

Smart Waste Management System For Metropolitan Cities

Literature Review

ABSTRACT:

Indiscriminate disposal of solid waste is a major issue in urban centers of most developing countries and it poses a serious threat to healthy living of the citizens. Access to reliable data on the state of solid waste at different locations within the city will help both the local authorities and the citizens to effectively manage the menace. In this paper, an intelligent solid waste monitoring system is developed using Internet of Things (IoT) and cloud computing technologies. The fill level of solid waste in each of the containers, which are strategically situated across the communities, is detected using ultrasonic sensors.

A Wireless Fidelity (Wi-Fi) communication link is used to transmit the sensor data to an IoT cloud platform known as ThingSpeak. Depending on the fill level, the system sends appropriate notification message (in form of tweet) to alert relevant authorities and concerned citizen(s) for necessary action. Also, the fill level is monitored on ThingSpeak in real-time. The system performance shows that the proposed solution may be found useful for efficient waste management in smart and connected communities.

INTRODUCTION:

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 close 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 an android app or a 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.

EXISTING WORKS:

One of the challenges in Smart City projects is the planning and executing a comprehensive waste management programme into connecting the various sectors like residential buildings, commercial & industrial establishments, hotels, healthcare institutes, transport sector, public places, tourism spots and many others. Smart City consultants play a major role in evaluating and formulating a waste management strategy that can be incorporated in the development plan of a smart city. The challenges are less in Green field projects.

Gaia Smart Cities Solution Private Limited, the Project Management Consultant (PMC) for Agra Smart City has envisioned and proposed a definite end to end solution for waste management.

Municipal Corporation is responsible for collection, segregation, transportation, dumping and processing of the city waste from door to door.

As a process, waste is transferred from primary collection vehicles into secondary collection vehicles for dumping at Waste Processing plant. Municipal Corporation either directly or through sub-contracting has field staff responsible for collection of door to door waste, street sweeping and collection of street waste and dumping to the nearest bins.

In current scenario, managing people who are responsible for the activity and proper utilization of assets / resources assigned to them has become a complex job for Municipal Corporation which is directly or indirectly impacting the cleanliness and hygiene factors to citizens. Some of the serious problems in existing solid waste process are:

- 1) Lack of information about collection with respect to time and area.
- 2) Lack of proper system for monitoring, tracking the collection and transportation vehicles
- 3) Verification of employee attendance and performance
- 4) On transfer of waste from primary collection to secondary collection, authenticity of vehicle transfer and improper co-ordination leads to missed trips and garbage piling.
- 5) Lack of quick response to urgent cases like vehicle accident, breakdown, long time idling, etc.

The proposed systems for keeping the city clean and waste free



In current scenario with respect to Solid Waste Management, there is a large scope for the engagement of Technology Partners and System Integrators (SI) to engage with Solid Waste Department of Municipal Corporation to setup right systems in place which help corporation with proper planning, monitoring, controlling and measure through a survey of hygiene, cleanliness and livability index.

The Agra Smart City got selected in the third round of 100 Smart Cities Mission. The tender document published for Master System Integrator concentrates on ICT Enablers for PAN City. A city has a vision to bring awareness among citizens of Agra and with stringent

monitoring systems on cleanliness and Hygiene factor across all the wards in the city, Special Purpose Vehicle (SPV) formed for Agra Smart City emphasized to provide a more robust, transparent and comprehensive mechanism with a lot more IT and ICT enablers.

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