

A Survey on Garbage Collection and Monitoring System for Smart cities using IOT

Neha shinde¹, Sayli Bhambre², Shraddha Thakur³, Varsha Devkule⁴

^{1,2,3,4}Dept of Computer Engineering, Terna Engineering College, Nerul, Navi Mumbai

Abstract—A big challenge in the urban cities is that of waste management as there is a rapid growth in the rate of urbanization and thus there is a need of sustainable urban development plans. As the concept of smart cities is very much trending these days and the smart cities cannot be complete without smart waste management system. There needs to be system that gives prior information of the filling of the bin that alerts the municipality so that they can clean the bin on time and safeguard the environment. To avoid all such situations we intend to propose a solution for this problem "Smart Garbage Bin", which will alarm and inform the authorized person when the garbage bin is about to fill. Then message will be send to the authorized person to collect the garbage from the particular area. The authorized person will sends the message from his web application to the garbage collectors by sending a SMS .This system maintain a dry waste and a wet waste separately. This will help to reduce the overflow of the garbage bin and thus keeping the environment clean.

Keywords— Smart Garbage bins, IOT, Waste management, sensors.

1. INTRODUCTION

Internet of Things is nothing but the applications performing with the help of internet access..IoT Communication over the internet has grown from user - user interaction to device - device interactions these days. The IoT concepts were proposed years back but still it's in the initial stage of commercial deployment. Home automation industry and transportation industries are seeing rapid growth with IoT. The basic project idea is to design a smart waste detection system which would automatically notify the officials about the current status of various garbage bins in the city, would have real-time monitoring capabilities, which would be remotely controlled using IoT techniques.

This paper introduces you to the use of IoT on one such area, that is, Garbage Detection in smart ways using IoT and see how this can also be a major part of developing a city into a smart city.

2. EXISTING SYSTEM

In the existing system garbage is collected by corporation by weekly once or by 2 days once. Though

the garbage shrinks and overflows the garbage bin and spread over the roads and pollutes the environment. The smell will be heavy and produces air pollution and spreads disease. The street dogs and animals eat the waste food and spreads over the area and creates dirty environment to avoid such situation we are planning to design IOT Based Garbage Management For Smart Cities.

Disadvantages of existing system

- Time consuming and less effective: trucks go and empty containers whether they are full or not.
- High costs.
- Unhygienic Environment and look of the city.
- Bad smell spreads and may cause illness to human beings.
- More traffic and Noise.

3 PROPOSED SYSTEM

In this proposed system there are multiple dustbins located through 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 a unique ID will be provided for every dustbin in the city so that it is easy to identify which garbage bin is fill. 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.



Fig:-Today bin condition in the city

Advantages:

- Real time information on the fill level of the dustbin.
- Deployment of dustbin based on the actual needs.
- Cost Reduction and resource optimization.
- Improves Environment quality -Fewer smells - Cleaner cities
- Intelligent management of the services in the city.
- Effective usage of dustbins.

4. LITERATURE SURVEY

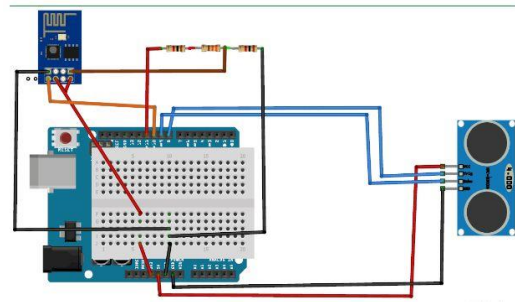
The idea of smart garbage bins and systems have been in discussion for quite a long time. The technologies used at disposal to develop this smart system have also evolved, Internet of Things (IoT). Each idea seems to be similar but is slightly different at its core and our proposed work is no exception from the same. After the IoT field, finding its hold in our lives, this is our original plan for designing a smart garbage collection system which has provision for citizen participation and analysis of data for better decision making. At hardware level, the smart system is a garbage bin with ultrasonic sensor, a micro-controller and Wi-Fi module for transmission of data.

The worldwide implementation of Internet of Things is possible with a Cloud centric vision. This work exploits the future possibilities, key technologies and application that are likely to drive IoT research. But a strong foundation to our work is provided, where the basics and applications of Arduino board is explained . It is quite interesting as it implements a GAYT (Get As You Throw) system concept as a way to encourage recycling among citizens. As we would discuss further, the citizen participation part of our system is quite influenced by their work.

5. PROPOSED WORK

The main objective of our project involves applying IoT technology (electronics and applications) to the current urban waste management scenario and enables a two way communication between the infrastructures deployed in the city and the operators/administrators. A centralized system for real-time monitoring is our goal to achieve. In this way both the municipal and citizens benefit from an optimized system which results in major cost savings and less urban pollution.

Block Diagram



6. PROPOSED APPLICATIONS

1. Waste Level detection inside the garbage bins. Transmission of the information wirelessly to concerned officials .
2. System can be accessed anytime and from anywhere
3. Real-time data transmission and access
4. Avoids the overflows of garbage bins.
5. This project can only be used by municipal authorities or other private firms to tackle the current problem of urban waste collection.
6. Improves Environment quality-Fewer smells-Cleaner cities
7. This system has no individual use, but can be used by a city, state or a country.
8. Using this system, waste collection would become efficient and also reduction in transportation costs can be witnessed.



Fig:- Proposed Architecture.

7. COMPONENTS AND COMPATIBILITY

For small scale simulation purposes we need the following components –

Wi-Fi Module:

802.11b/g/n protocol, Wi-Fi Direct (P2P), soft-AP, Integrated TCP/IP protocol stack. Wi-Fi Module helps us to send the details of the dustbin at the receiver side.

Arduino Atmega328

Arduino is an open-source prototyping platform based on easy-to-use hardware and software.

Arduino boards are able to read inputs - light on a sensor, anger on a button, or a Twitter message and turn it into an output - activating a motor, turning on an LED, publishing something online.

Resistors

AVR family microcontroller

Embedded C language

Arduino software

Ultrasonic sensors

8. CONCLUSION

This project work is the implementation of smart garbage management system using IR sensor, microcontroller and Wi-Fi module. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned contractor. Therefore, the smart garbage management system makes the garbage collection more efficient. Such systems are vulnerable to plundering of components in the system in different ways which needs to be worked on.

9. FUTURE ENHANCEMENT

Smart dustbin helps us to reduce the pollution. Many times garbage dustbin is overflow and many animals like dog or rat enters inside or near the dustbin. This creates a bad scene. Also some birds are also trying to take out garbage from dustbin. This project can avoid such situations. And the message can be sent directly to the cleaning vehicle instead of the contractor's office

10. REFERENCES

[1] Ikuo Ihara; Nagaoka University of Technology; Ultrasonic Sensing: Fundamentals and Its Applications to Non-destructive Evaluation.

[2] Arduino, "Available at <http://www.arduino.cc>," 2010.

[3] M. Batty, "Smart Cities, Big Data," Environment and Planning B: Planning and Design 2012, vol. 39, pp. 191–93.

[4] Xu Li, Student Member, IEEE, Performance Evaluation of Vehicle-Based Mobile Sensor Networks for Traffic Monitoring.

[5] Yusuf Abdullahi Badamasi, The Working Principle Of An Arduino, Electronics, Computer and Computation (ICECCO), 2014 11th International Conference on 29 Sept.-1 Oct. 2014.

[6] Pedro Reis , Rui Pitarma, Celistino Goncalves, Intelligent System for Valorizing Solid Urban Waste, Filipe Caetano Faculty of Engineering UBI University of Beira Interior Covilha, Portugal, 2015.

[7] Adnan Aijaz, Member, IEEE; Cognitive Machine-to-Machine Communications for Internet-of-Things: A Protocol Stack Perspective

[8] IEEE; INTERNET OF THINGS JOURNAL.

[9] Dr. K.G. Srinivasa Head of the Department; Department of Computer Science; M S Ramaiah Institute of Technology

[10] Ni-Bin Chang, Smart and Green Urban Solid Waste Collection Systems: Advances, Challenges, and Perspectives.