Smart Waste Management system for Metropolitan cities

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ABSTRACT :

Waste management is an integral part of the supply chains that our global economy relies on. Due to exponential growth of population there has been a remarkable increase in everyday waste wherein improper treatment and disposal cause serious socio-economic downturns.

Waste bins are part of our lives for decades and mostly its condition are overflowing due to improper waste dumping, collection and management, which leads in foul smell and unhygienic condition, thus inherently results in environment pollution. Therefore, in this paper, design of a Waste Bin with real time monitoring is presented and a smart waste management system is proposed using the recent technical advancements of automation and Internet of Things (IoT). The capacitance sensor in the bin continuously monitors the level of the bin in real time and communicates to the central cloud where the bins are connected. Ultrasonic sensor is used to open and clos the lid of the bin whenever the persons are nearby the bin. Such smart bins are connected to the cloud, where the bin status are communicated, recorded and monitored by the local bodies through and android app or centralized server. Thus the designed smart bin and proposed waste management system have better level of smartness compared to existing ones in metropolitan cities in a centralized manner. Waste has become a major worry for all of us due to the global population growth and industrialisation of nations.

Over the years, academics came to the conclusion that, in this age of globalisation, waste management alone is insufficient for the efficient treatment and disposal of garbage. Researchers have developed IoT-based Smart Waste Management initiatives and solutions with the aid of technology, ensuring that the time and energy needed to deliver waste management services and lower the amount of waste generated is minimised. Unfortunately, a number of variables, including the socioeconomic context, prevent developing countries from implementing those current solutions. In order to assure effective household garbage disposal, collection, transportation, and recycling while using the fewest resources possible, we have focused our research on creating an intelligent Internet of Things-based waste management system for developing nations like INDIA.

IOT-based garbage bins are used in this project's smart waste management to collect rubbish and track its level inside the bin. Two ultrasonic sensors are used in the system, which is controlled by a Node MCU. The level of waste in the bin is detected by one ultrasonic sensor, and the person approaching the bin to dispose of waste is detected by another. This detection aids in the lid's automatic opening and closing. The lid is coupled to a servo motor, which facilitates shutting and opening of the lid. This device will notify the relevant authorities of the amount of rubbish in the trash can. Apps are used to monitor and store IOT data.