

# **GARBAGE MONITORING SYTEM**

A  
Case Study Report

Submitted in fulfilment of the  
Requirements for the Course of

**THEME BASED LAB**

IN

**BE ¾ (IT) VI-SEMESTER**

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**Vasavi College of Engineering (Autonomous)**

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**Department of Information Technology**



**DECLARATION BY THE CANDIDATE**

We, Saiteja, Pranav, Jashwanth bearing hall ticket numbers, **1602-16-737-305, 1602-16-737-028 and 1602-16-737-018** hereby declare that the Case study report entitled **“Garbage Monitoring System”** under the guidance of **Mrs.S.K.Chaya Devi**, Assistant Professor, Department of **Information Technology**, VCE, Hyderabad is submitted in fulfilment of the requirement for the course of **Theme Based Lab** in BE ¾ (IT), VI-Semester. This is a record of bonafide work carried out by me and the Design embodied in this project report has not been submitted by any other.

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### **BONAFIDE CERTIFICATE**

This is to certify that the project entitled **GARBAGE MONITORING SYSTEM** being submitted by Saiteja, Pranavnath, Jashwanth bearing hall ticket numbers **1602-16-737-305, 1602-16-737-028 and 1602-16-737-018**, in fulfilment of the requirement for the course of **Theme based Lab** in BE  $\frac{3}{4}$  (IT) VI-Semester is a record of bonafide work carried out by him/her under my guidance.

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**Assistant professor**

**Internal Guide**

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**Professor& HOD**

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**External Examiner**

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# ABSTRACT

Garbage monitoring system 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. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The system makes use of Arduino, LCD screen, Wi-Fi modem for sending data and a buzzer. The LCD screen is used to display the status of the level of garbage collected in the bins. Whereas a web page is built to show the status to the user monitoring it. The web page gives a graphical view of the garbage bins and highlights the garbage collected in colour in order to show the level of garbage collected. The LCD screen shows the status of the garbage level. The system puts on the buzzer 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 by providing graphical image of the bins via a web page.

# INTRODUCTION

Internet of Things (IoT) is an ecosystem of connected physical objects that are accessible through the internet. The 'thing' in IoT could be a person with a heart monitor or an automobile with built-in-sensors, i.e. objects that have been assigned an IP address and have the ability to collect and transfer data over a network without manual assistance or intervention. The embedded technology in the objects helps them to interact with internal states or the external environment, which in turn affects the decisions taken.

If we had computers that knew everything there was to know about things - using data they gathered without any help from us - we would be able to track and count everything, and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling, and whether they were fresh or past their best. We need to empower computers with their own means of gathering information, so they can see, hear and smell the world for themselves, in all its random glory. This is precisely what IoT platforms does for us. It enables devices/objects to observe, identify and understand a situation or the surroundings without being dependent on human help

Internet of Things can connect devices embedded in various systems to the internet. When devices/objects can represent themselves digitally, they can be controlled from anywhere. The connectivity then helps us capture more data from more places, ensuring more ways of increasing efficiency and improving safety and IoT security.

Garbage Monitoring System is an Internet of Things (IOT) application which help us to monitor garbage bins in the world. As dustbin is considered as a basic need to maintain the level of cleanliness in the city, so it is very important to clean all the dustbins as soon as they get filled. We will use ultrasonic sensors for this system. The sensor will be placed on top of bin which will help in sending the information to the office that the level of garbage has reached its maximum level. After this the bin should be emptied as soon as possible. The concept of IoT when used in this field will result in a better environment for the people to live in. No more unsanitary conditions will be formed in the city. With the help of this system minimal number of smart bins can be used around the whole city and the city will still be much cleaner.



## REQUIREMENTS

Arduino uno:



Ultrasonic Sensor:



Lcd Display:



Wifi module:



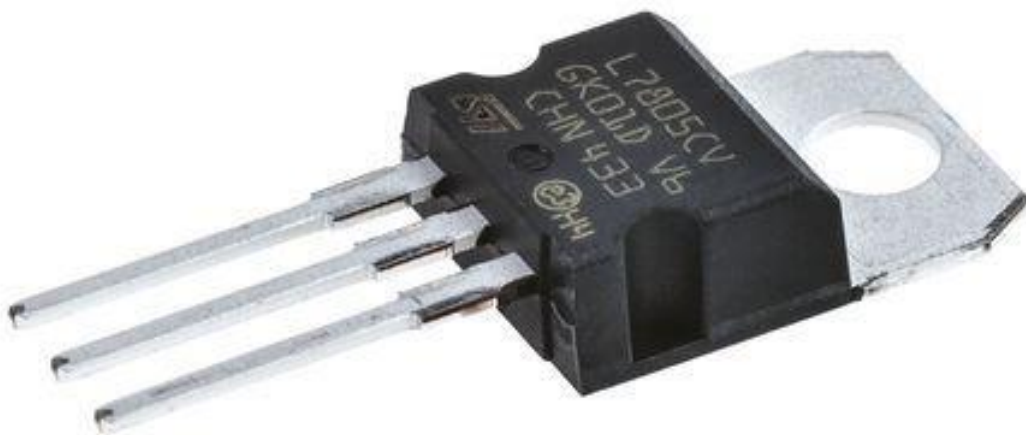
BuZZER:



Connecting Wires:



Voltage Regulator:



UBDOTS: <https://ubidots.com/>

# PROPOSED WORK

Use case is a software and system engineering term that describes how user uses a system to accomplish a particular goal. A view describes the functionality of the system as perceived by an external actor. An actor interacts with the system; it can be a user or another system. The use case view is for customers, designers, developers and testers.

- It is great security option when you are on vacation, because your home never looks empty.
- Save lot of power.

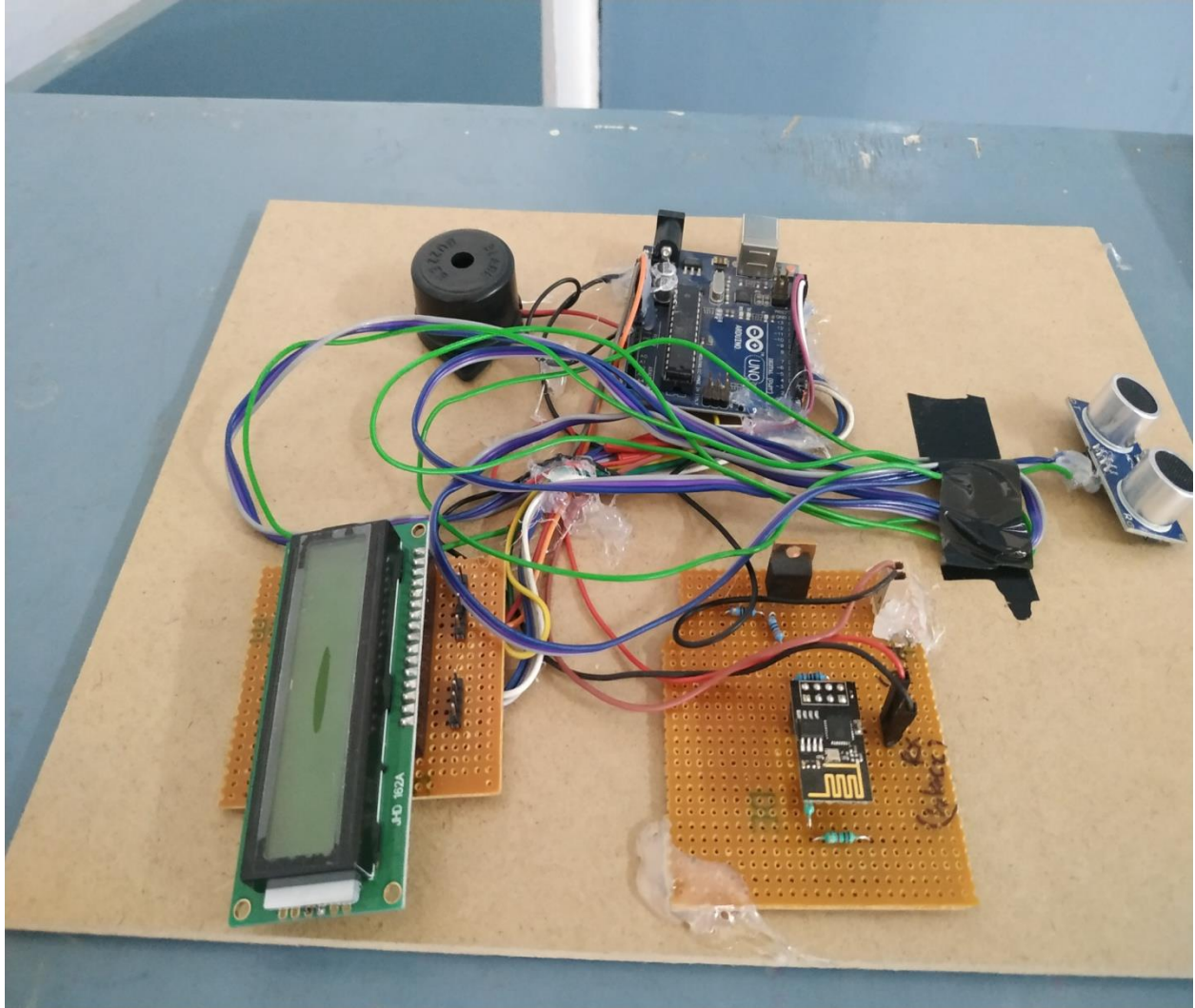
Three basic elements that make up a use case are:

**Actors:** Type of users interacting with the system. Here people monitor garbage bins using ubdots website.

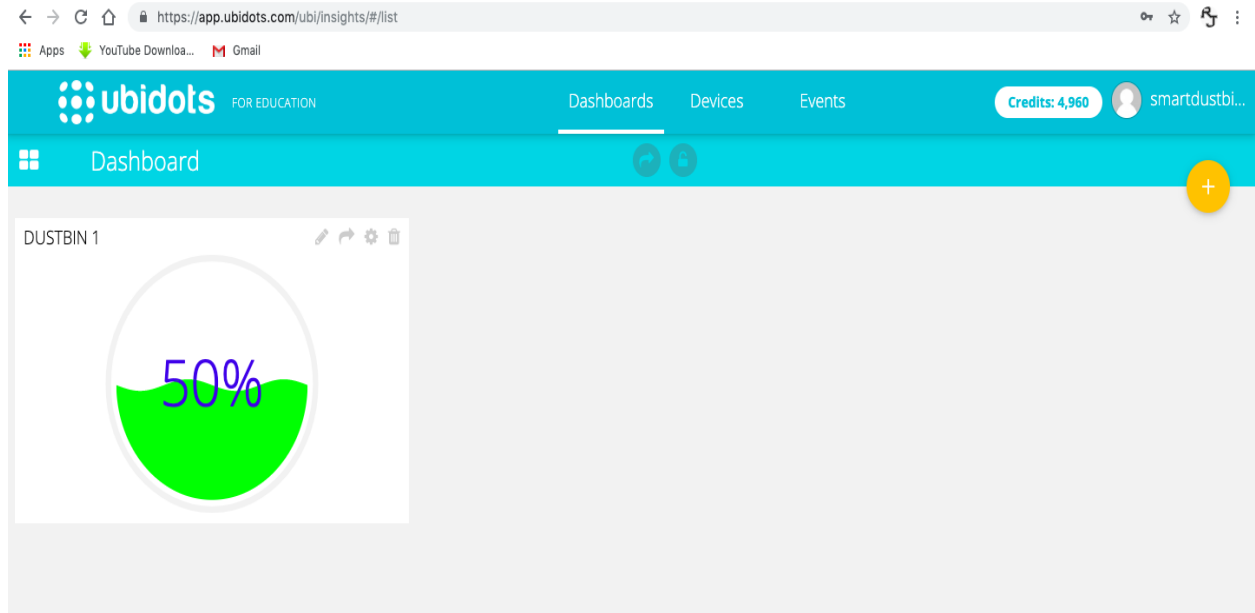
**System:** Functional requirements that specify the intended behaviour of the system.

**Goal:** Use cases are typically intended to fulfil the goals. The Authorized Users can where who has access to hardware must be able to control the bulb with the mobile.

## 2. UI PROTOTYPE:







## ARCHITECTURE AND TECHNOLOGY USED :

### UBIDOTS:

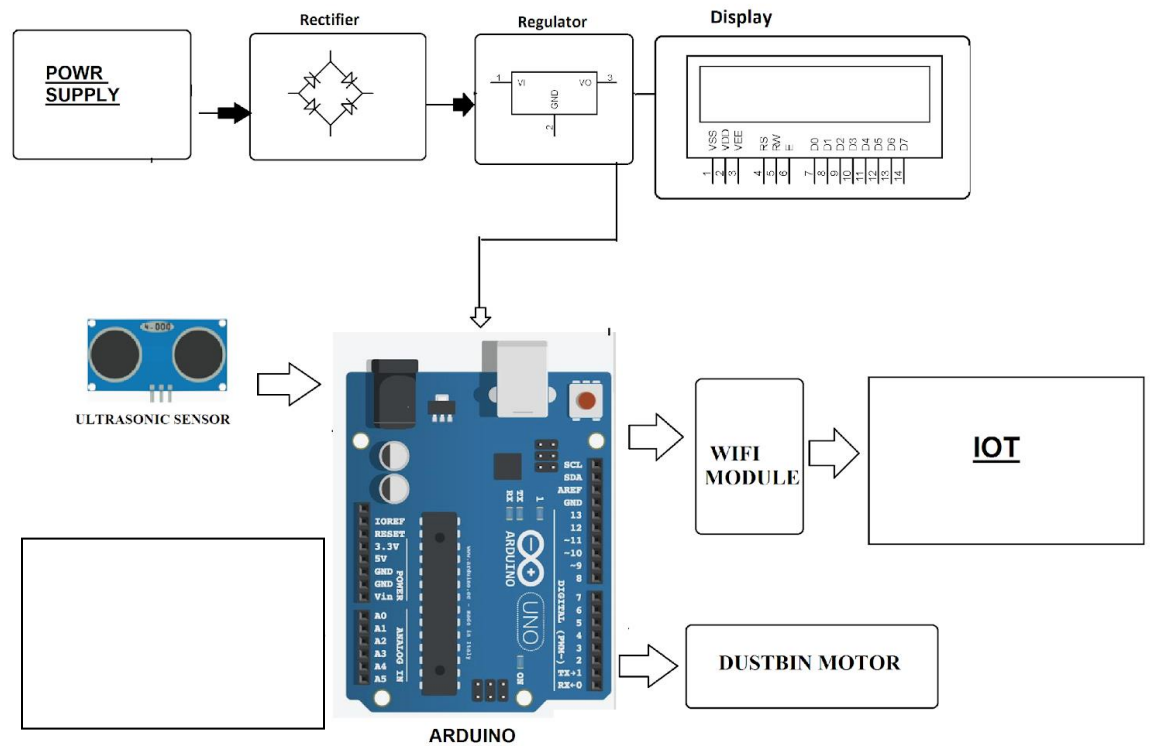
Ubidots is another interesting IoT platform that provides several services. First of all, it supports several devices, such as Arduino, Raspberry, Particle, Espressif, Onion, and much more. Moreover, it has different kinds of services, ranging from device connectivity to data visualization:

- SDK/API Ubidots provides an SDK for different devices to simplify the integration process between the device itself and the platform. Moreover, it has several APIs that can be invoked to interact with this platform.
- Several protocols support, such as MQTT and HTTP
- Synthetic variables that apply math formulas on data
- Data storage
- Data visualization

### Arduino IDE:

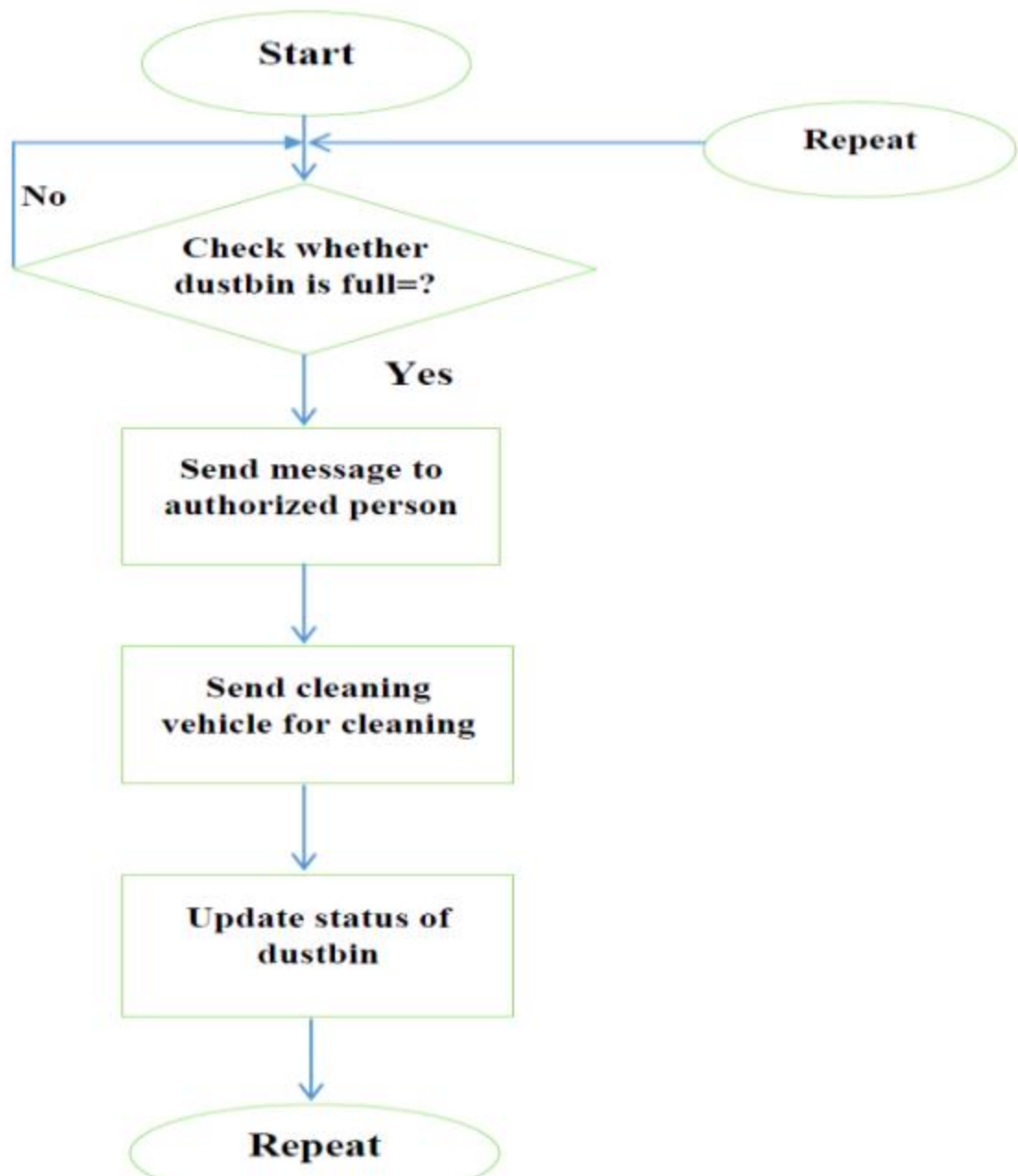
The Open source IDE makes it easy to write code and upload it to the board.

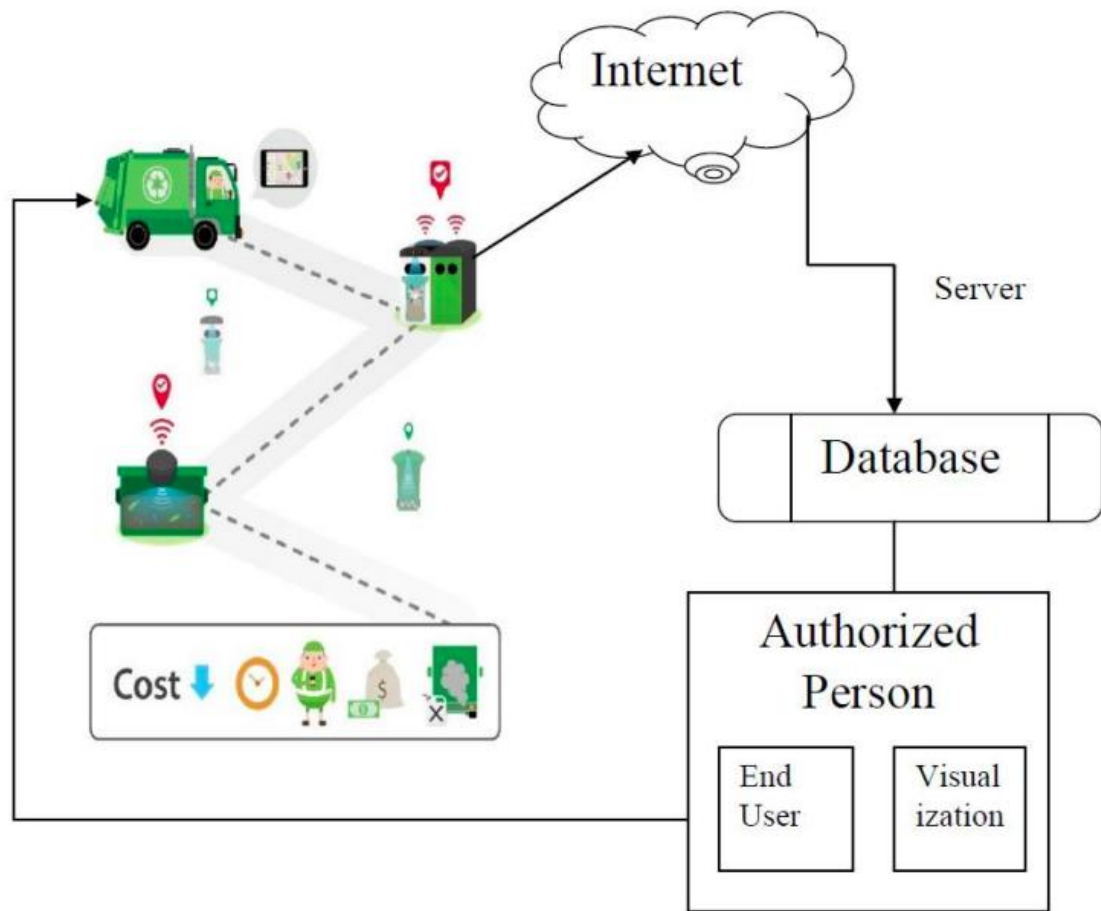
## CIRCUIT DIAGRAM





### Flow chart of working





# IMPLEMENTATION:

## CODE:

```
#include <LiquidCrystal.h> // includes the LiquidCrystal Library
LiquidCrystal lcd(2, 3, 4, 5, 6, 7); // Creates an LCD object. Parameters: (rs, enable,
d4, d5, d6, d7)
#define DST_IP      "things.ubidots.com"
#define idvariable  "5ca1a6bcc03f970712d2656c" // replace with your Ubidots
Variable ID
#define token       "A1E-fkvSGlb8r9Vp3yBGT1amcuYuPjnA9L" // replace with your
Ubidots token

const int trigPin = 9;
const int echoPin = 10;
const int buz = 8;
long duration;
int distanceCm, distanceInch;

int len,value,i;
//final code rx,tx=0,1
void setup()
{
  // Open serial communications and wait for port to open:
  char cmd[254]; // MAX LENGTH
  lcd.begin(16,2); // Initializes the interface to the LCD screen, and specifies the
dimensions (width and height) of the display
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(buz, OUTPUT);
  Serial.begin(9600);
  Serial.setTimeout(5000);
  lcd.setCursor(0,0); // Sets the location at which subsequent text written to the
LCD will be displayed
  lcd.print("....Welcome..... ");
  //test if the module is ready
  delay(5000);
  digitalWrite(buz, LOW);
  Serial.println("AT+RST");
  delay(4000);
  Serial.println("AT");
  delay(2000);
  Serial.println("AT+CWMODE=1");
  Serial.println("AT+CWJAP=\"123456789\",\"123456789\"");
  delay(7000);
  Serial.println("AT+CWMODE=1");
```

```

delay(4000);
Serial.println("AT+CIFSR");
delay(5000);
Serial.println("AT+CWMODE=3");
delay(3000);
Serial.println("AT+CIPMUX=0");
delay(3000);
}

```

```

void loop()
{
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distanceCm= duration*0.034/2;
  distanceInch = duration*0.0133/2;
  lcd.setCursor(0,0); // Sets the location at which subsequent text written to the
LCD will be displayed
  lcd.print("Distance: "); // Prints string "Distance" on the LCD
  lcd.print(distanceCm); // Prints the distance value from the sensor
  lcd.print(" cm");

```

```

  delay(100);
  if(distanceCm>0 && distanceCm<10)
  {
    for(i=0;i<15;i++)
    {
      digitalWrite(buz, HIGH);
      delay(300);
      digitalWrite(buz, LOW);
      delay(200);
    }
  }
  if(distanceCm>0 && distanceCm<50)
  {

```

```

    value=distanceCm;
    value=value*2;
    int num=0;
    String var = "{"value\":"+ String(value) + "}";
    num = var.length();
    String cmd = "AT+CIPSTART=\"TCP\",";

```

```

cmd += DST_IP;
cmd += "\",80";
Serial.println(cmd);
if (Serial.find("Error")) return;

len=strlen ("POST /api/v1.6/datasources/");
len=len+strlen (idvariable);
len=len+strlen ("/values HTTP/1.1\nContent-Type: application/json\nContent-
Length: ");
char numlenght[4]; // this will hold the length of num which is the length of the
JSON element
sprintf(numlenght, "%d", num); // saw this clever code off the net; works yay
len=len+strlen (numlenght);
len=len + num; //fixed length of the string that will print as Content-Length: in the
POST
len=len+strlen ("\nX-Auth-Token: ");
len=len+strlen (token);
len=len+strlen ("\nHost: things.ubidots.com\n\n");
len=len+strlen ("\n\n");
Serial.print("AT+CIPSEND=");
Serial.println (len); //length of the entire data POST for the CIPSEND command of
ESP2866
//Serial.println(cmd.length());
if (Serial.find(">"))
{
  //Serial.print(">");
} else
{
  Serial.println("AT+CIPCLOSE");
  delay(1000);
  return;
}
Serial.print ("POST /api/v1.6/variables/");
Serial.print (idvariable);
Serial.print ("/values HTTP/1.1\nContent-Type: application/json\nContent-Length:
");
Serial.print (num);
Serial.print ("\nX-Auth-Token: ");
Serial.print (token);
Serial.print ("\nHost: things.ubidots.com\n\n");
Serial.print (var);
Serial.println ("\n\n");
delay(3000);
//Serial.find("+IPD"); clear the input buffer after the web site responds to the
POST
while (Serial.available())

```

```

    {
        char c = Serial.read();
    }
    // Serial.println ("comleted 2");
    delay(1000);

}
else
{
    lcd.setCursor(0,0);
    lcd.print("out of range ");
}
}
}

```

## Methodology:

In this project methodology model takes the fundamental process activities of Project Plan, specification, Analysis, Design, development, validation and evolution and represents them as separate process phases. Using a waterfall model as a project development methodology. Do to Specific system models, system architecture and detailed design of the project, to implementation process using Eclipse JUNO tool and aurdino tool with java language for developing the modules in windows platform. In the smart dustbin hardware contains motor-driver, 16\*2 LCD Display, Aurdino UNO, Load cell, Playback IC, Speaker, IR Sensors, Smell Sensors , Bread Board, Power Supply and Raspberry pi. In the smart dustbin IR sensors will continuously monitor the status of the bin. If the bin reaches more than certain weight, the weight sensors will trigger the message to the concerned authority. Also when certain threshold level is reached, the level sensors will trigger the message to the concern authority. Here when the bin is filled it will give the user the details of the empty bins which are nearby with the help of LCD display, these dustbin will generate voice messages with the help of

playback IC and speaker. In order to avoid the decaying smell produced inside the dustbin harm-less chemical sprinkler is used. By using motor driver (12v), chemical will be sprayed. Here the chemical used is Baking Soda, which will prevent decaying smell spreading around the dustbin.

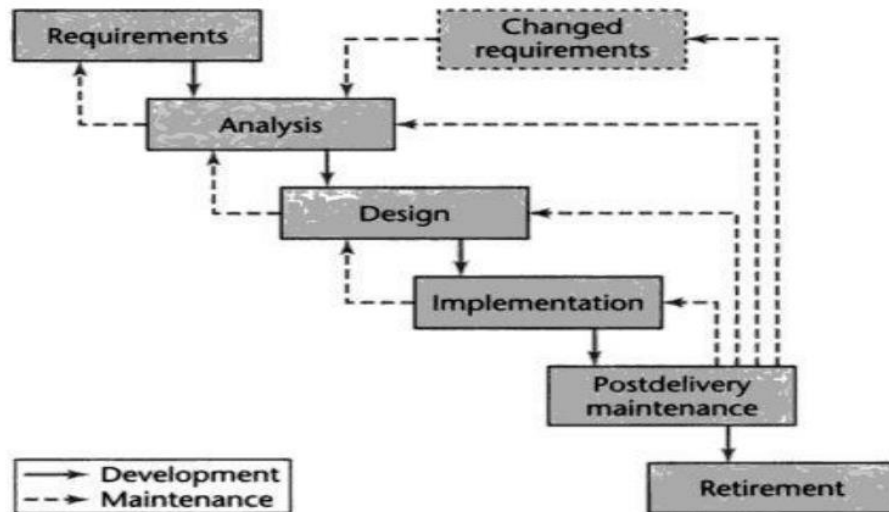


Fig : The Schematic Representation of Waterfall Model.

## 4. Result and conclusion:

This implementation of smart garbage Bin indicator receptacle, gives a solution for unsanitary environmental condition in a city. This implementation of Smart Garbage collection bin using internet, IR sensor, and raspberry pi. This system assures to send mail notification and status on dashboard of dustbins when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned contractor. This system also helps to monitor the fake reports and

hence can reduce the corruption in the overall management system. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. It ultimately helps to keep cleanliness in the society. Therefore, the smart garbage management system makes the garbage collection more efficient. The use of solar panels in such systems may reduce the energy consumption. Such systems are vulnerable to plundering of components in the system in different ways which needs to be worked on. These dust bin model can be applied to any of the smart cities around the world. A waste collecting and monitoring team which is deployed for collection of garbage from the city can be guided in a well manner for collection.

## **5. Scope for Future Work:**

The main aim of this project is to reduce human resources and efforts along with the enhancement of a smart city vision. We have often seen garbage spilling over from dustbins on to streets and this was an issue that required immediate attention. The proverb "Cleanliness is next to god and clean city is next to heaven" inspired us to conceptualized the project. Smart dustbin helps us to reduce the pollution. Many times garbage dustbin is overflow and many animals like dog or rat enters inside or near the dustbin. This creates a bad scene. Also some birds are also trying to take out garbage from dustbin. This project can avoid such situations. And the message can be sent directly to the cleaning vehicle instead of the contractor's office. Swatch Bharat Abhiyan (English: Clean India Mission and abbreviated as SBA or SBM for "Swatch Bharat Mission") is a national campaign by the Government of India, covering 4,041 statutory cities and towns, to clean the streets, roads and infrastructure of the country. In our system, the Smart dustbins are connected to the internet to get



the real time information of the smart dustbins. In the recent years, there was a rapid growth in population which leads to more waste disposal. So a proper waste management system is necessary to avoid spreading some deadly diseases

## **6. REFERENCES**

- Internet
- Faculty
- Peers
- Workshops
- Articles