

Intelligent Bin Management System for Smart City using Mobile Application

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ABSTRACT

In our society, the garbage bins are placed at public places in the cities. It is swarming due to increase in the waste every day; it creates unhealthy condition for the people and creates bad smell around the surroundings. It leads to scattering some diseases and human illness, to avoid such a situation we are planning to design "Intelligent Bin Management System for Smart City using Mobile Application". In this proposed System there are multiple dustbins are placed on the city or the Campus, the details about the dust bins and the area details are stored on the server. The users are responsible to intimate the garbage level and the information about the garbage level can be send to the server. 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.

Keywords: Garbage bins, Intelligent Bin Management System and Smart City.

1. INTRODUCTION

The improper disposal of municipal waste has a serious and dangerous impact on a wide range of areas. Garbage thrown in the street or in open spaces creates a public health hazard, while waste dumped near rivers, lakes and streams contaminates the water supply. Rubbish that is burned in the open rather than disposed of properly creates pollution and releases toxic fumes into the environment. Non biodegradable materials thrown into open drains make their way into the sewerage system, clogging pipelines and damaging infrastructure. The hazards posed by the dumping of untreated hospital and industrial waste are even greater, with the release of pathogens and toxic compounds posing a grave threat not just to human life but also to plants and animals [2].

Garbage dumped in the countryside is not simply an eyesore; entire landscapes are ruined and unique habitats for flora and fauna are lost. All of these problems are common in India, where vast quantities of solid waste remain uncollected in the streets, along major roads, in empty plots of land, downhill slopes and in illegal dumps. The waste collection process is a critical aspect for the service providers. The traditional way of manually monitoring the wastes in waste bins is a complex, cumbersome process and utilizes more human effort, time and cost which is not compatible with the present day technologies [1]. Now with the rise of technology it is high time that we should use technology for waste management systems. As we have seen that technology with analytics has made the world a better place to live by its application in the field of genetics, insurance, marketing, engineering, banking etc in past many years.

So, in this paper we have integrated analytics in order to create optimal changes in the conventional methodology of waste collection with the large amount of data that is being produced by the smart bin networks. The movement of waste across the whole city can be tracked and thus can be monitored by a single system efficiently and concretely. This

system can prove to be a revolution for the whole urban waste management system of upcoming smart cities.

2. RELATED WORKS

Sanket S. Ghate [1] et al describes on technology like Zigbee, GSM etc. that enables the remote monitoring of solid waste bin in real time and which will inform the authorized person when the garbage bin is about to fill. These technologies are good enough to ensure the practical and perfect for solid waste collection and transportation monitoring and management for greener environment. It doesn't have any user interaction site like websites and android application.

Narayan Sharma [2] et al describes the application of our model of "Smart Bin" in Managing the waste collection system of an entire city. The network of sensors enabled smart bins connected through the cellular network generates a large amount of data, which is further analyzed and visualized at real time to gain insights about the status of waste around the city. This paper also aims at encouraging further research in the topic of waste management. It is difficult to implement in large cities.

Pavithra [3] The IR sensor placed inside the trash sense the level of trash and gas sensor will sense the toxic gases. Once the trash is filled, alarm rings. The RFID placed inside the trash will intimate about the overflowing of trash to the corporation office. The RFID placed at the corporation office is serial interfaced with PC. The visual display is coded with VB. The information regarding the removal of trash is sent to the respective area truck driver about the location of the field trash can. The complaint report contains the exact location of the trash can. These "strategy design models" do not work alone.

Parkash, PrabuV [4] et al proposed the system there are multiple dustbins located throughout the city or the Campus, These dustbins are provided with low cost embedded device which helps in tracking the level of the garbage bins and an

unique ID will be provided for every dustbin in the city so that it is easy to identify which garbage bin is full. When the level reaches the threshold limit, the device will transmit the level 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. There is no time stamp in which real-time clock shown to the concern person at what time dust bin is full and at what time the waste is collected from the smart dustbins.

Smart Santander [5] et'al proposes a unique in the world city-scale experimental research facility in support of typical applications and services for a smart city. This unique experimental facility will be sufficiently large, open and flexible to enable horizontal and vertical federation with other experimental facilities and stimulates development of new applications by users of various types including experimental advanced research on IoT technologies and realistic assessment of users' acceptability tests. The project envisions the deployment of 20,000 sensors in Belgrade, Guildford, Lübeck and Santander (12,000), exploiting a large variety of technologies.

Cuff, M. Hansen, and J. Kang [6] Embedded networked sensing, having successfully shifted from the lab to the environment, is Primed for a more contentious move to the city to where citizens will likely be the target of data collection. This transition will Warrant careful study and touch on issues that go far beyond the scientific realm.

Pike research [7] The development of smart cities is now a truly global phenomenon, with considerable activity and notable projects across all regions. Working in partnership with technology and service suppliers, city leaders and central governments are realizing the benefits smart city projects can provide to increase and improve economic opportunity, sustainability, and quality of life.

M. Dohler, I. Vilajosana, X. Vilajosana, and J. LLoza [8] et'al have a clear idea today about the necessity and usefulness of making cities smarter, about the potential market size, about trials and tests. However, it seems that business around Smart Cities has difficulties of taking off and thus runs short of projected potentials. This paper looks into why this is the case and proposes a clear roadmap and action plan on how to make Smart Cities finally happen. To this end, we first review involved stakeholders and the eco-system at large. Thereupon, we propose a viable approach to scale business within said eco system. We also describe the available ICT technologies and finally exemplify all findings by means of a sustainable smart city application. Over the course of the paper, we draw two major observations which are seen to facilitate a sustainable smart city development. First, independent smart city departments (or equivalent) need to emerge, much like today's well accepted IT departments, which clearly decouple the political element of the improved city servicing from the underlying technologies. And second, a coherent 3 phase smart city rollout is vital, where inphase-1 utility and revenues are generated; in phase-2 also only utility

service supported; and in phase-3 in addition a fun/leisure dimension permitted.

Vilajosana, J. Llosa, B. Martinez, M. Domingo-Prieto, A. Angles, and X. Vilajosana [9] et'al proposes a procedure to make smart cities happen based on big data exploitation through the API stores concept. To this end, we first review involved stakeholders and the ecosystem at large. We then propose a viable approach to scale business within that ecosystem. We also describe the available ICT technologies and finally exemplify all findings by means of a sustainable smart city application. Over the course of the article, we draw two major observations, which are seen to facilitate sustainable smart city development.

3. EXISTING SYSTEM

The efficiency of collecting the garbage is poor in Indian cities compared to other countries. Thus, Indian Government is struggling to manage the garbage. Issues with respect to the disposal has become challenging with growth in population. Poor garbage collection and improper transportation facility are answerable for the earnings of garbage at all spot and points of the city. Due to these unavailable facilities, municipal garbage management is getting critical. Improper garbage management further leads to incurable diseases to living organisms. The waste collection process in India can be possible in two ways. The first one is manual solution; here the garbage collectors are involved in the process of collecting the garbage from the bins and also on the road sides. If the bin's are not filled or that are partially filled, it will leads to time and fuel waste. The second method is hardware based solution, here the sensors are placed inside the bin, it sense the garbage level in the bin whether it reached the threshold value or not. If it reached the threshold value the hardware system directly sends the alert message to the supplier and the supplier transmits this message into the garbage collector. After receiving the message the garbage collector went to the place and collects the garbage from the bins.



Fig. a) Manual Solution



Fig. b) Manual Solution

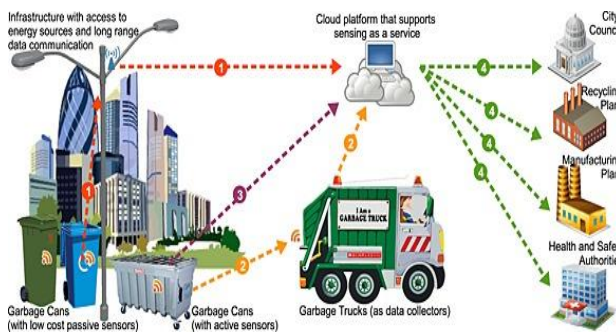


Fig. c) Hardware based collection

It contains the following drawbacks:

- a) The site will look ugly while it is being used for landfill [3]
- b) Dangerous gases are given off from landfill sites that cause local air pollution and contribute to global warming [1]
- c) Local streams could become polluted with toxins seeping through the ground from the landfill site[2]
- d) Once the site has been filled it might not be able to be used for redevelopment as it might be too polluted [2].

4. PROPOSED SYSTEM

In our project, an individual user sends the details about the bin to the server through the android application when the bin is filled. After receiving the message a server sent this information to authorized users. A filled bin can get cleaned when an authorized user receives the notification from server.

Architecture:



Fig. d) Proposed System

Algorithm explanation

This algorithm explains the connectivity between Http server client and app server. This connection takes place in step by step process

- Step-1. User has to enter his or her username and password
- Step-2. Once the details are entered user has to hit the login button
- Step-3. The user details will be checked from the server side
- Step-4. Once the detail calls true, the intent will pass from one activity to another

Modules of proposed system

Client Module:

It defines the interaction between the user and the server by means of providing the authentication properties.

Server Module:

Authority module is the server module, which receives the messages from the user and transmits it into the garbage collector with optimal path information.

Database connectivity module:

The capacity of this module is to maintain the details about the actors and process involved in the garbage collection.

Actor of Proposed System

User:

User is an important actor, they sends the information about the bin status to the server on reaching the appropriate level. Before transmitting the information, an user must register with the system.

Authority:

Authorities are the person who involved in the monitoring process of the garbage collection in the particular area. They also must register themselves with the system.

Garbage collector:

Garbage collectors are the person involved the field work. They are responsible for collecting the garbage from the bin's and also on the road sides.

5. CONCLUSION

Development is at its rapid growth stage around the world, as more number of people desire to live in the city lights with more opportunities for growth and success. Cities are expanding like never before to accommodate this growth and in this process the concept of smart cities came into action. Our proposed system creates the responsibility between the people to aware of the pollution and makes the cleanness by means of them. It also intends to improve the environmental quality and also creates the user friendly environment.

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