Garbage Management using Internet of Things

D. Chaitra[1*], ChetanaSrinivas[2]

[1,2] Dept. of Computer Science and Technology, East West Institute of Technology Institute, Bangalore, India

Abstract—The garbage bins placed at public or in a campus places are overflowing and it creates unhygienic conditions and also ugliness to that place. At the same time bad smell is spread with diseases. To avoid all such situations a project called Garbage collection bin overflow indicator using IOT (Internet of Things) technology can be implemented. Resultantly, smart cities with smart waste management systems can be implemented. One of the applications of IoT is the effectivein management of garbage for healthy environment for life on this green planet with greater efficiency. The purpose is to develop an IoT based costeffective system that can monitor the everyday garbage in real time by using smart technology with the help of android and web applicationand Ultrasonic sensors.

Keywords—**IoT(Internet of Things); garbage monitoring; Ultrasonic sensor, Android and web application.**

I. INTRODUCTION

Currently a fast development of Smart Cities are observed where the world are on the run to become smarter. When considered a Garbage management is becoming a global problem due to the lack of care and attention by the authorities the garbage bins are mostly seem to be overflowing. IOT based Garbage Monitoring system is a system which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page or by android application and ultrasonic sensors placed over the bins to detect the garbage level to compare with the garbage bins depth. The system makes use of Arduino family microcontroller, LCD screen, Wi-Fi modem for sending data and a buzzer. The system is powered by a 12V transformer. The LCD screen is used to display the status of the level of garbage collection. . Whereaweb page is developed to show the status to the user to monitor it. The web page gives a graphical view of the garbage bins in a colored form the garbage collection. The system puts on thesensors when the level of garbage collected crosses the set limit. Thus this system helps to keep the city clean by informing about the garbage levels of the bins to authority.

II. RELATED WORK

The technologies used to develop a smart system through Internet of Things (IoT). This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via web page or by android application with the help of thi a notification or message can also be sent to garbage collecting vehicles.. [1]. Ultrasonic or infrared sensor can be used for implementation of checking the flow of garbage intake.[2] "Smart garbage collection bin overflow indicator using IOT" in this System, when the sensor reaches the threshold a notification will be sent to the municipality or garbage collector so then that person can send vehicle to collect. The garbage dustbin placed across the cities can we kept as two category as wet and dry dustbins which will easy to collect and as well as it helps people to follow some rules and to be in the formal form of government.

III. EXISTING SYSTEM

In the existing system garbage is collected by municipality by weekly once or by 2 days once by this the garbage overflows the garbage bin and spread over the roads and pollutes the environment and mainly this happens because when the garbage is not collected the waste are just dumped on the road side irrespective of rule and it also creates air pollution and spreads disease. By this system its not only effecting the humans but also the street dogs and animals eat the waste food and spread over the area and creates dirty environment.

Disadvantages of existing system

- Time consuming and less effective: trucks go and empty there containers and return.
- Unhygienic Environment.
- Bad smell spreads and may cause illness to human beings and also other animals.
- More traffic is created.

IV. METHODOLOGY

There can be multiple dustbins located through the city or the campus, these dustbins are provided with low cost device

that is sensor which helps to detect the level of the garbage dustbins. These dustbins are given an unique ID regarding with respect to the area or the pace so that its easy to identify and help to locate and collect the trash out of it as shown in Fig1.
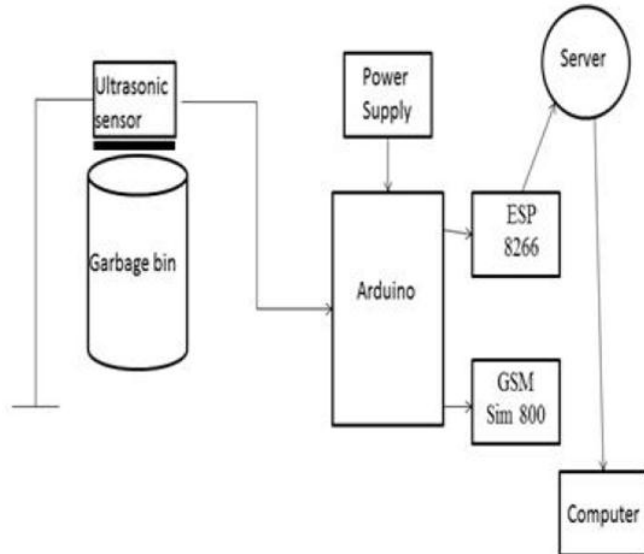

Fig1.System Overview

The components of the Fig 1 are discuss below :

A. IR Sensor
An infrared sensor is is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. In this system four IR sensor are used so that we can detect four different levels of waste and this four levels are discussed below .

B. Buzzer
A buzzer is also called as beeper which is an audio signaling device this buzzer functions as include alarm devices, timers. Whenlevel of waste is going to reach at 70 percent it will notify by a message or by a blinking light or it can be in a form of a buzzer.

D. GSM Modem
GSM/GPRS is a Global System which is used to track the dustbins which are filled with the garbage and with this tracking the can collect the garbage on time so that it can be emptied and they can be ready to accept the new garbage intakes.

E.Arduino Board
Arduino is a software which isa open sourceboard which are enabled to read inputs and pops up message and helps to stay with the system in accordingly.

F. ESP 8266-01:

The ESP 8266 is a low power highly integrated microchip.
Advantages
- Smart dustbin are implemented based on the actual needs.
- Cost Reduction are observed and resource optimization are gained .
- Improves Environment quality with Cleaning the city and disease free cities.
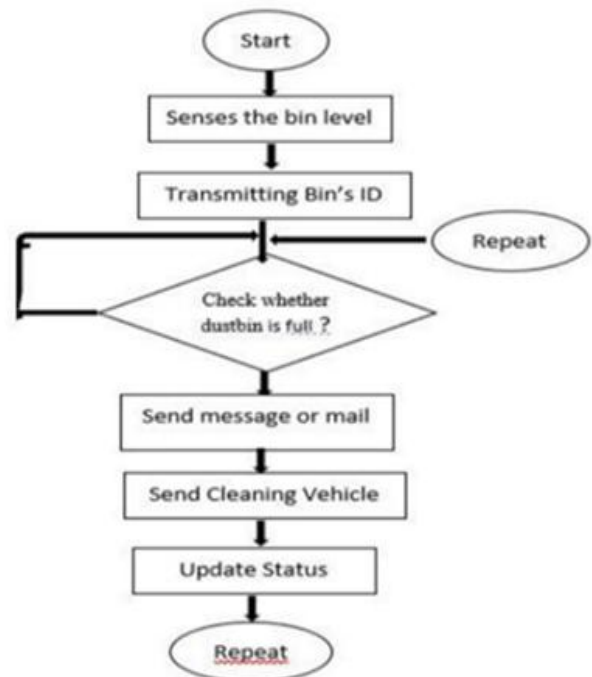- Effective usage of dustbins are seen .

Fig 2 .Flow Chart

Fig2 Represents Flow Chart of monitors the garbage bin. The system uses ultrasonic sensor placed over the bins to detect the garbage level and compare it with the garbage depth. If garbage level is 70% or less than 70% then it's ok. But if garbage level is above 70% their Arduino gives information above bin level to server ESP8266 01 module. A Server is used to store data and shows of all dustbins level on the web page. GSM used to send the text message to the mobile. A message contains information about garbage level ofa particular bin and intimate the regarding people.

V. RESULTS AND DISCUSSION

The proposed solution is cost efficient in terms of other solutions are compared in Fig3 and Fig4. The simulation results have been monitored at smartphone showing sensor values and the status of dustbin either full or empty. Smartphone results are shown in Fig 3.
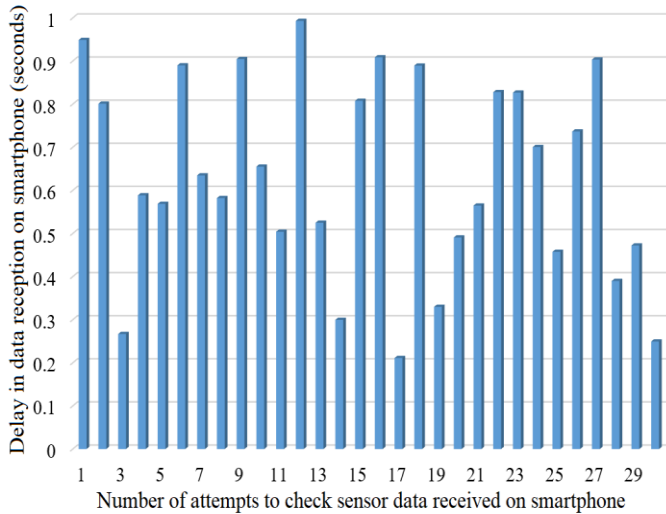
Fig 3 Delay in sensor data received with sensor refresh rate of one second

Further, it has been observed that sensor data obtained in real time had a delay of less than one second as shown in Fig.3. Delay could be reduced to even microseconds by increasing refresh rate of ultrasonic sensors. Reason behind this delay of one second is the sensor refresh rate that was set as one second. The stop watch has been used to compute these results. The results have been validated by compared sensor values with onsite real monitoring of dustbins with varying garbage. Sensor values are accurate in comparison with onsite status of dustbin as shown in Fig. 4. Distance error is less than one centimeter.
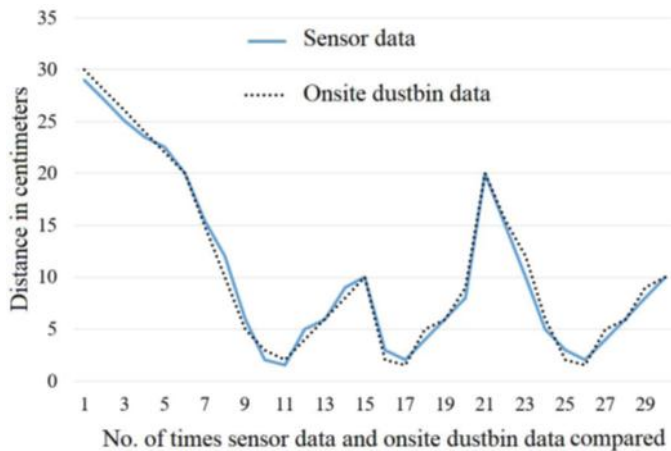

Fig4.Comparison of distance values obtained from sensors and on site real values of distance measured manually.

The results have been validated by compared sensor values with onsite real monitoring of dustbins with varying garbage. Sensor values are accurate in comparison with onsite status of dustbin.Distance error is less than one centimeter.

VI. CONCLUSION AND FUTURE WORK

The system of collecting the details of smart garbage management methods helps to find out effective methods which are useful for providing hygiene environment in cities. As the level of garbage in the bins crossed the limit , it will be informed to the authority, if it is found ignored then it will be forwarded to the higher authority to take actions. Thus a hygiene and clean environment can beexcepted and provided. By implementing this smart garbage management methods that can be implemented to make city clean.

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Authors Profile

Ms. D.chaitra pursed bachelor of engineering in information science from EWIT, Bangalore , VTU and pursuing herM.Tech degree in computer science at East West Institute of Technology Bangalore, VTU, India, Her area of interest includes IoT, Cloud computing, Networking.

Mrs. ChetanaSrinivas received the M.Tech degree in Computer Science , Bangalore, India, She is currently working as Associate Professor in the Department of CSE EWIT, and pursuing PhD in vtu, Bangalore, India. Her area of interest includes Image processing, Big data and cloud computing.