

InfraRed Bin

1. Introduction:

The objective of this project is to create a technologically advanced trash bin that enhances user convenience and promotes efficient waste management. The bin incorporates an infrared sensor, a remote control system, and a servo motor for lid control. The ultrasonic module is utilized to monitor the fill level, and a buzzer provides audible alerts when the bin is nearing capacity.

2. Materials and Components:

- Arduino Uno
- Wires and connectors
- Mini breadboard
- KY-022 infrared module with remote control
- SG90 servo motor
- Buzzer
- HC-SR04 ultrasonic sensor

3. Methodology:

3.1 Circuit Construction:

The physical and schematic representations of the circuit were carefully designed and constructed to ensure the system's functionality and safety. The Fritzing software was used for visualizing the circuit layout.

3.2 Arduino Code:

The project relies on Arduino programming to control the various components and achieve the desired functionality. The code leverages three key libraries:

- Time free tone: Used to create the alarm sound transmitted by the buzzer because both the servo motor and the tone function reference the clock, creating a conflict between the two operations. This library allows the sound generation to be independent of the clock.

- IR remote: Used to manage the reception and decoding of signals via the remote control and infrared sensor.
- Servo: Allows control of the servo motor's movements.

The code initializes pins, sets up ultrasonic sensors, and defines actions for remote control inputs. The *attach* and *enable* commands for the servo and ir are used to initialize the two modules. After displaying the hexadecimal codes associated with the zero and one buttons through the decode function, these are used as conditions in an if statement to open or close the bin lid through the *servo.write* function. When the bin is opened, the variable *full* is set to one, allowing for checking the bin's fill level using the ultrasonic module. In this case, if the distance between the module and the bin's contents is less than 3 cm, the alarm is activated.

4. Results:

The smart infrared trash bin successfully fulfills its objectives, offering the following key features:

- Remote control lid operation.
- Infrared sensor for lid control.
- Ultrasonic module for fill level monitoring.
- Buzzer alarm for full bin notification.

5. Conclusion:

This project showcases the successful development of a smart trash bin with infrared capabilities. It provides users with a convenient and efficient way to manage waste while promoting sustainability and environmental consciousness. The project's success highlights the potential for innovative solutions in everyday life.