AUTOMATED TRASH-CAN

Mobile and Wireless Communication Sessional
Course Code: CSE 416

Afsana Mimi Choity
ID- 1902047

1 Components

Arduino Uno: The main microcontroller that controls the entire system.
Ultrasonic Sensor (HC-SR04): Detects the distance of an object from the dustbin.
Servo Motor: Controls the lid of the dustbin. It opens when an object is detected within the specified range.
Piezo Buzzer: Produces a sound when an object is detected within the specified range.
LED Light: Lights up when an object is detected within the specified range.
Power Bank: Provides power to the Arduino Uno and the connected components.

2 Functionality

i. The ultrasonic sensor continuously measures the distance of any object in front of it.
ii. If the measured distance is less than the defined threshold (20 cm), the system activates:

- The LED light turns on to indicate the detection.

- The piezo buzzer produces a sound.

- The servo motor moves the lid of the dustbin to an open position.

iii. After the lid is opened, it stays in that position for 3 seconds (adjustable duration).
iv. If no object is detected within the specified range, the system returns to the initial state:

- The LED light turns off.

- The servo motor closes the lid.

3   Benefits

Hands-Free Operation: Users can dispose of trash without physically touching the bin, promoting hygiene and reducing the risk of contamination or the spread of germs.
Automatic Lid Opening and Closing: The servo motor-controlled lid offers a convenient and automated way to open and close the trash bin, making it more user-friendly.
Proximity Detection: The ultrasonic sensor detects the presence of an object in close proximity, triggering the lid opening, enhancing the user experience.
Visual Indication with LED: The LED light provides a visual indication when an object is detected, making the system more intuitive and user-friendly.
Audible Alert with Buzzer: The piezo buzzer produces an audible alert, signaling the detection of an object within the specified range, further enhancing the user's awareness.
Adjustable Detection Range: Users can potentially adjust the detection range based on their preferences or the specific environment in which the trash bin is placed.
Demonstrates Internet of Things (IoT) Principles: The project showcases the principles of IoT by incorporating sensors and actuators to create an automated and responsive system.
Promotes a Clean Environment: Encourages responsible waste disposal by providing an engaging and automated way to interact with the trash bin, potentially increasing user compliance with proper disposal practices.
Potential for Integration with Smart Home Systems: The project can be a foundation for further integration with smart home systems, allowing users to control or monitor the trash bin remotely.

4   Limitations

Sensing Accuracy: The ultrasonic sensor may have limitations in accurately measuring distances, leading to potential errors in object detection.
Power Dependency: The project relies on a power bank, requiring regular recharging or replacement, especially in high-usage scenarios.
Mechanical Wear: Moving parts, particularly the servo motor, may experience wear and tear over time, potentially leading to malfunctions. **Limited Automation:** The project lacks features for trash disposal or sorting, limiting the level of automation in waste management.