Smart Dustbin using Servo Motor

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SYNOPSIS

Concept of Project:

In this project, we will be making a Smart Dustbin using Arduino, where the lid of the dustbin will automatically open when someone approaches with trash. The other vital components used to make this Smart Dustbin are an HC-04 Ultrasonic Sensor and an SG90 Tower Pro Servo Motor.

Component List:

- Arduino
- Servo motor
- Ultrasonic sensor
- 5v Battery
- Dustbin
- Wires
- LED

Detailed Specification about Components:

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. Servo motors or 'servos', as they are known, are electronic devices and rotary or linear actuators that rotate and push parts of a machine with precision. Servos are mainly used in angular or linear positions and for specific velocity and acceleration. An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves and converts the reflected sound into an electrical signal.

Schematic (Simulation):

When an individual comes in front of a dustbin to throw waste, the ultrasonic sensor will detect its presence and transfer the signal to Arduino, further providing the signal to the servo motor. With the help of the 5v Battery starts working and opens the lid of the dustbin. A LED will be glowing when the lid of the dustbin is open.

Explanation of Project:

To open the lid, we have fixed a small plastic tube, or instead, we can use a thread to the servo horn (a single-ended horn) using instant glue, which will help open the lid. For this mechanism to open the lid of the dustbin, it must be placed near the hinge where the lid is connected to the main can. After this, the Ultrasonic sensor will be placed on the front side of the dustbin, which is internally connected with the help of wire to the servo motor and Arduino, which will be attached inside the dustbin.

Result:

Here is a snapshot of our model, which includes an Arduino, an ultrasonic sensor, and a servo motor.
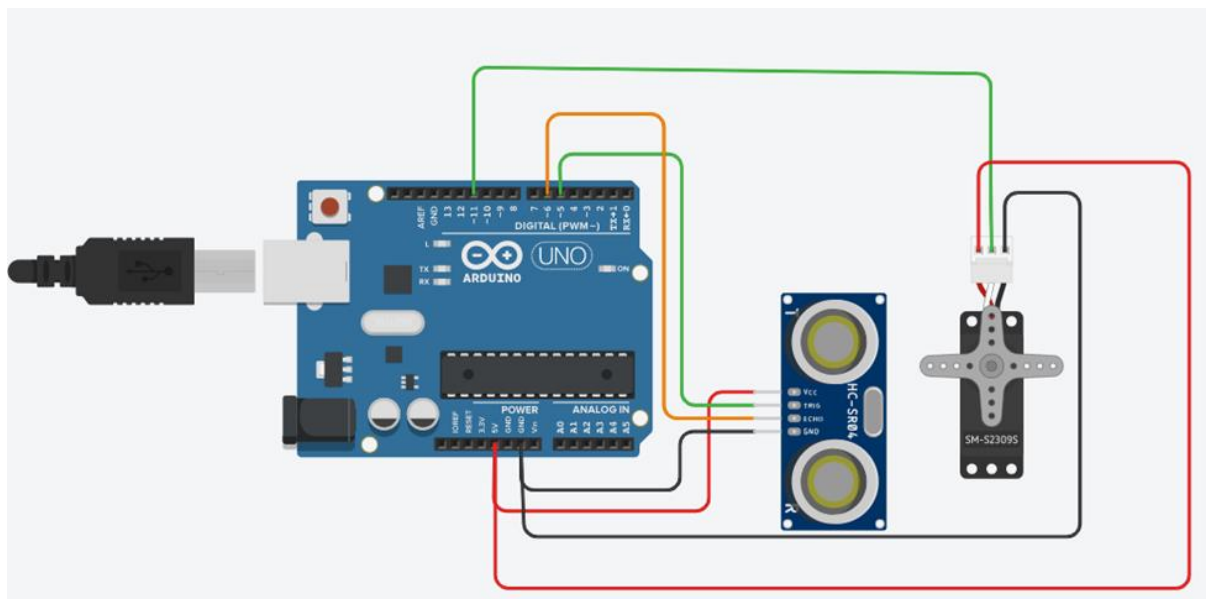
Simulation link: https://drive.google.com/file/d/1XDtfTNRiI0ehdrLs-n-emPIhdC_SpCs6/view?usp=sharing

Conclusion:

This project's ultimate aim is to minimize the contact made with the dustbin. With this project, the dustbin lid stays closed; hence, the waste is not exposed to external elements like water, flies, mosquitoes, rats, etc., which may contribute to harmful diseases. The dustbin would also be protected from any spillage, ensuring the cleanliness of the surroundings.

Thus, we hope that society would benefit significantly from our project and help elevate the quality of life for all.