76. Smart Autonomous Trash Bin

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Abstract

The rapid increase in population has to heightened sanitation- related issues and the current waste management systems have exhibited deficiencies. Conventional garbage disposal methods frequently lead to overflowing trash bins, ineffective waste management and unclean environments in public and residential areas. This research addresses the challenge by proposing a smart autonomous trash bin. As compared to with the traditional trash bins, it makes use of ultrasonic sensors, servo motor, microcontroller and Bluetooth module to automatically open, close the bin and indicate the trash levels in real-time to the person responsible for garbage collection for timely collection. Ultrasonic sensor (HC-SR04) is used to determine the distance between the garbage or the user and the bin. This bin is designed to open its lid only when a user approached and close automatically when the user moved away. Further, the ultrasonic sensors detect trash levels and data is transmitted through Bluetooth module to mobile app. The servomotor helps in opening and closing of the autonomous trash bin after receiving commands from the microcontroller. A prototype was developed and tested. When a user was detected within the predefined distance from the trash bin, the motor was activated to open the lid. The lid opened only if the trash in the level in the bin had not exceeded a predefined level (fill level). When the trash bin was full the mobile app indicated that the trash was full for trash collection. The proposed solution presents a significant contribution to the field of waste management offering a practical and innovative solution to the challenges posed by conventional garbage disposal methods.

Keywords: *Waste management, Garbage management, waste collection*