Smart Waste Management System For Metropolitan Cities

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.

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

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 theyare 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 an 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.

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

LITERATURE SURVEY:

Due to economic developments, the globally developed wastes are increasing. It is essential that the reliable national data survey on waste composition and generation will provides effective management of waste in Ghana. In this the wastes are separated in various aspects and the results shows that rate of waste generation was 0.47% kg/person/day, which translates into about 12,710 tons of waste per day per the current population. This type of sorting and separation efficiency was 84% for biodegradable wastes and 76% for non-biodegradable wastes**. KodwaMiezah, KwasiObiriDhanso (2015)**
Waste disposal plays major role in day-to-day people's life. In urban and rural areas, every people is facing problem with segregation of waste. Growing population has become one of the main causes for increasing the rate of landfill waste. Municipalities are facing serious problem to manage these dumped wastes. This will result in energy better environment performance, minimize raw materials

wastage and will reduce the manufacturing costs. The PLC has an advantage of automation and it has low error rate. This controller has productivity, flexibility and efficiency. This system is basically useful for small scale industries. PLC is an industrial digital controller. It is used to control manufacturing process. This PLC is used in assembly lines robotic devices and in fault diagnosis. PLC is used in big plans in automobile industries. Here, they have used DELTA PLC. It have eight digital inputs and output pins,32-bit CPU, program capacity of 16k steps, data register of 10k words, execution speed of 0.35micro seconds.

Insung Hong, Sunghoi Park (2014)

Owing to the paradigm, the poor Waste Management has become one such issue and it leads to serious environmental problems and cost issues. In this paper, an IoT- based smart Garbage system (SGS) is proposed for proper disposal of wastes. In an SGS, battery-based smart garbage bins (SGBs) exchange information with each other using wireless mesh networks, and a router and server collect and analyze the information for service provisioning. Further it includes various IoT techniques considering user convenience and increases the battery lifetime through two types of operations. It has been found that this method had achieved the energy efficiency for the separation of wastes at the rate of 16%. The system along with the adaptive user-oriented charge policy resulted in the reduction of waste at the rate of 33%, and was expected to improve the efficiency of waste management.

Bhide, A. D and Shekdar A. V (1998)

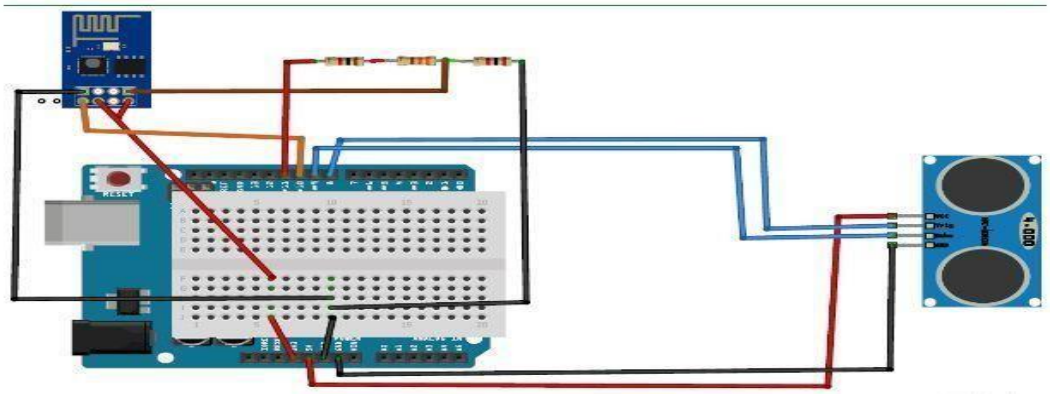
The efficient system to clean the indoor building is implemented by Jamil Abedalrahim Jamil Alsayaydeh. They used Arduino, fan, buzzer, led, ultrasonic sensor and Wi-Fi-module. This project will detect the people coming near to the dustbin and throwing the waste into it. It will be detected by the ultrasonic sensor. The level of waste can be viewed in the Blynk app. If the level reaches the maximum point, it will send the notification. They have used GSM and GPS for tracking location and for sending the notification. They have used buzzer for the security purpose. **Buenrostro. O and Bocco (2003)**

An intelligent alerting integrated system is created by using Web based IoT. In this system, they have used IR sensor, Arduino UNO and Bluetooth module. If the dustbin is full, the location will be send to the municipal from the android phone and the bins will be cleaned the yardman. The status of the dustbin is viewed automatically in mobile app by transferring the data with the help of Bluetooth module in local cloud. Every dustbin has its own Id and database. Database show the list of bins with their Id and exact location. The information will be collected firstly by the sensor and it will be send to the microcontroller and then the information will be viewed in the mobile app. The information will also be forwarded to the database and it can be monitored regularly by the authorized **admin. Claudine Capel, (2008)**

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.

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.