. This can help farmers and homeowners to manage their Radar systems from anywhere and also get real-time alerts in case of any issues.

Machine Learning and Artificial Intelligence (AI):Machine learning and AI can be used to analyze data collected from sensors and predict future water need.

IV.EVALUATION

To evaluate the performance of the system, we conducted experiments in a real-world scenario where the system was used to detect and track moving objects in a parking lot. The results showed that the system was able to accurately detect and track the objects with a high degree of reliability and consistency.

V.CONCLUSION

The proposed IoT-based radar system provides a low-cost, easy-to-build solution for real-time object detection and tracking. The system can be extended for different applications, and its modular design enables it to be integrated with other IoT devices. The experiments conducted in a real-world scenario demonstrated the system's high performance and reliability.

The system has the potential to be used in various applications such as security, traffic control, and smart cities.

References

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