

## Waste Management System Using Iot

Mrs.D.Anuradha<sup>[1]</sup>, A.Vanitha<sup>[2]</sup>,S.Padma Priya<sup>[3]</sup>,S.Maheshwari<sup>[4]</sup>

Associate professor <sup>[1]</sup> M.E.,PGDBA,(Ph.D), Students <sup>[2], [3] & [4]</sup>

Department Of Computer Science Engineering,

Panimalar Engineering College, Chennai

Tamil Nadu - India

### ABSTRACT

In the present world, we see the dustbins are placed on the roadside and dustbin is overflowing.this overflow of dustbin is due to the increase in the population and the wastage from hotels, industries etc.This overflow of dustbin will make our environment ugly and cause many disease to the public.To avoid this situation we planned to design “Waste Management System Using IOT System”.This is implemented to place in the smart cities.In this proposed system,multiple dustbins from the different areas throughout the cities are connected using IOT technology.In this the dustbin is provided with low cost embedded devices and it will sense the level of dustbin,then it is sent to the municipality officer.Then he will send the information to the truck driver to collect the waste. Ultrasonic sensor will sense the level of dust in dustbin.It will also indicate the presence of any toxic gases in the bin by alarm sound.

**Keywords:-** 8051 microcontroller, ultrasonic sensor, GSM modem, resistor.

### I. INTRODUCTION

Things that are connected to the Internet and those devices controlled from the Internet is called Internet of Things.In this system,the smart bin is connected with the internet to display the exact information about the dustbin level and to which area it belong.In present there was a rapid growth in the population which leads to large quantity of waste disposal in the cities. The overflow of dustbin will create a unpleasant environment and it affect many people by spreading the deadly disease. The implementation of proper waste management system will avoid the spreading of such disease. The dustbins are properly managed and information is seen regularly and the municipality officer make immediate response by intimating to truck driver. The truck driver will go immediately and collect the waste form the dustbin. Multiple dustbin are connected through the cities. The Dustbins are integrated with ultrasonic sensor, RF module. The ultrasonic sensor is used to detect the level of dust in the dustbin. After detecting the level of dustbin the information is send to the RF Transmitter and received by the RF Receiver at the Central System and Internet connection is enabled through the connection of Wi-Fi module.The data is Received and processed in the cloud. This information is send to the web browser.

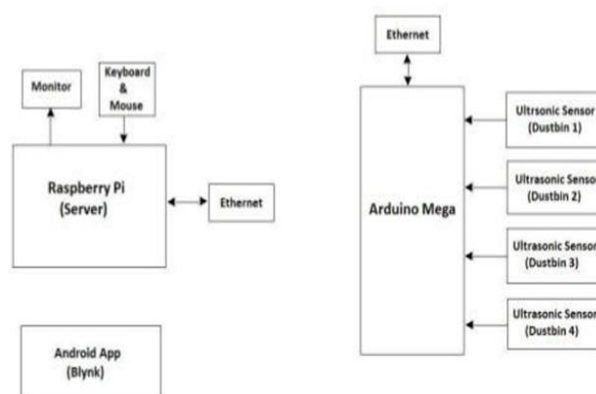
Pictures of dustbin being overflown and the waste from the dustbin is spilled out from all around. This will leads to the cause of many disease as many number of insect and mosquito breed on it.There is also a lot of substance that cause disease. The managing of solid waste is the major problem in the city. This solid waste management system will eradicate such a problem or reduce the problem.

Our Prime Minister of India,Sri Narendra Modi has introduced the development of smart cities In India.City administration needs understanding of the generating reports,control over

pricing.District administrations are interested in controlling the process of waste collection,checking quality of service,quick and legal ways for solving disputes and problems.

This paper will give the efficient way to keep the environment clean and green. Waste trucks owning companies need platform for organizing and optimization of their business process.waste truck drivers need navigation system and reporting problem system.Citizens want to have better service,lower cost and having easy accessible reports.

### II. BLOCK DIAGRAM DESCRIPTION

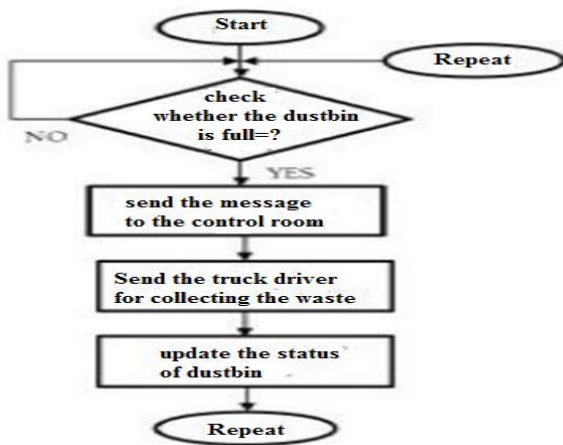


In this each dustbin is given a unique ID for easy identification.We continually moniotor all the dustbin in our system through an Android App Blynk and also monitor all the events in the system.In this system many number of dustbins are connected throughthe internet.The ultrasonic

sensor is connected to detect the level of dustbin. The dustbin is divided into three levels. The Ultrasonic sensor detects the level of the dustbin and sends it to the RF transmitter. The availability of waste could be monitored through an Android app. The ultrasonic sensor will be interfaced to Arduino Mega and will be the input section of the system.

Arduino Mega will be programmed to perform the task to measure via sensor and give output. Arduino Mega will be connected to Internet and it will be logged onto the server through the Ethernet shield. Raspberry Pi is configured as the server and will send the commands to the Arduino Mega to monitor all events. This information is then given to the web using Internet. The municipality officer gets the output in virtualization. This will display the level of all dustbins and display the ID of dustbin which is full. It will also indicate the presence of Toxic gases in the dustbin.

FLOW CHART:



#### IV. EXISTING SYSTEM

In the existing system there is no indication whether the dustbin is overflowed. It is more time-consuming task and it is less effective. It leads to the wastage of time since the truck will go and clean whether the dustbin is full or empty. This system needs high cost. This system will create a unhygienic environment and make the city unclean. In this system the level of the dustbin will not be known and create the bad smell spreads and cause illness to human beings. It also makes more traffic and noise.

#### V. PROPOSED SYSTEM

In present day the dustbin is overflowed, the proposed system will help to avoid the overflow of dustbin. It will give the real-time information about the level of the dustbin. It will send the message immediately when the dustbin is full. Deployment of dustbin based on actual needs. Cost of this system is minimum.

The resources are available easily. Improves environment quality by reducing the smell and making the cities clean. It has

effective usage of dustbins. It will also reduce the wastage of time and energy for truck drivers. It will also indicate the availability of toxic substances in the bin.

#### V. METHODOLOGY

**Ultrasonic Sensor:** The sensor is used to detect the level of the dust in the dustbin. It uses a sound transmitter and receiver. An ultrasonic sensor creates an ultrasonic pulse, called ping, and listens for the reflection of pulse. The sound pulse is created electronically using a sonar projector consisting of a signal generator, power amplifier, and electro-acoustic transducer array. A beam former is usually employed to concentrate the acoustic power into the beam.



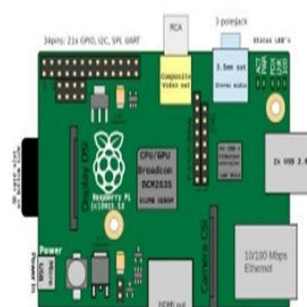
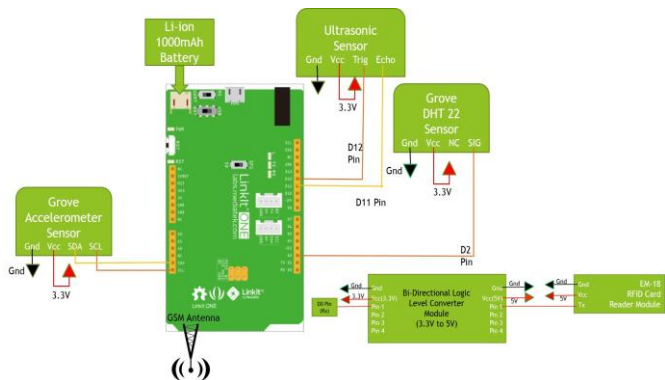
Fig :- 1 Ultrasonic Sensor

#### Arduino mega:

The mega 2560 is a microcontroller board based on the ATmega2560. It consists of 54 digital input and output pins in which 15 can be used as PWM output, 16 analog inputs, 4 UARTs which is a hardware serial port, 16 MHz crystal oscillator, a USB connection. It also has a reset button, power jack, and ICSP header. It has the sensor to detect the temperature and humidity and axis digital accelerometer. The board contains a battery shield and connector cables. In this coding is embedded in the kit. The coding contains information used to determine the temperature. Then HTML code is used for displaying the output.



Fig :- 2 Arduino Mega



## VI. RF MODULE

RF module has used Amplitude Shift Keying. RF has transmitter and the receiver. The transmitter module takes serial input and transmits the signal through RF. The Receiver module is placed away from the source of transmission and the module receives the Transmitted signal. The system allows one way communication between two nodes, namely transmission and reception. The parallel input is converted into serial set of signals by the encoder. These signals are serially transferred through RF to the reception point. After the RF receiver the decoder is used to decode the serial format and receive the original signal as output. These output can be observed on the corresponding LEDs.

### 8051 MICROCONTROLLER:

It is the microcontroller used for processing the signal at sender and receiver. It will process the signal from the sensor and transmit to the transmitter. The transmitter transmit the data to the receiver. The receiver receives the data and process it again with microcontroller and send to the web. The microcontroller is made by Intel in 1961. It is a single chip used for control application. It has 40 pins in a dual-in line package layout, 128 bytes Ram, 4096 bytes ie. 4KB ROM, 2 timers, 1 serial port, 4 I/O ports.

### Raspberry Pi:

It is a series of small single board computers developed in the united kingdom by the raspberry Pi Foundation to promote the teaching of basic computer science in schools. The raspberry Pi will be used as the server system and it will send the command to the Arduino Mega to monitor and manage the events. The raspberry Pi has Ethernet and USB. The Ethernet adaptor is internally connected to an additional USB port. In this it is a Raspberry Pi 3 model B. This Pi model uses a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-core ARM-Cortex\_a53 processor, with 512 KB shared L2 Cache.

## OUTPUT:

In this the result is displayed in the virtual form. The information about the level of the dustbin and the area where it is located is send to the municipality office with the unique ID that is given to the dustbin. The waste level inside the dustbin is detected by this system. This will transmit the information to the concerned person wirelessly. Everyone can access the data at any time from any where in the world. Continuous and immediate data transmission. This system will avoid the overflow of dustbin. It will also avoid the emission of toxic gases from the dustbin.

## VII. CONCLUSION

The objective of the project is for the real time access of information about the dustbin. This waste Management System using IOT has implemented the management of waste in real time using smart dustbin to check the fill level of dustbin to check if it is full or not. The novel cloud-based system for waste collection in smart cities. Providing the services for the different kind of stake holders involved in this area. On-board surveillance cameras and reporting system. Development of application for city administration, municipality staff. In this information is send and action is taken immediately based on the aspect. It is accessed from anywhere in the world continuously. It is able to be understand easily by all kind of people. It does not have any complicated work. This Iot based management of waste is very useful for smart cities in many aspects. This system will prevent the overflow of dustbin and make the environment neat and clean. It will reduce the wastage of time, cost and energy of the human. It will also prevent the occurrence of any disease. The truck drivers easily get the information about the clearing process and do their work immediately.

## FUTURE WORK

The future scope of the project is using the time stamp. The system can be implemented with the time stamp in which the real clock is used to display to the person at what time the dustbin is full and when the truck driver has collected the

waste from the dustbin. We can manage the food waste that is dump in the dustbin. Since this management of food waste will

Reduce the outcome of nasty smell. Since the food waste is managed properly there is no such smell that will pollute the city.

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