

# Smart Dustbin Using Ultrasonic Sensor and Servo Motor

## Technical Documentation with Block Diagram

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#### Introduction

This system describes a contactless smart dustbin that opens automatically when an object, such as a plastic bottle, is detected at a specific range. The smart dustbin implemented on an ultrasonic sensor, a servo motor, and an ESP32 microcontroller.

#### Components

- ESP32 microcontroller
- Ultrasonic sensor (HC-SR04)
- Servo motor (SG90)
- Power supply

#### Operation

The ultrasonic sensor detects objects, measuring a specific range. If a specific range is detected, wait for a short delay, then the lid automatically opens.

#### Diagram

Shows the connections between the components.

#### Future Improvements

- Waste Classification: Confirm the material type using weight sensors or cameras.
- Cloud Integration: Send disposal data to a server for logging and analytics.
- AI Reward System: Reward users for proper disposal through a mobile app.

