

IoT based Smart Waste Management

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ABSTRACT

The concept of internet of things (IoT) based upon connecting surrounding objects with wired and wireless network without any human involvement, to provide advance services to the user. These objects communicate with each other and exchange the different information. As today's generation worked with highly equipped mobile devices with different network technologies, IoT gained more research interest. Today we are implementing various characteristics of IoT with the smart city application to make cities more efficient and safer. Likewise to maintain the cleanliness in the cities are the major issues facing at different places. The approach of waste management in smart way is executable in urban areas where waste production is domestically high but the effort put to control it is relatively very low. Various problems of waste management like improper disposal of waste, improper collection management, improper policies for waste management etc. Which will lead to serious environment issues. The smart waste management mostly helpful to escape the obstruct collection of waste generated domestically which creates difficulty to manage its disposal. Lots of work has been done in the waste management systems still there is some scope for research in this area. This concept will work with the smart waste management, which will calculate which type of waste get collected from different areas and whether we can use it for preparing fertilizers. Our system will compose of different sensors, hardware kit and smart dustbins. Each dustbin will check for the percentage of waste collected like plastic material, metal etc. and sends messages to the android application. The portable application demonstrates the weightage of collected waste.

Keywords : —*Smart city, IoT, Geographic data system (GIS), Location Intelligence, smart wastebins.*

I. INTRODUCTION

A smart town is nothing however a vision to integrate many information and communication technology (ICT) beside Internet-of-Things (IoT) in an exceedingly method therefore on manage a city's assets. The city's assets embrace, among others, the local departments, data systems, libraries, schools, hospitals, waste management systems, transportation systems etc. Currently, Indian cities accommodate nearly 31% of current population and contributes to 63% of GDP (Census 2014). Urban areas are expected to accommodate four-hundredth of India's population and contribute seventy fifth of India's GDP by 2030. This needs comprehensive development of infrastructures concerning social, economical, physical, and institutional fields. All are vital in rising the standard of life and attracting people and investment. Development of sensible cities may be a step in that direction. In this paper, we discuss a sensible mechanism for rising the management of wastes in cities. The planned system based on the muse of geographic data systems (GIS), and improvement algorithms. It consists of an IoT based mostly prototype with sensors to live the waste volume in containers or waste bins, with facility to

transmit data over the net. The system is simulated certain town of Pune, using Open knowledge. The simulation covers an amount of one month to model wastebin filling and waste assortment. The simulations are done for performing an efficient comparison of different ways that for assortment of wastes: ancient technique and dynamic on-demand answer, planned work (intelligent) for many cases. The result of this work is a combined system model for sensible waste assortment system.

II.LITERATURE SURVEY

A. IoT Based Waste Management for Smart City:

Prakash and Prabu, describes, the System in which Smart dust bins are connected to the internet to get the real time information of the smart dustbins located throughout the city or the Campus, which are provided with low cost embedded device having an unique ID so that it is easy to identify which garbage bin is full i.e. it becomes easy to track the level of the garbage bins which are located in the city. Smart bins are interfaced with micro controller based system with IR Sensors and RF modules. When the level reaches the commencement level and device will transmit the status of that dustbin along with the unique ID provided. These details can be accessed by the concern Authorities from their place with the help of Internet and an immediate action can be made to clean the dustbins. In this system, effective usage of smart dustbins or Managing and monitoring can be done by the status of it and accordingly help to take the decision.

B. Smart cities: A case study in waste monitoring and management:

This paper presented a smart monitoring system for public trashcans. The user-centered design approach was used to understand the needs of the users, derive the requirements and develop the system. Continuous involvement of the stakeholders during design phase assured the alignment between design objectives and the results of the pilot study. The system was evaluated by combining quantitative data, that is collected from the wireless sensor network and the qualitative data that is based on observations and interviews. One of the main requirements for the design was setting \$100 as the maximum price per sensor/bin; making cost as the key challenge for a smart trash collection solution. This price limit was respected throughout the study, with the potential of lowering it substantially by designing a more integrated solution and with the economies of scale. The project also showed that the most important argument for the implementation of a smart collection system is the ability to improve the service quality for users (citizens) and the work experience for collectors, rather than the possibility of cost reductions. Such a system should not replace the knowledge that collectors have of an area, but instead build on top of it, allowing them to better assess situations. Both municipalities and private contractors that do trash collection work towards one goal: Improving the quality of experience of users in the area. It is highlighted that, implementing a smart trash monitoring system will require commitment and financial investment, and the feasibility of the solutions depend on how much user satisfaction is worth to these parties.

C. IOT Based Smart Garbage alert system using Arduino UNO:

An embedded based intelligent alert system is devised for the proper monitoring and maintenance of the garbage. This system averts the irregular cleaning of the dustbins by sending alerts to the concerned individual at regular intervals. It further improves the system by additionally endorsing the status of cleaning in real time and measure the performance of the team. Thus, this system comes in handy as an admirable solution in environmental maintenance. In addition to this, it also aids to diminish the need for high human intervention in garbage maintenance of the municipality and pollution monitoring system.

D. Garbage Monitoring System Using IOT:

This PAPER is an integrated system of Ultrasonic sensor, metal detector, microcontroller, MPLab IDE, Zigbee Rx module. Ultrasonic sensor they give the readings more accurately, it is introduced for economic and efficient garbage collection. By implementing this paper, they can avoid the overflowing of trash bins in residential areas which will prevent many diseases and hence they can maintain a clean environment. This system will automatically send the notification to the municipal corporation. The proposed system is more efficient and practical than the existing scenario of processing solid waste collection in which everything is manually done. Every smart dustbins will be given a Specific ID number, which will be, send in the notification by using that they will get to know the location of dustbins. This system will reduce the wastage of fuel by reducing number of trips of garbage collection vehicle.

E. Smart Waste Management using Internet-ofThings (IoT):

They presented an intelligent waste collection system. The system is based on IoT sensing prototype. It is responsible for measuring the waste level in the wastebins and later send this data (through Internet) to a server for storage and processing. This data helps to compute the optimized collection routes for the workers. In future, we would like to enhance the system for different kind of wastes, namely solid and liquid wastes.

III. PROPOSED WORK

We propose a waste assortment system on the premise of level of wastes gift within the wastebins. The info obtained through sensors was transmitted over the web to a server for storage and process mechanisms. It is used for watching the daily choice of wastebins, supported that the routes to pick many of the wastebins from very different locations area unit decided. Every day, the staff receive the updated optimized routes in their direction devices. The numerous feature of this system is that it's designed to update from the previous experience and judge not solely on the daily waste level standing but conjointly the predict future state with relevance factors like traffic congestion in an area unit wherever the wastebins are placed, cost-efficiency balance, and alternative factors that's troublesome for humans to look at and analyze. Supported this historical

information, the rate at that waste bins is stuffed was definitely analyzed. As a result, it will be expected before the overflow of wastes occurs within the wastebins that area unit placed during a specific location. Depending on economic needs mere at early stages, the optimized choice of wastebins to be collected is predicted to improve assortment potency.

IV.FIGURES AND TABLES

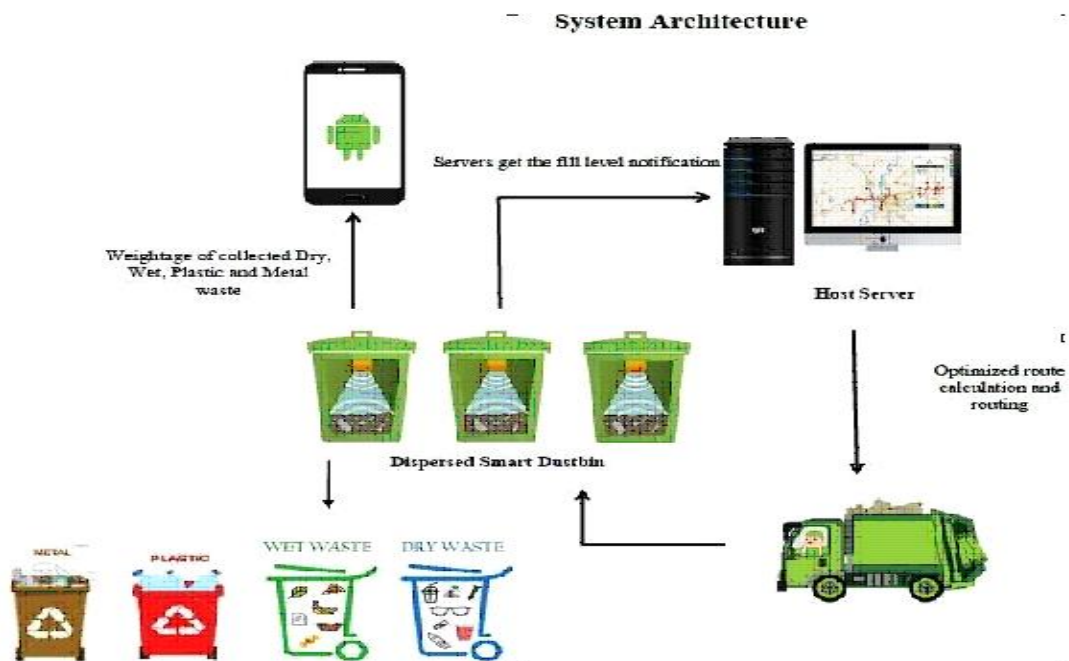


Fig 1. System Architecture

V. CONCLUSION

By this proposed system, we come to know that lot of work done in field of waste management and IoT based Smart collection. We got that Waste Management implemented with various IoT techniques. To keep effectiveness of work IoT technique used. There is a very little focus on control mechanisms on SWM that is adversely effecting on safety, health and the environment of smart city. By using this proposed system, we find out the weightage of plastic, metal substances and are notified on particular android application.

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