WASTE MANAGEMENT SYSTEM USING AWS

Shrutika M. Deore[1], Priyanka S. Kukade[2], Karishma L. Yadav[3], Joel John[4]

Shrutika M. Deore[1], Department Of Computer Engineering, Late G. N. Sapkal College Of Engineering Nasik, Maharashtra, India
Priyanka S. Kukade[2], Department Of Computer Engineering, Late G. N. Sapkal College Of Engineering Nasik, Maharashtra, India
Karishma L. Yadav[3], Department Of Computer Engineering, Late G. N. Sapkal College Of Engineering Nasik, Maharashtra, India
Joel John[4], Department Of Computer Engineering, Late G. N. Sapkal College Of Engineering Nasik, Maharashtra, India

ABSTRACT

In the recent years, Urbanization has increased hugely. At the same time there is an increase in waste production very much. Waste management has been a very necessary issue to be considered. Raising of insects and mosquitoes can create problems around promoting impure environment. This may even cause terrible diseases. In this project of smart waste bin, we presented the smart waste-bin that can manage the waste in a smart city project. Each n every trash can contain a smart device for level detection of the trash can which transmits the garbage/trash level with its token ID, accessed by the concerned municipal/regional authorities through the smart phone application, so that they can take immediate actions to clean the trash once it gets filled with waste. The system consists of Ultrasonic Level sensors to measure the level of waste inside the bin. The Ultrasonic sensor is placed at the top of the dustbin which can be used to measure the ability of the dustbin. Once these smart bins are implemented on a large scale, by replacing our traditional bins present today, waste can be managed efficiently as it avoids unnecessary lumping of wastes on roadside. The system also accommodate with network environment, to manage all related information from waste management.

Keyword: - *clean and green environment, sustainable living; smart bin, GSM/GPRS, Internet of Things, wireless network, Arduino Mega, smart city, cloud,*

1. INTRODUCTION

The main idea behind the system is for smart waste bin for having the control and maintaining sanitation. This system has been tested in a real situation. This system naturally minimized the average cost of maintaining

a clean and safe environment in bins by raise the waste bin pick-up schedule and also prevents dangers like _re and germs spread. More importantly, this system uses the existing communication framework. Being wireless the system is easy to deploy and maintain. It may be noted that this system is especially relevant for developing countries, as it presents a profitable, quick and effective implementation. It also fits in nicely with the plans of many governments to not only implement smart cities but also enhanced importance of developing of mobile application which are being included in many countries. The sensors will detect the level of bin and produce result of collect the bin quickly.

RELATED WORK

In paper [1], for the intelligent garbage collection, a smart alert system has been propose wherein a alert signal, generated through an Ultrasonic sensor (interfaced with Arduino UNO), is provided to municipal web server. On

receipt of such alert, the driver visits the particular location and performs the task of emptying the dustbin. In this process RFID is being used for auto-detection of status of dustbin i.e. empty or filled. Once the task of emptying is done, signals are sent back to server about the accomplishment of the task. An integrated module with RFID and IOT has been designed and proposed in this work.

In paper [2], the mechanism to priorities the collection based on the location e.g. schools or hospitals have been integrated together and, in that way, a dynamic waste management system has been proposed. Further, the similar priorities have been identified for the dangerous waste (i.e. causing the quick health impact to people living areas). The mentioned goal is achieved by means of novel algorithms which optimizes the priority and related cost. In current method data is evaluated with real time and synthetic data is retrieved by municipality of Saint Petersburg, Russia and for this they have designed and developed models like dedicated trucks model, detour model, minimum distance model, and reassignment model.

In paper [3] , the goal defined here is to reduce the power consumption and increase the operational time by designing a system which collects the data and deliver the data through wireless mesh network. The architecture considered for this expands over three tier namely, outdoor nodes (to sense the fullness of bin through sensor node), analytics (to analyses the data, process them, tag the metadata and then interface with the external system) and workstation (which works as the graphical interface for user). This system operates with the data delivery ratio of 99.25% and can be effectively used for litter bin daily seasonality information.

In paper [4], the present system is configured as 'pre-separated waste' for differentiating the database of waste collected obtained from the sensor with respect to its category i.e. organic, plastic, paper, bottle, metal etc. This enables to have an efficient waste management system and has been adopted in Korea. In the description of such a system, a generic work flow has been provided, wherein, on receipt of alert message, collection is to be arranged and once the task is done the status in the system is updated accordingly. While the types of smart bins and cloud

We proposed cloud integrated wireless garbage management system framework whose implementation includes following elements:

Wireless Sensing Node:

This unit is located in each smart bin in the city. It comprises sensors that collect ambient data from the bins, a microcontroller that samples the sensed data, a wireless module that transmits the data to the central station.

Cloud based server:

This is a connected Web entity that receives, Stores, displays and analyses the information provided by the various wireless sensing nodes in real time. It also notifies the workers for suitable action.

Software Android App:

This is an application software system. The workers install it on their smart phones for mobile live monitoring of bins and hence take suitable action.

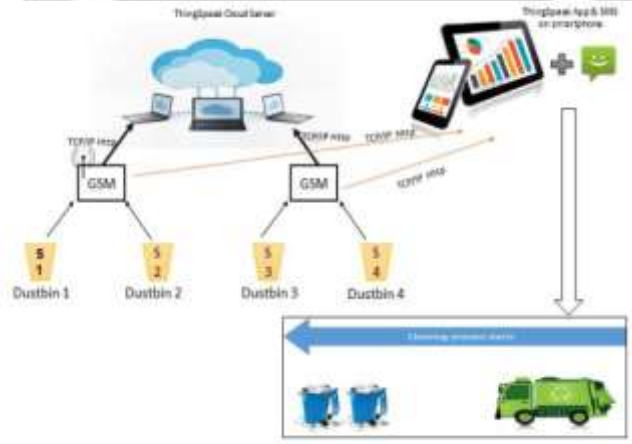

Figure 1: Architecture diagram

We are using different hardware and software resources for developing this application and stable readings in an easy-to use package from 2 cm to 400 cm or 1 to 13 feet. The operation is not affected by sunlight or black material, although acoustically, soft materials like cloth can be difficult to detect. It comes complete with ultrasonic transmitter and receiver module.

Figure 2: Ultrasonic Sensor

1.1Arduino:

It's a single-board microcontroller, designed to make the application of interactive objects or environments more accessible. Sense the environment by receiving input from variety of sensors can be programmed with the Arduino software IDE. The Atmega328 on the Arduino Uno comes pre burned with a boot loader that allows us to upload new code to it, without the use of an external hardware programmer.

Figure 3: Arduino

2. PROPOSED ALGORITHM

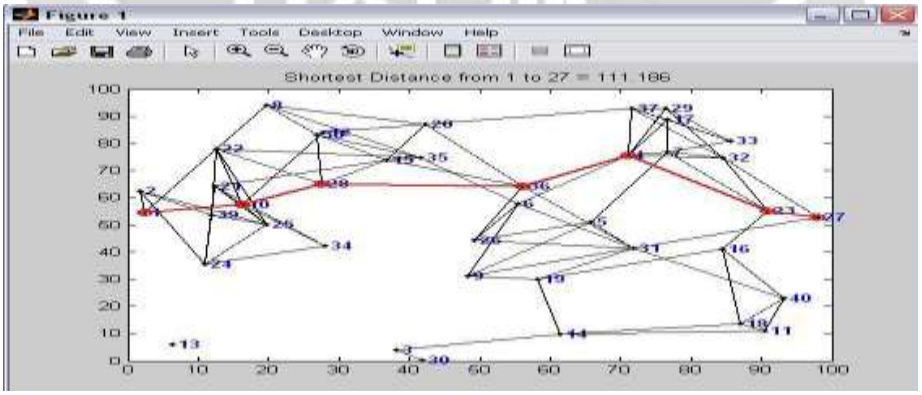

Figure 4:Dijstra's Algorithm

Below is a pseudo-code for solving shortest path problems. We used Dijkstra's Algorithm. Examing each line carefully. Understanding what is done in each step is very important

1.Let v1 be the origin vertex,and initialize W and ShortDist[u] as

2.W := {v1} ShortDist[v1] :=0 FOR each u in V - {v1} ShortDist[u] := T[v1,u]

3.Now repeatedly enlarge W until W includes all verticies in V

WHILE W <> V

4.Find the vertex w in V - W at the minimum distance from v1

5.MinDist := INFINITE FOR each v in V - W

IF ShortDist[v] < MinDist

6.MinDist = ShortDist[v]

w := v

END {if}

END {for}

7.W := W U {w} Add w to W

Update the shortest distance to vertices in V - W

8.FOR each u in V - W

ShortDist[u] := Min(ShorDist[u],ShortDist[w] + T[w,u])

END {while}

Remember this is one type of algorithm to solve shortest path problems. There are also other algorithms to solve these problems

3. SIMULATION RESULTS

We proposed cloud integrated wireless garbage management system framework whose implementation includes following elements:
Wireless Sensing Node: This unit is located in each smart bin in the city. It comprises sensors that collect ambient data from the bins, a microcontroller that samples the sensed data, a wireless module that transmits the data to the central station.
Cloud based server: This is a connected Web entity that receives, stores, displays and analyses the information provided by the various wireless sensing nodes in real time. It also notifies the workers for suitable action.
Software Android App: This is an application software system. The workers install it on their smart phones for mobile live monitoring of bins and hence take suitable action.

CONCLUSION AND FUTURE WORK

We have been implemented the real time waste monitoring garbage system with the smart bin to check the levels of garbage in dustbin whether the dustbins are full or not. In this system the information of dustbin can be accessed by the user/authorities from anywhere by using android app. When garbage levels reached the condition details of bin will be sent to the authorities via email and this system will reduce the monitoring system of cleaner to check the garbage levels as result this will reduce the solid waste. Our model designed with low cost, high accuracy sensors, cloud database to get the data with high accuracy and we used Arduino hear to give the constant internet connection to the system to update the data in cloud database and android app will give the details of bin from cloud database. And further we implement this model to connect all the dustbin together by using own

cloud database and web portal will give the information all full dustbins as result it will be easy to monitor the system.

Our model designed with low cost, high accuracy sensors, cloud database to get the data with high accuracy and we used Aurdino hear to give the constant internet connection to the system to update the data in cloud database and android app will give the details of bin from cloud database. And furtherwe implement this model to connect all the dustbin together by using own cloud database and web portal will give the information all full dustbins as result it will be easy to monitor the system.

REFERENCES

[1] InsungHong,SunghoiPark,BeomseokLee,JaekeunLee,DaebeomJeong, andSehyunPark, IoT-Based Smart Garbage System for E_cient Food Waste Management –Scientific World Journal-Aug 2014.

[2] Ala Al-Fuqaha, Mohsen Guizani, Mehdi Mohammadi, Mohammed Aledhari, Moussa Ayyash, Internet of Things: A Survey on Enabling Technologies, Protocols and Applications -IEEE-2015.

[3] TheodorosAnagnostopoulos ,ArkadyZaslavsky ,Alexey Medvedev , IRobust Waste Collection exploiting Cost E_ciency of loT potentiality in Smart Cities –EEEApril 2015.

[4] Vikrant Bhor1, Pankaj Morajkar2, Maheshwar Gurav3, Dishant Pandya4, Amol Deshpande, Smart Garbage Management System -March 2015.

[5] Dario Bonion, Maria Teresa Delgado Alizo, Alexandre Alapetite, Thomas Gilbert, MathaisAxling,HelenUdsen, Jose Angel Carvajalsoto, Maurizio Spirito, ALMANAC: Internet Of Things for Smart Cities IEEE-2015.

[6] FachminFolianto, Yong Sheng Low,Wai Leong Yeow, Smart bin: Smart Waste Management System -IEEEApril 2015.

[7] KristnaRybov, Jan Slavk, Smart cities and ageing population Implications for waste management in the Czech Republic -IEEE 2016.

[8] Jose M. Gutierreza, Michael Jensenb, Morten Heniusa and Tahir Riazc, Smart Waste Collection System Based on Location Intelligence -2015.