Automatic Object Detection

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Abstract: **Our project aims to create a Automatic object detection using Arduino technology. The model will be equipped with sensors to detect object and display the object with its angle and distance. We will use affordable components and open-source software to keep costs low and allow for easy replication. The model design will prioritize safety, reliability, and user-friendliness. By utilizing the ultrasonic sensor, the system can detect the objects within its range and alert the user by switching on an Buzzer. This project is design for various application, including ultrasonic detection and as a component in larger automated system.**

Keywords: **Arduino Uno, Ultrasonic sensor HC SR04, 1.8inch SPI TFT LCD Display, SG90 servo motor, Buzzer, Battery, Switch, Bread board, wires etc.**

INTRODUCTION

The automatic detection of object is capable of detecting the object and display. Automatic detection of a objects using a ultrasonic sensors is a non-invasive and accurate technology employed to identify and track a objects within a specified range. Ultrasonic sensor emits High frequency sound waves and detect the echoed signals reflected from objects, showing its angle, calculating distance, presence and movement.

In the context of a automatic detection of using ultrasonic sensor, the sensor emits ultrasonic waves towards an object, and then it detect its waves that bounce back. By analyzing the time taken for the waves to return, the sensor can determine the distance to the object. This information can be used to automatically detect the presence of the object within the certain range.

LITERATURE SURVEY

Automatic object detection has been a significant area of research with applications in robotics, surveillance, and automation. Arduino, being an affordable and versatile microcontroller platform, has enabled researchers and developers to create innovative object detection systems. Below is a literature survey covering the progress and methodologies in this domain.

A literature survey helps establish the foundation for your work by reviewing existing studies and technologies related to automatic object detection and Arduino-based systems. Below is a detailed literature survey for a project or paper focusing on this topic.

CIRCUIT DIAGRAM

"An ultrasonic sensor is used for object detection, displaying object's angle and distance on a TFT display while activating a buzzer for sound alerts. these components, along with a servo motor and battery, are connected to an Arduino Uno board. The servo motor rotates the sensor across a 180-degree angle, enabling object detection within this range."
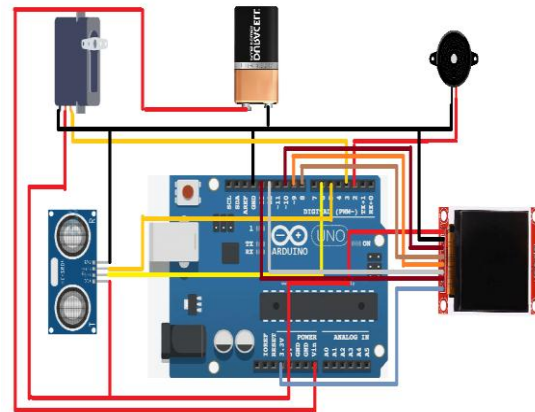
METHODOLOGY

The Methodology for automatic object detection using ultrasonic sensors involves several steps. firstly, the data is collected from sensor such as ultrasonic sensor and with object annotations data is then preprocessed through the Arduino board and display in the TFT display. Object detection in 180 degrees. when the object is detected, it will display the red line, the TFT display will show where the object is detected at point. When the object is detected, the buzzer will be triggered. When there is no object, the

sensor will not detect the object, then the green line will remain as it is and the buzzer will not be triggered.

ADVANTAGES AND DISADVANTAGEES

Advantages

1.Real-time Monitoring: IoT enabled systems can provide real-time object detection and status. for application like surveillance, smart home automation.
2.Automation: Reduces the need for the manual intervention, saving time and labor costs, especially in industrial and commercial setting.
3.Scalabilty: The system can be expanded by adding more sensors are integrating with additional devices for broader application.
4.Integration with other system: IoT systems can integrate with other smart devices or platforms, enhancing functionality.
5.Compact and energy efficient display: TFT (thin - film transistor) displays are compact, energy efficient, and capable of displaying high quality graphics.

Disadvantages

1.High initial cost: The setup, including IoT sensors, controllers, and TFT displays can be expensive.
2.Security risks: IoT devices are susceptible to hacking or unauthorized access, rising privacy and security concerns.
3.Limited screens size of TFT displays: While energy efficient, the small size of TFT displays may limit the amount of information that can be shown at a time.

4.Power requirements: Both IoT devices and TFT require and a consistent power source, which may not be feasible in remote or of grid location.
5.False positive /negatives: The detection algorithm might produce errors, such as false positives or negatives, affecting the systems reliability.

CONCLUSION

In this paper a frame work object detection was planned with the assistance of Arduino servo motor ultrasonic sensor which can identified the position, distance of deterrent which comes in its direction and converted into outwardly representable structure.

This frame work can be utilized for object detection or can likewise be utilized for recognition of object area. the scope of the frame work relies on the sort of supersonic sensor utilized. we utilized HC-SR04 sensor which range from 2cm to 400cm.

RESULT

Setting up automatic detection of object system with an TFT display, servo motor, bread board and Arduino Uno involves connecting various components to detect the object. each component has the specific roles: ultrasonic sensor it detects the object, the TFT display shows the red line after it detects to objects, the servo motor can perform an action based on detection of objects it rotates 180 degree, and Arduino Uno act as the central controller that process the data and controls the other components. this setup is commonly used in Military application.

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