

# IoT BASED SMART WASTE MANAGEMENT SYSTEM:IN CITY

Miss: Sana Bagban<sup>1</sup>,Mr: Hemant Tirmare<sup>2</sup>

<sup>1</sup>PG student from Department Of Technology

(Department Of Computer Science and Technology, Shivaji University, Kolhapur, India)

<sup>2</sup>Asst.prof, Department of technology

(Department of Computer Science and Technology, Shivaji University, Kolhapur, India)

## ABSTRACT

In today's world we see that the internet access had reach to a certain level and with the help of internet there is an inventory of smart devices had been found. So, with the help of such devices we are going to take a smart step toward the country. In our paper we are going to discuss about the waste management system. As we see that in our surrounding and in the public places the waste is not collected and not even dumps properly where the dust bins are overflowing due to more amount of waste storage which leads to many diseases, illness to humans. Hence to avoid such a situation we are planning to design "IoT Based Waste Management for Smart Cities". Internet of Things (IoTs) consists of collection of data and analysis which can be used in many other domains and use to operate more efficiently. Devices such as RFIDs, sensor and actuators are embedded and collect the information. In this paper it is not only used to collect the waste but also use to disposal it to a proper location with the help of waste collecting vehicle. One of the most challenging issue-Municipal wastes Collection within Smart City.

**Keywords-Collecting Vehicle, Smart bins, Ultrasonic Sensor, Waste Management**

## 1.INTRODUCTION

Increase in population growth there is no any maintainance observes in city government there is lack of action to be performed against such programs such as waste management which become a major problem. This respective problem should be take care by corresponding authorities and they should take action to overcome it. This gives some related solutions. Internet has become an essential tool in every aspect.

Communication over the internet has become very popular now days. The IoT concepts were proposed for the development for smart cities.IoT can be used to provide way for smart waste management. The methods are implemented using sensors and microcontroller. With the help of GUI the information to the authorized user been monitories. The Internet technologies enhanced by the use of the Internet Protocol (IP) wireless sensors enable the Internet of Things (IoT) paradigm. When WSNs are applied in a city, they are responsible for

collecting and process information. The waste management include following part of waste schemes such as (i) waste collection (collecting vehicle) (ii) transport of waste to appropriate location. In this paper, we focus on planning of waste collection activities. Hence in some case we see that during festival or some function, lots of waste material is generated in particular area. In such situation waste bin gets full creates many problems. So in case, authority person can get the information through WIFI .They can go and pick up the dustbins.

### **1.1 PROBLEM DEFINATION**

As we have seen number of times the dustbins are getting over flown and concern persons don't get the information within a time and due to which unsanitary condition formed in the surroundings, environment bad smell spread out due to waste, and also bad look of the city, harmful diseases around the locality which is easily spreadable.

## **II.WASTE MANAGEMENT APPROACH**

### **2.1 LITERATURE SURVEY**

#### **EXISTING SYSTEM**

As we see many times the bins are getting overflow and bad smell spread around the surrounding which can pollute the air in environment and causes harmful diseases. Thus the waste in the cities can be effectively and efficiently has to be implemented. The many ideas has already been come forward and implemented which cannot be considered as an effective. So a survey had been done and the paper includes various different methods for waste management in the cities. The survey presented in [1] Kunzmann K.R., Smart Cities: A new idea for the Urban development, include a dustbin which is interfaced with the microcontroller have an IR wireless system which is to show current state of waste in the bin, on mobile browser with the html page by Wi-Fi, which is use to update the status on the html page. Hence it reduces the human resources. By use this modern technology, the smart waste bin can be very costly by considering the total dustbin needed in India, hence they have use the sensor which can help to reduce the cost and it efficient in its application. Here in both the sender and the receive side for sending and receiving the data Wi-Fi module is used. Weight sensor present in the dustbin for detection of waste, it will only detect the weight of waste but not the level in it. Thus message can be send to collecting vehicle. Thus here the waste bins are managed.

To overcome this problem an efficient smart waste management has to overcome. There are various advantage and disadvantage proposed during design. This paper gives survey based on Smart Waste Management in Cities using IoT and the survey involves various smart management ideas that can be implemented. The routing and the dynamic model apply the sensor capacity and wireless communication to give the bin state.

#### **2.1.1 DISADVANTAGE OF THE EXISTING SYSTEM**

- As we are monitoring and managing the solid waste system using RFID,GIS and GSM it will only able to maximize waste collection but not any action about uncollected waste.
- As the lid of the bin is been open it increases large number of insects and mosquitoes which breed on it.

- In the smart waste bins, it helps to keep the bins clean and surrounding when it is filled but poor waste collection and improper transportation facility.
- In smart waste bin IoT system it optimizes the waste collection and reduces the fuel consumption the open container without the lid proves to be breeding place for germs.

### **PROPOSED SYSTEM**

The proposed system focuses on the economic feasibility and efficiency of the system. The important features of the system are that it is designed to learn from the experience and to do improvement in the everyday waste collection status and also on the traffic congestion and balancing the cost efficiency function and many other factors. The system based on the waste level data from the trashcans in larger cities. Where the data is stored in the server and through the internet which is send by the sensors.Hence the collected data use for optimizing and monitoring the trashcans level. The rate at which the trash bin is full can be analyzed based on the historical data and overflow of bins can be predicted.

Our idea of Smart Waste Management is very useful for the cities in various aspects. As in the cities there are many dustbin are located in different other places are been flown many times and authorized people do not get any information related to it. Hence our system is designed to overcome this problem and use to provide a complete detail related to dustbins location in various areas of the city. The concerned authorized person can get information from anywhere and anytime and can take decision immediately.

#### **2.1.2 ADVANTAGE OF THE PROPOSED SYSTEM**

- As we know the dustbin is essential part of cleanliness hence we have to look after it.
- The smart bins which is been designed handy as it can put to work by just placing ultrasonic sensor in the bottom of the lid.
- The major advantage it gives is it will stop overflowing of dustbins along roadside as bins are managed at real time.

### **III. SYSTEM DIAGRAM**

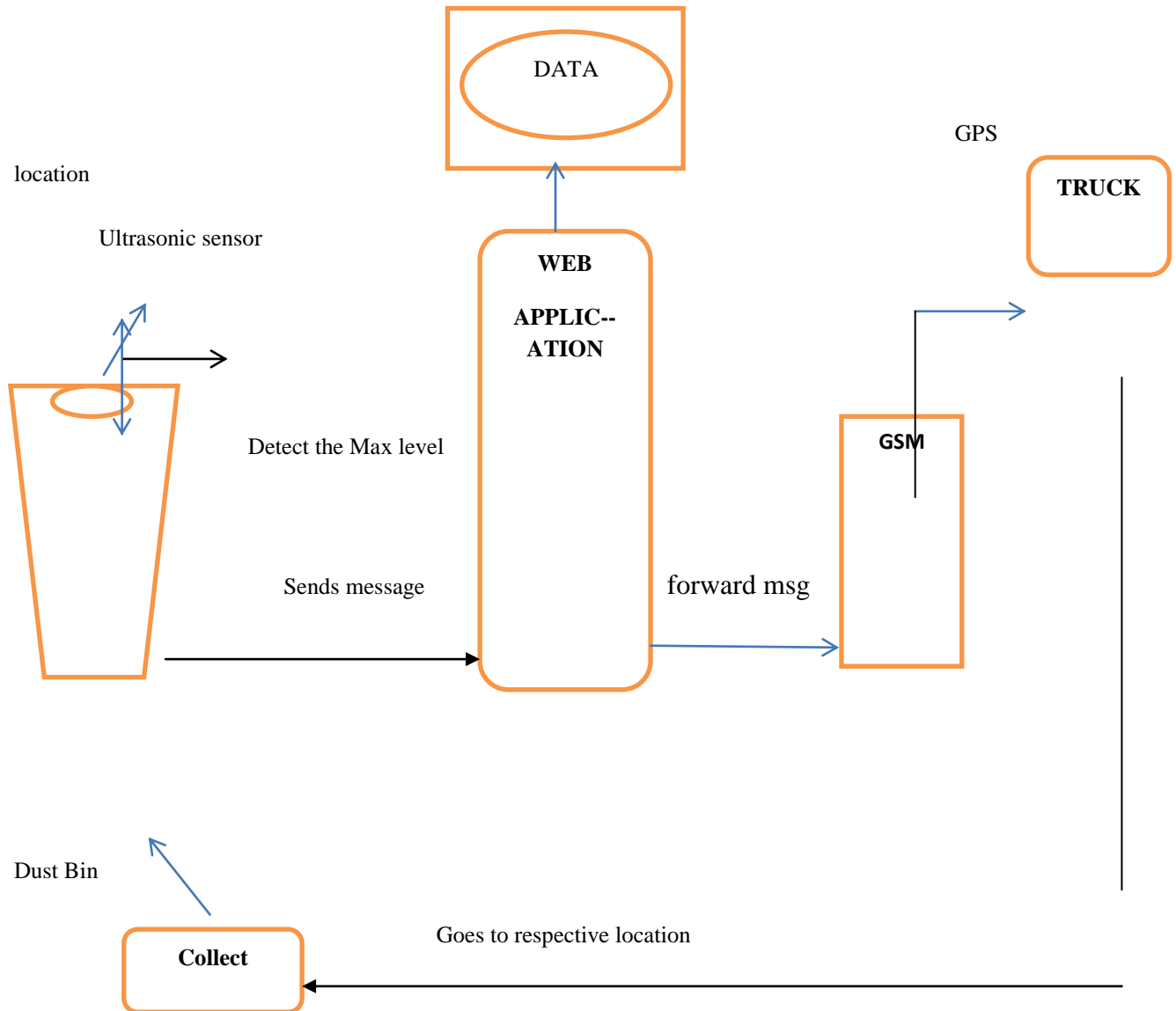


Fig1: System Diagram

### 3.1 WORKING PRINCIPLE

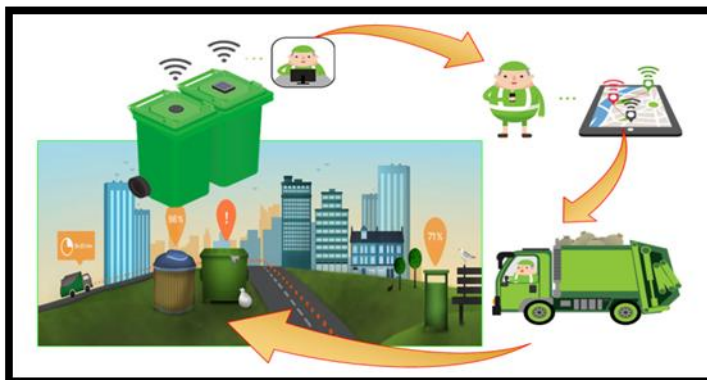
- SMART BINS

The Smart Waste Bin consists of the Sensor system. The Sensor used is known as Ultrasonic Sensor. The level of waste in the bins is detected with the help of ultrasonic sensors and communicates through GSM system. This sensor used to detect the level of the waste in bins. This system assures the clean of the bin when they are full. And hence the signals are sending to garbage collecting vehicle to collect it. The NodeMUC sends the request to ultrasonic sensor. The ultrasonic sensor accepts the request and reply back to the NodeMCU with the full

percentage of garbage. NodeMCU keep track of the level of garbage in the bin using ultrasonic Sensors. Then the level of garbage in the NodeMCU is updated to database. The user login to android application, NodeMCU checks the distance and the full percentage of the bin in the database. And that information is send back to user application through NodeMCU.

- **WASTE COLLECTING VEHICLE**

Each garbage truck is given a number id which is stored in database with its location. A camera is placed at each waste bin the camera used for capturing images of garbage truck continuously. A database is created in server which the image been taken by camera. Then microcontroller use to compares and set limit with input data to threshold level. Then microcontroller with GSM interfaced sends a message to the server .The receiver contains the slave Id. The server compares the slave id and location of each waste bin which stored in the database which is located in city. This gives the exact location of the bin which is full and the person can go to particular place and collect the waste in time. After getting message from the server the waste collecting vehicle reach to location and the driver set a password with keypad in microcontroller. When the password matches the mechanism then it activates. This mechanism is nothing but consist of use of dc motor which is fixed on the plate on which waste can be detect



**Fig 2 : working process of waste management system**

#### **IV. DATAFLOW DIAGRAM**

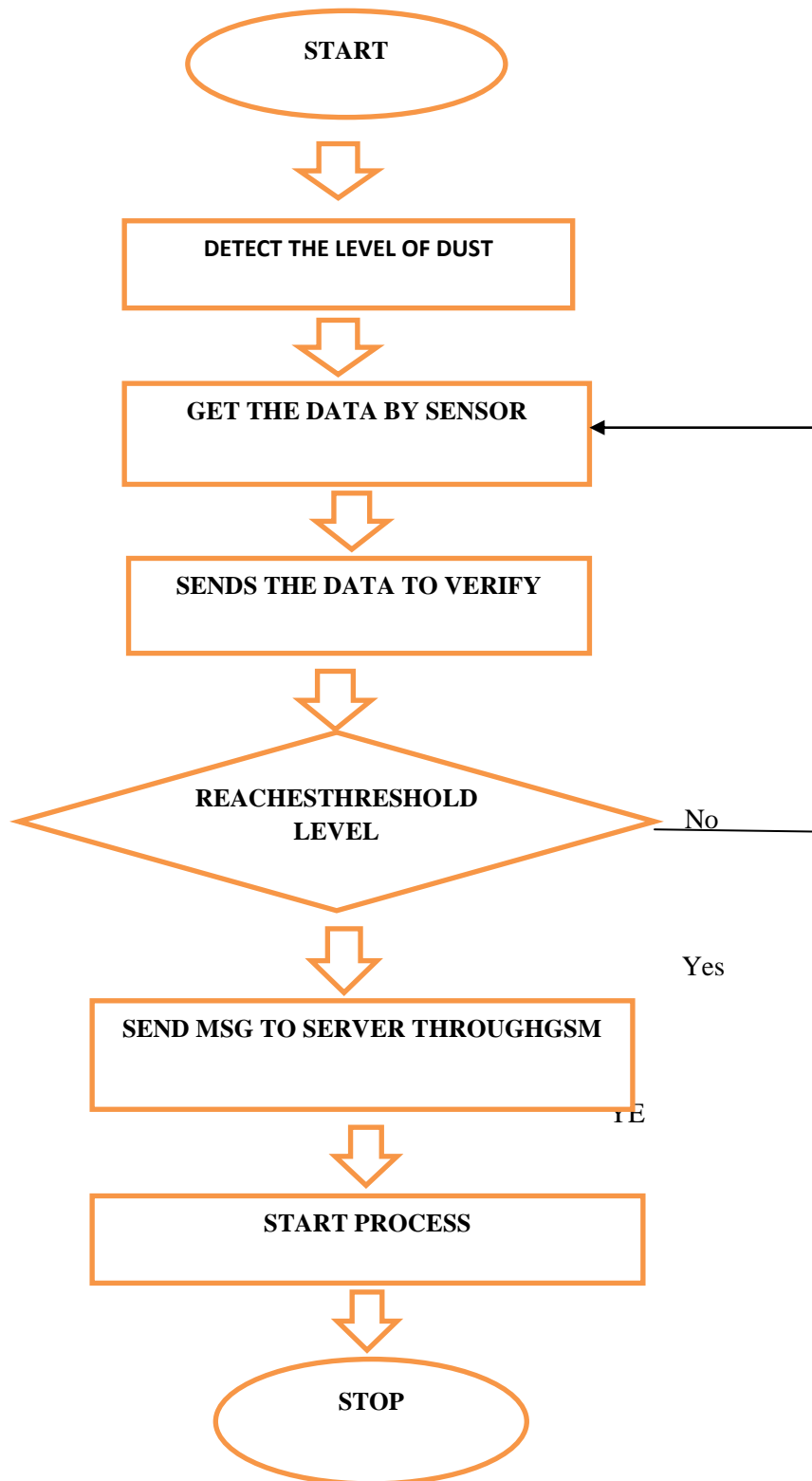


Fig3: Data Flow Diagram

The [4] above dataflow diagram gives the overview of the waste management system performed. Initially the flow diagram consists of the start where the start of the process takes place then it is Initialization which is to initial the waste in dustbin is either full or not. If it is full then it sends its signal to collect the waste by using sensor. Sensor is use to send the data to authorized user about overflow of the dustbin. If it reaches its threshold level then sends the message to collecting vehicle to come and collect the waste's is use to locate the path of the dustbin which is been full. Thus the mechanism repeats.

Considering the following main purposes:

- The provisioning of data has to be performed with high reactivity and high level of scalability.
- The system has to provide new sensors in the sensing environment. To get these requirements, specific design hasto develop.

## **V. CONCLUSION**

We have the smart public dustbins with the sensors connected to internet which can notify the authorities to collect it by monitoring the state of dustbins and web application where the concerned authorities are notified the state of the dustbin also we have the location based features using the GPS modules interfaced in garbage collecting vehicles which can automatically assign the nearest vehicle in radius to pick up the when the dustbins are full, this reduce time and cost.

This paper gives the ideas and the use of IoT and its various applications. And also use to give the energy efficient models.Thuspresented the intelligent transport system for the waste collection in the city, and deliver the strengths and weaknesses of the models. Finally, our future work depends on the proper placement of the bin where the network connectivity needs to be high. And also a proper attention over the security system should be maintained.

## **VI.ACKNOWLEDGEMENTS**

This paper carried out all the information related to the waste management system. It consists of all the economical and the technical perspective information .This research paper help to gives various ideas of the waste collection and managing the waste to its appropriate locations with the help of the sensor, networking system and modules.

## **REFERENCES**

- [1] Kunzmann k.R., Smart Cities: A New Paradigm of Urban development.Crios 1/2014,pp.9-20,dio:10.7373/77140
- [2] Theodoros Anagnostopoulos, Member IEEE, Arkady Zaslavsky, Senior Member IEEE, Kostas Kolomvatsos, Alexey Medvedev, Pouria Amirian, Jeremy Morley, Stathes Hadjieftymiades

- [3] Theodoros Anagnostopoulos Department of Info communication Technologies Arkady Zaslavsky CSIRO Computational Informatics CSIRO Alexey Medvedev Department of Info communication Technologies ITMO University
- [4] Gaikwad Prajakta, Jadhav Kalyani, Machale Snehal |Electronics and Telecommunication, B.V.C.O.E.W, Maharashtra, India|SMART GARBAGE COLLECTION SYSTEM IN RESIDENTIAL AREA
- [5] Twinkle sinha, k.mugeshkumar, p.saisharan, —SMART DUSTBIN|| , International Journal of Industrial Electronics and Electrical Engineering, ISSN: 2347-6982 Volume-3, Issue-5, May- 2015.
- [6] V. Catania, and D. Ventura, “An approach for monitoring and smart planning of urban solid waste management using smart-M3 platform”, In the Proceedings of IEEE 15th Conference on Open Innovations Association FRUCT, 2014, pp. 34-31