AUTOMATED TRASH-CAN

Mobile and Wireless Communication Sessional

Course Code: CSE 416

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1. **Introduction**

In the realm of cutting-edge technological strides, I take immense pleasure in unveiling my recent endeavor—a sophisticated automated dustbin harnessing the prowess of Arduino Uno, a piezo buzzer, an ultrasonic sensor, a servo motor, and an LED light. This innovative contrivance seamlessly integrates with a power bank, serving as a portable and efficient power source.

This ingenious solution tackles conventional concerns associated with waste disposal by deploying a smart and responsive system. As an object approaches within a proximity of less than 20 cm from the bin, a cascade of actions ensues. The LED light radiates, providing a visual cue, while a distinctive sound emanates from the piezo buzzer, signaling users to the bin's responsiveness.

The crux of this project lies in the orchestration by the Arduino Uno microcontroller, deftly coordinating the synchronized interplay of the ultrasonic sensor, servo motor, and other integral components. The incorporation of a power bank ensures the project's autonomy and adaptability in diverse settings.

This project not only exemplifies the amalgamation of hardware components but also showcases the potential of straightforward yet efficacious automation in addressing day-to-day challenges. The ensuing sections of this report will delve into the intricacies of the project, encompassing technical details, encountered challenges, and the broader ramifications of this automated dustbin.

**2. 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

**3.Benefits**

**Hygienic Convenience:** Dispose of trash without touching the bin, reducing contamination and the spread of germs.

**Automated Elegance**: The servo motor-controlled lid offers a user-friendly, automated experience for opening and closing the trash bin.

**Smart Sensing**: The ultrasonic sensor detects nearby objects, triggering a visually indicated lid opening for an enhanced user experience.

**Visual and Audible Alerts:** LED light provides a visual cue, while the piezo buzzer offers an audible alert, ensuring users are aware of detected objects within the specified range.

**Customizable Range: Users** can adjust the detection range based on preferences or specific environmental conditions.

**IoT Showcase:** The project exemplifies IoT principles, showcasing a seamless integration of sensors and actuators for an automated and responsive system.

**Encouraging Responsible Disposal:** Promotes proper waste disposal practices by providing an engaging and automated interaction with the trash bin.

**Smart Home Integration Potential:** Acts as a foundation for potential integration with smart home systems, enabling remote control and monitoring of the trash bin.

**4. Limitations**

**Sensing Challenges**: The ultrasonic sensor's accuracy may be limited, introducing potential errors in distance measurement and object detection.

**Power Management:** Dependency on a power bank necessitates regular recharging or replacement, particularly in scenarios of high usage.

**Mechanical Wear and Tear:** The servo motor and other moving parts are susceptible to wear and tear over time, posing the risk of malfunctions in the system.

**Automation Limitations:** The project falls short in offering advanced features like trash disposal or sorting, restricting the level of automation achievable in waste management.

**5. Conclusion**

In summary, the automated dustbin project has skillfully integrated Arduino Uno, a piezo buzzer, an ultrasonic sensor, a servo motor, and an LED light to establish an effective waste disposal system. The responsive features, activated within a 20 cm range, elevate convenience and hygiene in traditional waste management. Despite challenges, the project showcases the harmonious collaboration of hardware components, orchestrated by the Arduino Uno. The inclusion of a power bank ensures both portability and adaptability. Looking ahead, the project hints at potential improvements, emphasizing the transformative impact of simple automation on daily challenges and highlighting the evolving landscape of smart and sustainable technologies in waste management.