

Smart Waste Management System in Smart Cities Using IOT

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Abstract: To make the smart cities greener, more secure, and more productive, Internet of Things (IOT) can assume an essential part. Change in well-being and personal satisfaction can be accomplished by connecting devices, vehicles and framework all around in a city. Best technological arrangements can be accomplished in smart cities by making distinctive partners to cooperate. Framework integrators, arrange administrators and innovation suppliers have a part to play in working with governments to empower brilliant arrangements. Be that as it may, building such arrangements on open, standards based communication stage that can be utilized is a test.

Keywords: Internet of Things; Garbage; GSM/GPRS.

I. INTRODUCTION

Smart city is only a dream to coordinate a few data and correspondence innovation (ICT) alongside IOT-of-Things (IOT) in a path in order to deal with a city's resources. The city's advantages incorporate, among others, the nearby offices, data frameworks, libraries, schools, healing centers, waste management system, transportation frameworks and so on. The proposed framework is in light of the establishment of geographic data frameworks, and advancement calculations. It comprises of an IOT based model with sensors to gauge the waste volume in compartments or on the other hand waste bins, with office to transmit data over the Internet. In Developing Countries, Solid Waste Management is a test for urban communities' specialists. According to the Municipal Solid Waste Management and Handling Rules of 2000 in India, wasteful accumulation and dumping is the obligation of the Municipal Committees/Corporations. In any case, sadly, the waste administration isn't given careful consideration and the obligations are subsequently performed inadequately by these nearby bodies. This prompts various issues identified with sanitation, health and the environment. The advances set up for accumulation and dumping of waste are to a great degree wasteful and accordingly will be not able understand the grave issue close by i.e. proficient administration of waste. It is in this manner important to synchronize the accumulation and transportation of waste as this will prompt effective and sparing waste administration. With the rising fuel costs, work, vehicle upkeep ,and expanded volume of strong waste, specialists are tested to discover creative answers for lessen general expenses. Specialists need to center particularly around the waste gathering and transport stage, which works out to be the most exorbitant part in a city wasteful administration program.

II. RELATED WORK

The model consolidates variable neighborhood search and dynamic programming with a specific end goal to accomplish ideal solution. Dynamic scheduling and routing display in applies limit sensors and remote correspondence foundation accordingly to know about the bin state. It joins explanatory displaying and discrete-occasion reproduction with a specific end goal to accomplish constant dynamic scheduling and routing.

A. Waste management in USA

UG (Under Ground) LIFT squander compactor space sparing and framework in which condition represents the difficulties to the proprietor. There is just a minor container in the underground. It comprises of two unit's i.e., compartment with a steel outline and compactor. The framework is suited to Dry and Wet and is a productive

arrangement for reusing. This framework can be diagrammed to coordinate the area with standard compactor sizes are 10m³, 16m³ and 20m.

B. Waste management in Australia

A robotized vacuum squander gathering system, likewise called pneumatic deny gathering (or) computerized vacuum accumulation(AVAC), transports the loss at greatest speed through underground pneumatic tubes to the accumulation station and it is compacted and fixed in holders or canisters. Whenever the holder is full, it is transported away and discharged (by utilizing trucks).

III PROPOSED METHODOLOGY

In the proposed frame work, the level of waste in the clean containers is identified with the assistance of RFID sensor. (i.e. if dust bin is full then it will shoe green LED ON) After the indication of the sensor this data will be send by GSM where that dust bin is located at the exact location. Android system will show the exact location where dust bin is filled and where it is situated .After that effective route is sent to the driver and which bin have to be collected gets from the RFID tag. Management will send differnet vehical at different area according to the requirement .GSM is used to alert the driver where dust bin are full or empty by use of this truck driver will collect the waste from bin.

A. System Architecture

Smart Cities is the eventual fate of common residence, since by 2050the huge measure of earth population (i.e., 70 percent) will move to urban areas along these lines shaping immense urban areas. These urban communities will join brilliant framework with a specific end goal to oversee their needs for major and propelled administrations. The utilization of Future Internet with the improvement of IPv6 (i.e., 6LoWPN)as well as sensors and remote sensor systems empower IOT to reform Smart City district action in each part of day by day life.



Fig.1 System Architecture

Each dust bin having a particular RFID which having particular ID. Using which administration manager can analysis the amount of waste in each dust bin is it empty or full sometimes also it shows message fast filling from specific dust bin. The RFID (Radio Frequency Identification) alongside cell sensor innovation is moderated effective administration costs and facilitated smart waste management system. As each dust bin having RFID tag so its security is good. Only administration can access these system that why user name and password is provided to the users. The framework is executed with the assistance of different modules which are clarified in this segment.

1. User

The user opens the application. If he is already registered in that case first of all he will ask for the user name and password which is given to all the user. After the login of password it goes to enlist page which contains the all information. In the registration page the client needs to give required information that he actually needed after that click

on submit button. In the Login page, if the entered information matches with the information in the database then Login is effective. If the username and password doesn't matches the automatically it goes to login page sometimes it shows data doesn't matches.

2. Sensor Indication

When the user do the successfully login in that case he can access data and area of that particular bin Two LEDS are put on dust bin these are red and green. Both are used for different purpose. If the weight in bin crosses particular level at that time red LED lilt up and if the bin is empty means there is no load in the bin in that condition green LED is in ON condition. All the messages are shown on the LCD display.

3. GSM

The GSM module used to show the exact location of that bins means is it empty or full alongside exact location that particular bin i.e., latitude, longitude, weight of that bin that message is send to the administration where actual database contains. After that using GSM module message is send to driver of that truck which gives the exact location of that bin and effective route is also given to him by link.

4. Web Server

Web Server is used to show the exact data that included in the database means all information like latitude and longitude. After that data is send to particular web server.

5. Food Waste Disposal System

Food Waste disposal machine (FWDM) is a machine to reuse with the end goal of re-utilizing waste food to fill in as manure by pounding the food waste in the fundamental compartment and the food waste that has been finished will be dry under the daylight to make compost plants. Just by completing two stages, fill in and take it. At the point when the substance of the bin is filled, at that point the status of the bin will be refreshed in the application which will be noticeable to the client. In the event that the client needs to see the area of the container.

Table 1. Information of all bins on server.

ID	Volume	Latitude	Longitude	Date	Time
1	Volume Filled	1258.2913	07731.213	15/05/2018	7:34:12
2	Volume Empty	1259.3012	07732.413	15/05/2018	10.20.56
3	Volume Empty	1261.4213	07734.163	15/05/2018	12.27.04
4	Volume Filled	1267.2145	07739.423	15/05/2018	20.21.48

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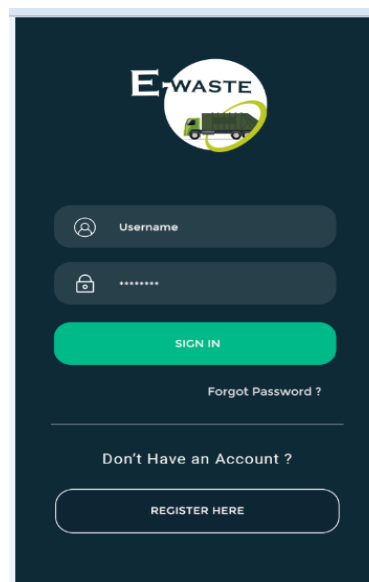


Fig. 2 User Login and Password.

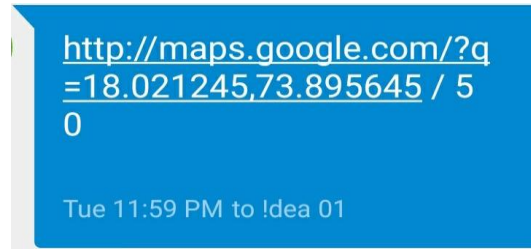


Fig.3 Exact location of Bin.

A web server gives the all the information about the bin in that particular area. Sometimes it gives location and all information about the bin.

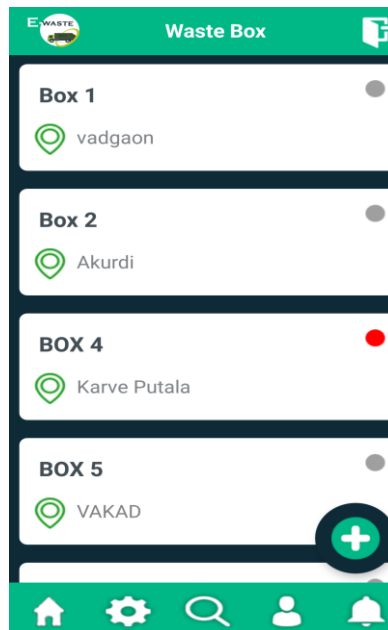


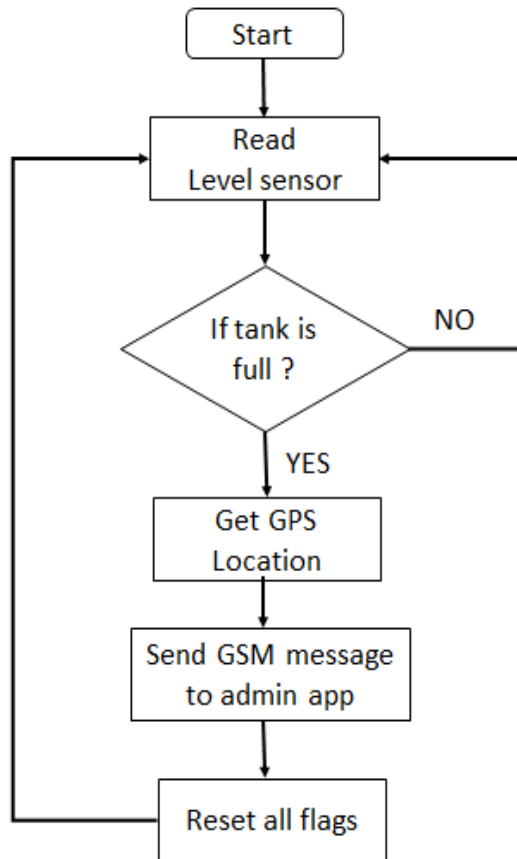
Fig. 4 Waste box dash board.

When the dust bin is full in that case application gets refreshed and gives the information to the clients as well as truck driver or responsible authority.



Fig. 5 Location of Bin using Google map.

B. Flow Chart



IV. CONCLUSION

This will help the waste managers to efficiently route and schedule the movement of collection machinery. The overflowing of waste bins will also be avoided. It is responsible for measuring the waste level in waste bins and alter send this data to server for storage and processing.

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