ijpam.eu

# Garbage Monitoring System Using IOT

[1]Ashima Bajaj and [2]Sumanth Reddy

[1]Computer Science and Engineering,

SRM University, Chennai, India.

ashima_bajaj@srmuniv.edu.in

[2]Computer Science and Engineering,

SRM University, Chennai, India.

sumanthkumar_govardhan@srmuniv.edu.in

## Abstract

In the present scenario, we see the garbage bins being overloaded and all the garbage spills out resulting in pollution. The detection ,monitoring and management of waste is one of the primary problems of the present era. The traditional way of monitoring the wastes in waste bins is complex, cumbersome process which takes more human effort, time and cost which is not compatable with the present day technologies in any way. Hence our problem statement is to design a system based on microcontroller using zigbee methodology for collecting garbage from particular area whose garbage bins are overflowing with prior concern. This method is advanced in which garbage management is automated. This project  Garbage Monitoring system using IOT  is a very innovative system which will help to keep the cities clean. This system makes use of microcontroller, LCD screen, zigbee methodology for sending data. Ultra sonic sensors are used to detect the level of garbage collected in the bins. The LCD screen is used to display the level of garbage collected in the bins.

**Key Words:** Microcontroller, UltraSonic Sensor, Metal Detector

# 1.    Introduction

Pollution is the spread of contaminants into an environment that causes instability, disorder, harm or discomfort to the environment. Solid waste management is one of the major environmental problems of India. Solid waste management is the collection, transport, disposal, managing and monitoring of waste material. Garbage may consist of the municipal solid waste construction waste, commercial Garbage may consist of the municipal solid waste construction waste, commercial waste ,industrial waste etc… left over the city. This project is useful for creating "Smart City" and it is based on "Internet of Things". For healthy lifestyle cleanliness is needed and it begins with the use of trash bins. This project will help to eradicate or minimise the solid waste disposal problem. In present scenario, many times we see the garbage bins gets overloaded due to increase in solid waste everyday. It creates unhygienic environment and bad smell in the society and because of this many disease get spread in the society to avoid this situation we are designing "Garbage monitoring system using Internet of Things" In this proposed system the multiple  trash bins are located throughout the city, these trash bins are embedded with low cost embedded device. When the dustbin gets half  filled that is when the threshold value become 50% then the corporation will get notification and when the garbage level will reach the threshold value  80% then the notification will get half filled. The proposed system is cost effective because it will notify twice to the organization and they will get time to optimise the cost of transportation.

# 2.    Literature Survey

This is not an original idea, for the implementation of smart dustbins ; the idea has existed for many years, after the IoT field finding its grip in our lives. This is, however an original plan for designing a smart garbage bin with Ultrasonic sensor ,metal detector, microcontroller (16F877A), xbee-rx (an XBee reactive extensions API) and MAX232 for transmission of data to the server. The ultrasonic sensor  will be used to detect the level of garbage in dustbin. Metal detector will be used to detect the opening and closing of lid We have set two threshold values 50% and 80%.when the garbage level reach  50% and 80% the notification will get display on the web page Accordingly information is processed that is controller checks if the threshold level is exceeded or not, and this information will transfer to the server by using Zigbee . By using garbage monitoring system the information of all smart dustbins can be accessed from anywhere and anytime by the concern person and he/she can take the decision accordingly. The front end to create web page is core java and the backend is MySQL.The software component used to create web page is JDK6 or JDK7 and the hardware component used is MPLab 8.36.

# 3.  System Architecture
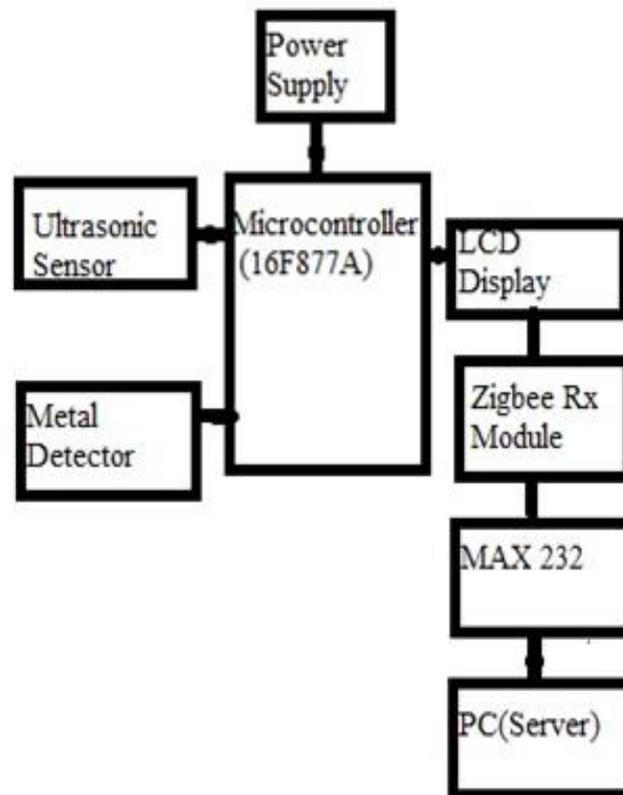


# 4.  Methodology Integrated

ZigBee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. ZigBee is typically used in low data rate applications that require long battery life and secure networking. ZigBee has a defined rate of 250 kbit/s, best suited for intermittent data transmissions from a sensor or input device. Zigbee device are used to transmit data over long distance. ZigBee devices are mainly utilized in mesh network form to transmit data sequence over a longer distances and transmitting data through intermediate devices to reach more distant ones. Zigbee networks are used to form ad-hoc, with no centralized control or high power transmission or receiver able to reach all of the devices. The zigbee module is serial interfaced with the PC. The microcontroller compares the set limit with input data ,if anyone or both input data crossed threshold level. Then

microcontroller which is interfaced with Zigbee module which transfer data to the server .The sent data contains the ID of the garbage can. The server compares the ID with its database which contains record of ID and location of each garbage can located in city. Then it gives exact location of the garbage can which is full.

# 5.    Hardware Description

**Power Supply:** We use 12v power supply in our project. It is mainly used to provide DC voltage to the components on board. 5V is required for relay applied from power supply. 5V is constantly given to microcontroller.

**Ultrasonic Sensor:** Ultra sonic sensor is used to detect the level of garbage. The sonic waves emitted by the transducer are reflected by an object and received back in the transducer. After having emitted the sound waves, the ultrasonic sensor will switch to receive mode. The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor. Ultrasonic sensors can detect movement of targets and measure the distance to them. Sensors can have an on or off digital output for detecting the movement of objects, or an analog output proportional to distance.

**Metal detector:** Metal detector is used to monitor lid opening or closing. when you move a metal detector over a piece of metal, the magnetic field coming from the detector causes another magnetic field to appear around the metal. It's As you move the detector about over the piece of metal, the magnetic field produced by the metal cuts through the coil. Now if you move a piece of metal through a magnetic field, you make electricity flow through it. this second magnetic field, around the metal, that the detector picks up. So, as you move the detector over the metal, electricity flows through the receiver coil, making the loudspeaker click or beep.

**Microcontroller:** It get information from sensor and process on it. It compares the received data with the threshold level set and accordingly output is generated. It consists of two 8 bit and one 16 bit timer. Capture and compare modules, serial ports, parallel ports and five input/output ports are also present in it. An EEPROM is also featured in it which makes it possible to store some of the information permanently like transmitter codes and receiver frequencies and some other related data. It has a total number of 40 pins and there are 33 pins for input and output.

# 6.  Flowchart
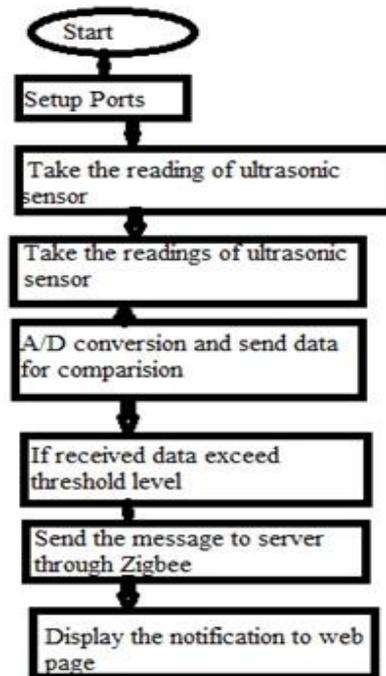


# 7.  Conclusion

This project is an integrated system of Ultrasonic sensor, metal detector, microcontroller, MPlab IDE, Zigbee Rx module. Ultrsonic sensor will give the readings more accurately, it is introduced for economic and efficient garbage collection. By implementing  this project we can avoid the overflowing of trash bins in residential areas  which will prevent many diseases and hence we can maintain a clean environment. This system will automatically send the notification to the municipal corporation. The proposed system is more efficient and practical then the existing scenario of processing solid waste collection in which everything is manually done. Every smart dustbins will be given a specific ID number which will be send in the notification by using that we will get to know the location of dustbins. His system will reduce the wastage of fuel by reducing number of trips of garbage collection vehicle.

Department of Computer Science & Engineering of SRM University, Kattankulathur.

# References

[1]     Navghane S.S., Killedar M.S., Rohokale Dr.V.M, IoT Based Smart Garbage and Waste Collection Bin, International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) 5(5) (2016).

[2]     Sahu R.M., Akshay Godase, Pramod Shinde, Reshma Shinde Garbage and Street Light Monitoring System Using Internet of Things, International Journal Of Innovative Research In Electrical, Electronics, Instrumentation  And Control Engineering 4(4) (2016).

[3]     Gaikwad Prajakta, Jadhav Kalyani, Machale Snehal, Smart Garbage Collection System In Resedential Area, International Journal of Research in Engineering and Technology 04(03) (2015).

[4]     Tapase R.B., Ashwini Mohite, Trupti Kadam, Puja Deshmukh, Intelligent Monirtoring System For Garbage Waste Bins Using Arduino, International Journal of Research in Engineering and Technology 05(12) (2016).

[5]     Tarandeep Singh, Rita Mahajan, Deepak Bagai, Smart Waste Management using Wireless Sensor Network, International Journal of Innovative Research in Computer and Communication Engineering 4(6) (2016).

[6]     Parkash, Prabu V, IoT Based Waste Management for Smart City,  International Journal of Innovative Research in Computer and Communication Engineering 4(2) (2016).

[7]     Sandeep M. Chaware, Shriram Dighe, Akshay Joshi, Namrata Bajare, Rohini Korke, Smart Garbage Monitoring System using Internet of Things (IOT), International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering 5(1) (2017).