OBJECT TRACKING AND DETECTION FOR SHORT RANGE SURVEILLANCE USING 2D ULTRASONIC SENSOR ARRAY

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INTRODUCTION:

A motion detector is a system that uses the ability of many sensors to detect movement and triggers another circuit. However, motion detectors are used normally to monitor areas of smaller size, which helps in controlling the conditions more closely. Detectors used for security purpose usually detect movement in short range areas. As such, motion detectors can detect movement of objects at vulnerable points and high security places, such as artillery warehouses etc.

There are numerous commercially available solutions for motion detectors nowadays, the basic aim of this system is to design and construct a cheap and simple motion detector system which is aimed at detecting anything that moves, like the physical movement of animals, humans etc. The design is to improve the use of sensor in detecting motion. In general, it is aimed at a low cost design, development and construction process of an ultrasonic motion detector.

OBJECTIVE:

1. To detect and track objects low powered ultrasonic ping sensors in any type of environment.
2. The system is designed keeping portability and lower energy consumption in mind which makes it ideal for remote applications.
3. To make a system which has very high reliability with a fraction of the cost compared to conventional object tracking methods.
4. To design the system with a modular approach so that the system can be mounted on any platform (e.g.: ATV or Quad-Copter etc.).
5. To design system interface software that can be implemented on various software platforms and devices.
6. To design RADAR Screen that can be used to plot position of object in 2 dimensions and give accurate location to user on screen.
**METHODOLOGY:**

1. Interfacing ultra-sonic ping sensor to aurdino board.
2. Programming the aurdino board to calculate the distance using ping sensor output.
3. Designing a 2-D Ping sensor array.
4. Reducing noise due to crosstalk in the sensor array.
5. Interfacing servo motor to aurdino board.
6. Using the servo motor to rotate ping sensor array.
7. Programming the setup to display the distances between the sensors and various obstacles around the setup in Real time.
8. Using DC gear motor to make the setup MOBILE.
9. Using H Bridge as motor driver and voltage regulator for the setup.
10. Adding Bluetooth module HC-05 to make the setup wireless.
11. Creating an Android application using MIT Creator tool-2 to control setup and also display outputs in any android mobile.

**CONCLUSION:**

There are various motion detectors but this particular design is unique because of its mode of operation, as it uses low power ultrasonic waves. This device can sense the movement of animals or objects within the range of detection. System can be implemented on various platforms since it is light weight and very power efficient. It is designed to output data serially so that the output data can be used for further calculations or storage or display. The system after design and construction was tested and found to work in accordance with theoretical design.

**FUTURE WORK:**

The proposed system can further be improved by using a mixed sensor array that is using an ultrasonic array for distance measurement at the middle and using LIDARs for the outer sensors. Adding more sensors to fill blind spots which improve tracking capability.