An Energy Efficient and Low Cost Smart Recycling Bin

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Abstract

This research work focuses on the application of IoT (Internet of Things) in the field of waste recycling. We propose an energy efficient and low cost prototype system for a recycling bin. In an attempt to ease sorting during waste disposal, the system identifies the type of waste material which is being discarded and automatically opens the corresponding bin. Being battery operated and providing real-time service imply that downtime due to power shortage must be kept at a minimum. Our approach focuses on a novel wake-up technique applied to an Arduino microcontroller which controls the opening and closing of the bin lids. Our technique reduces power consumption of the microcontroller by allowing it to be in deep sleep mode when not in use. This is achieved by concatenating a wake-up bit at the beginning of a request to wake up the sleeping microcontroller. It then, executes the request and goes back to sleep. Our experiments demonstrate an increase in battery life of more than 3 hours when compared to the standard full power mode usage. Also, we introduce QR (Quick Response) code to identify the type of waste products, which is less costly and more environmental friendly than RFID (Radio Frequency Identification) tag based solutions.
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References


Index Terms

Computer Science
Automated Systems

Keywords

Internet of Things (IoT), Energy Efficient System, Smart Systems, Waste Recycling, Deep Sleep Mode, Microcontroller, Sensor Networks