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IOT Based Intelligent System for Waste Management

Badadhe Komal R.[1]
Department of Information Technology
Pravara Rural Engineering College.Loni
komalbadadhe14@gmail.com

Dahiwal Shital S.[2]
Department of Information Technology
Pravara Rural Engineering College.Loni

Abstract -To make the cities greener, safer, and more efficient, Internet of Things (IoT) can play an important role. Improvement in safety and quality of life can be achieved by connecting devices, vehicles and infrastructure all around in a city. Best technological solutions can be achieved in smart cities by making different stakeholders to work to-gether. System integrators, network operators and technology providers have a role toplay in working with governments to enable smart solutions. But, building such solutions on an open, standards based communications platform that can be continuously used is a challenge.

The Collection of waste is a very much needed municipal service that requires hugeexpenditures and execution of this operation is high-priced. The high pricing is due tothe various factors such as man power, navigation of vehicles, fuel, maintenances andenvironmental costs. The above factor necessitates the design, implementation and execution of the intelligent smart bin for proper management of waste. This paper focusedon the implementation of an IoT based embedded system which integrates Radio Frequency Identification (RFID), Sensors, Arduino controller.

This system provides a database of the information of bin status, amount of waste inthe bin, time of the collection of waste are transmitted to monitor and efficiently managethe waste collection strategies.

INTRODUCTION

Waste Management System is one of the vital indispensable services provided by municipal authorities in the country to keep city clean.

The generation of waste is increasing by 1.3Waste management is all the activi-ties and actions required to manage waste from its inception to its final disposal . This includes collection, transportation, treatment and disposal of waste together with mon-it oring and regulation. Waste collection methods vary widely among different countriesand regions. Domestic waste collection services are often provided by local government authorities. Curb side collection is the most common method of disposal in most countries, in which waste is collected at regular intervals by specialised trucks. Waste collected is then transported to an appropriate disposal area.

Now days, cities with developing economies experience exhausted waste collection services, inadequately managed and uncontrolled dump sites and the problems are wors-ening . Waste collection method in such countries is an on-going challenge and many struggle due to weak institutions and rapid urbanization.

II. NEED FOR IMPROVEMENT IN WASTE MANAGEMENT SYSTEM

• By 2030, almost two-third of the worlds population will be living in cities. This fact requires the development of sustainable solutions for urban life, managing waste is a key issue for the health.

• Efficient and energy-saving waste management, reduce in CO2,air pollution and vehicle exhaust emissions these are just a few examples for the demands of future cities. In views of that, the efficient use and responsible handling of resources become more important.

• Effectively managing waste is important in developed countries. Waste management may swallow up to 50 percent of a cities budget, but only serve a small part of the population. Sometimes, up to 60 percent of waste is not being collected; it is often simply burned by the roadside. It can pollute drinking water, it can spread disease to people living nearby.

• Even with great route optimization, the worker must still physically go to the dustbin to check waste levels. Because of this, trucks often visit containers that do not need emptying, which wastes both time and fuel.

• Waste management prevents harm to human health and the environment by reducing the volume and hazardous character of residential and industrial waste.

• Improving proper waste management will reduce pollution, recycle useful materials and create more green energy.

III. FEATURES OF SMART WASTE MANAGEMENT SYSTEM

The smart, sensor based dustbin will judge the level of waste in it and send the message directly to the third party person who takes contract of waste management.

It can sense all the type of waste material either it is in the form of solid or liquid.

According to the filled level of the dustbin, the vehicles from the municipal corporation will choose the shortest path with the help of the TRANSPORTATION SOFTWARE, which will save their time.

It emphasizes on DIGITAL INDIA.

The system is simple. If there is any problem with any equipment in the future,that part is easily replaceable with new one without any difficulty and delay.

IV. ARCHITECTURE OF WASTE MANAGEMENT USING IOT

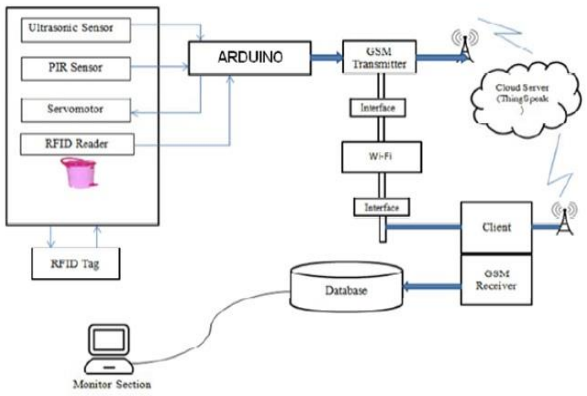

Fig. : architecture of waste management using IOT

V. ADVANTAGES

• Less time and fuel consumption as the trucks go only to the filled containers.

• Decreased noise, traffic flow and air pollution as a result of less trucks on the roads.

• Our smart operating system enable two way communication between the dustbin deployed in the city and service operator. Therefore the focus is only on collection of route based fill level of the containers.

• The sensors installed in the containers provide real time information on the fill level. This information helps determine when and where to prioritise collection.

• In this way both service providers and citizens benefit from an optimized system

which results in major cost savings and less urban pollution.

• Reduces the infrastructure (trucks, containers), operating (fuel) and maintenance costs of the service by upto 30 percent.

• It keeps the surroundings clean and green, free from bad odor of wastes,emphasizes on healthy environment and keep cities more beautiful.

VI. APPLICATIONS

• This can be best used by municipal corporation for their betterment of management regarding collection of wastes.

• With the help of proper technology (GPS and SOFTWARE APPLICATIONS) we can guide the trucks to choose the shortest path.

• It also favours the SMART CITY project and DIGITAL INDIA.

VII.CONCLUSION

We presented an intelligent waste collection system. The system is based on IoT sensing prototype. It is responsible for measuring the waste level in the waste bins and later send this data (through Internet) to a server for storage and processing. The necessity for the web based waste management application is increasing day by day due to the population and less maintenance in the disposal of waste. The novelty of this proposed work is to develop an intelligent alerting system

integrated with RFID and IoT for proper innovation management of garbage. A municipal authority can use this type of system to monitor the waste collection status in real time environment and measure the performance of yardman, thereby reducing the manual process of monitoring and verification.

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