Marathwada Mitra Mandal's Polytechnic
Thergaon, Pune – 411033

Institute

Vision: To nurture proficient technicians with sound ethical and social values contributing towards the welfare of masses.

Mission: We take ardent efforts to inculcate technical skills, social, and ethical values among students along with Theoretical, Analytical and Practical Knowledge through an excellent harmony among academia, professional and extra-curricular activities.

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- To provide strong theoretical and practical knowledge of computer engineering branch with an emphasis to maintain software and hardware systems.
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- **PSO2:** Ability to develop, maintain and test computer systems on the basic of programming languages, computer network and hardware.
- **PSO3:** Professional Skills: Ability to communicate effectively, recognize ethical values and responsibility towards society.

MARATHWADA MITRA MANDAL’S POLYTECHNIC

A

PROJECT REPORT

On

WASTE MANAGEMENT SYSTEM USING IOT

Submitted by

Mr. Shubham Waghmare.
Mr. Ajay Gaur.
Mr. Abhay Jagtap.
Mr. Omkar Sutar.

in partial fulfillment for the award

of

DIPLOMA

In

Computer Engineering

UNDER THE GUIDANCE OF

Mr. Solanke V.S

FOR THE ACADEMIC YEAR

2019- 2020

MAHARASHTRA STATE
BOARD OF TECHNICAL EDUCATION

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Perseverance, Inspiration & Motivation have always played a key role in the success of any venture.

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Shubham Waghmare
Ajay Gaur
Abhay Jagtap
Omkar Sutar

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ABSTRACT

Waste management is one of the main issues that the entire world challenge of the case of developed or developing cities. Raise amounts of recyclables that are not maximized and indifference in proper waste division has led to the crowd in flourish a solution to this. This project Waste Management system using IOT is new systems which will cooperation to keep the cities hygienic. This system monitors the dust bins and notify about the level of waste collected in the dust bins via a blynk app. To avoid dereliction of the waste and to increase the disinfection of the humanity, Waste management system is designed. In the suggested system, the level of the waste is identified with the help of ultrasonic sensor.

CHAPTER 1

INTRODUCTION

1.1 Overview

A massive challenge in the developing cities is waste management. Hence, Waste management using IOT is a system which can trash this issue or at least decreases it to the smallest level. Waste may contain of the unacceptable material left over from home, Public place, College, industries etc, due to these wastes there will be deadly gases expand from them which is damaging for the neighboring residents which leads to serious diseases. Hence, we desire such a system that can destroy or at least reduce this issue to some expansion. With the build-up in technology it is high time that we use technology for waste management systems. The Waste management system is a perfect solution to the exact and curious issues in waste management.

1.2 Need for Improvement in Waste Management System

a. By 2030, almost two-third of the world's population will be living in cities. This fact requires the development of sustainable solutions for urban life, managing waste is a key issue for the health.
b. Efficient and energy-saving waste management, reducing CO2, air pollution and vehicle exhaust emissions—these are just a few examples for the demands of future cities. In views of that, the efficient use and responsible handling of resources become more important.
c. Effectively managing waste is important in developed countries. Waste management may swallow upto 50% of a city's budget, but only serve a small part of the population.

d. Sometimes, up to 60%of waste is not being collected, it is often simply burned by the roadside. It can pollute drinking water, it can spread disease to people living nearby.
e. Even with great route optimization, the worker must still physically go to the dustbin to check waste levels. Because of this, trucks often visit containers that do not need emptying, which wastes both time and fuel.
f. Waste management prevents harm to human health and the environment by reducing the volume and hazardous character of residential and industrial waste.
g. Improving proper waste management will reduce pollution, recycle useful materials and create more green energy.

1.3 Feature of Waste Management System

a. The smart, sensor-based dustbin will judge the level of waste in it and send the message directly to the municipal corporation.
b. It can sense all the type of waste material either it is in the form of solid or liquid.
c. According to the filled level of the dustbin, the vehicles from the municipal corporation will choose the shortest path with the help of the "TRANSPORTATION SOFTWARE", which will save their time. It emphasizes on "DIGITAL INDIA"

1.4 Advantages of Waste Management System

a. Monitors the garbage bins and informs about the level of garbage collected in the garbage bins.
b. Keeps our Environment clean & green.
c. Cost & Effort are less in this system.
d. Reduces the human efforts required for garbage disposal management.
e. This project is also helpful in the government project of **"SWACHH BHARAT ABHIYAN''**

CHAPTER 2

ANALYSIS

2.1 Project Management

Project management is the practice of initiating, planning, executing, controlling, and closing the work of a team to achieve specific goals and meet specific success criteria at the specified time. The primary challenge of project management is to achieve all of the project goals within the given constraints. This information is usually described in project documentation, created at the beginning of the development process. The primary constraints are scope, time, quality and budget. The secondary and more ambitious challenge is to optimize the allocation of necessary inputs and apply them to meet pre-defined objectives.

The objective of project management is to produce a complete project which complies with the client's objectives. In many cases the objective of project management is also to shape or reform the client's brief to feasibly address the client's objectives. Once the client's objectives are clearly established, they should influence all decisions made by other people involved in the project – for example project managers, designers, contractors and sub-contractors. Ill-defined or too tightly prescribed project management objectives are detrimental to decision making.

2.2 Requirement Analysis

In Requirement analysis user requirements are gathered. Software Requirement Specification (SRS) documents are prepared. Functional requirements are to be considered. Hardware and software constraints are considered. This page is detailed appraisal of existing system. This appraisal includes how the module work and what it does. It also includes finding out in more detail about the system problems and what user require from new system or any new change in the system. After this phase the analyst should be familiar with both the details and operations of the module and what else is required for the system. This output of this phase results the detailed model of the system. This chapter defines the module functions and data. The phase also contains detailed set of user requirement and these requirements are used to set objectives for new system.

CHAPTER 3

COMPONENTS REQUIRED

3.1 Arduino At Mega

Arduino Mega 2560 is a micro-controller board build on the ATmega2560. It comes with 54 digital input/output pins (of which 15 are useable as PWM outputs), 16 analog inputs, a USB (Universal Serial Bus) connection, a power supply jack, an ICSP (In Circuit Serial Programming) header, 4 UARTs (hardware serial ports), and it is also having reset button. It contains all things that is needed to support the micro-controller and simply connect it to a computer system with a USB cable and having good configuration and give power supply with a AC-to-DC adapter to get started.

Fig 3.1 Arduino At Mega

3.2 Ultrasonic Sensor

An ultrasonic sensor is an electronic component that calculate the distance of a aimed object by emitting a ultrasonic sound waves, and convert the reflected sound into an electrical signal. An Ultrasonic wave traverse faster than speed of audio sound (i.e. that sound humans can hear). Ultrasonic sensors have two main components i.e. Transmitter (which emits the sound using piezoelectric crystals) and receiver (which destroy the sound after it have been travelled and from the target).

Fig 3.2 Ultrasonic Sensor.

3.3 ESP 32 Dev Module

An ESP32 Dev Module is a sequence of with less cost efficiency, less power system on a micro-controller chip with integrated Wi-Fi module and a dual-mode Bluetooth system. ESP32 is designed and developed by Espressif Systems, and it is manufactured by TSMC. The ESP32 sequence use a Tensilica Xtensa LX6 microprocessor in the both dual-core and single-core variations and includes in-built antenna switches, RF balun (a contraction of balanced-unbalanced), power amplifier, low-noise receive amplifier, filters, and power-management modules.

Fig 3.3 ESP 32 Dev Module

3.4 Jumper Wires

A jump wire (also known as jumper wire, or jumper) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

Fig 3.4 Jumper Wires

3.5 Software of Arduino

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and provides simple one-click mechanism to compile and load programs to an Arduino board. A program written with the IDE for Arduino is called a "sketch".

The Arduino IDE supports the languages C and C++ using special rules to organize code.

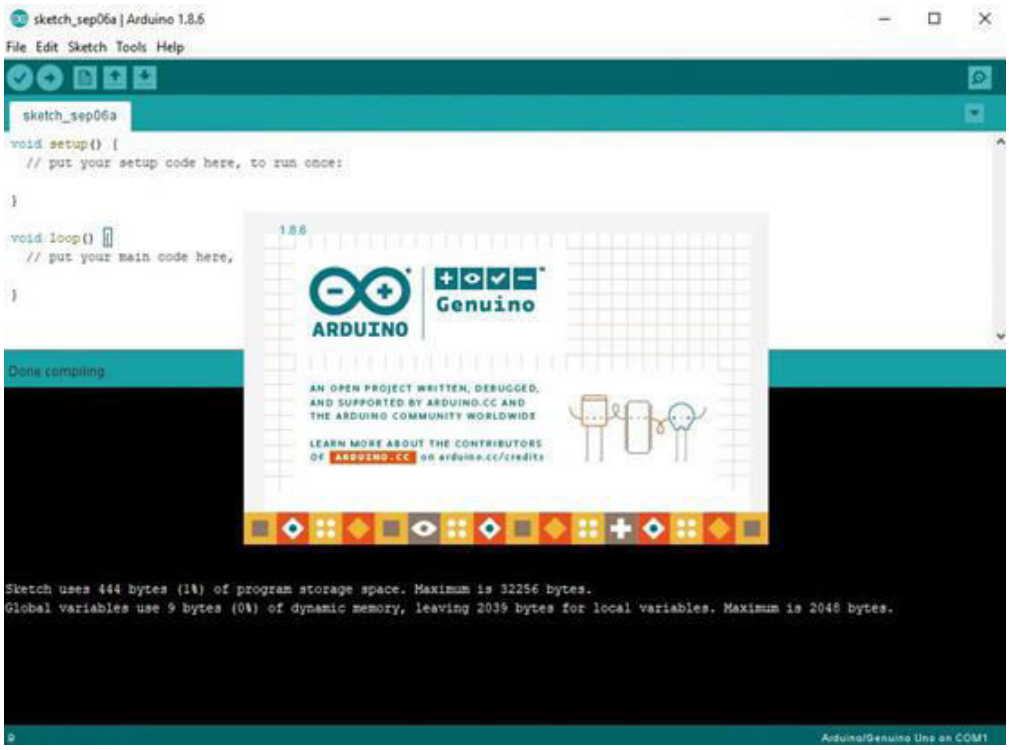


Fig 3.5 Arduino IDE

CHAPTER 4

SYSTEM MODELLING

4.1 Activity Diagram

An activity diagram visually presents a series of actions or flow of control in a system similar to a flowchart or a data flow diagram. Activity diagrams are often used in business process modeling. They can also describe the steps in a use case diagram. Activities modeled can be sequential and concurrent.

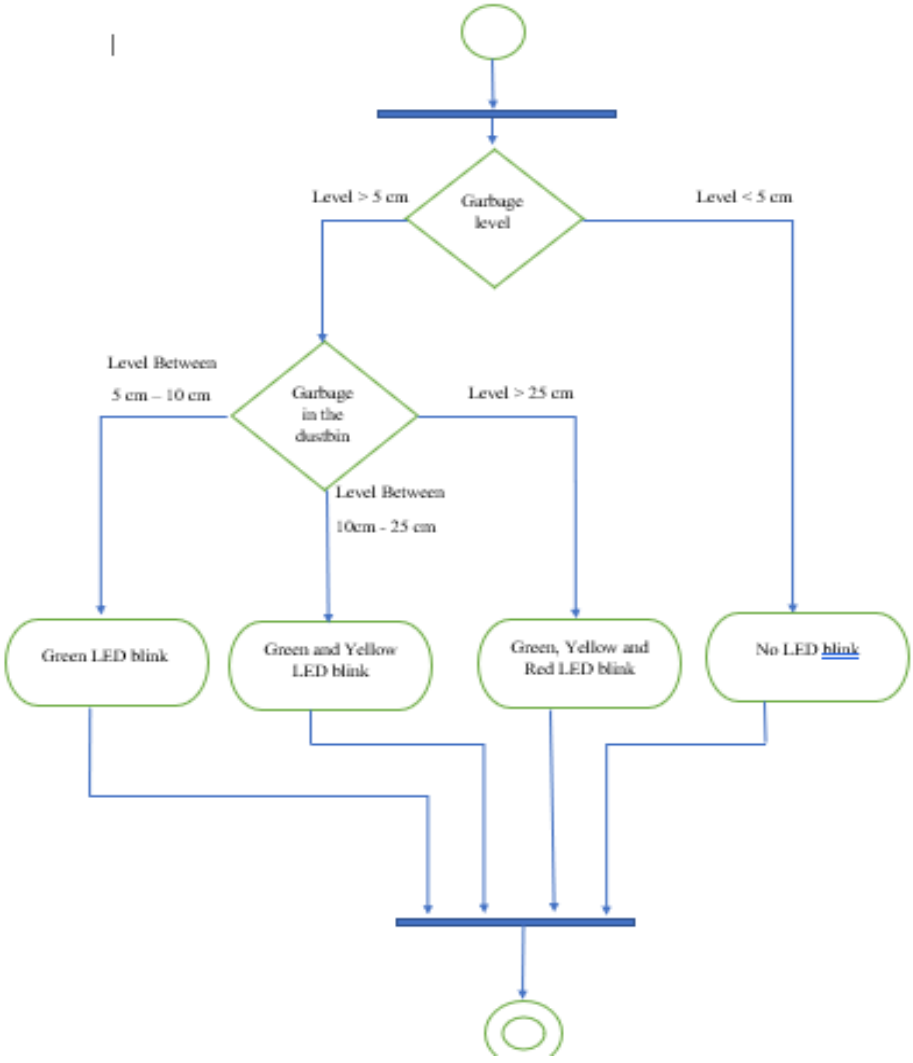


Fig 4.1 Waste Management System Activity Diagram

4.2 Use Case Diagram

A UML use case diagram is the primary form of system/software requirements for a new software program underdeveloped. Use cases specify the expected behavior (what), and not the exact method of making it happen (how). Use cases once specified can be denoted both textual and visual representation (i.e. use case diagram). A key concept of use case modeling is that it helps us design a system from the end user's perspective. It is an effective technique for communicating system behavior in the user's terms by specifying all externally visible system behavior.

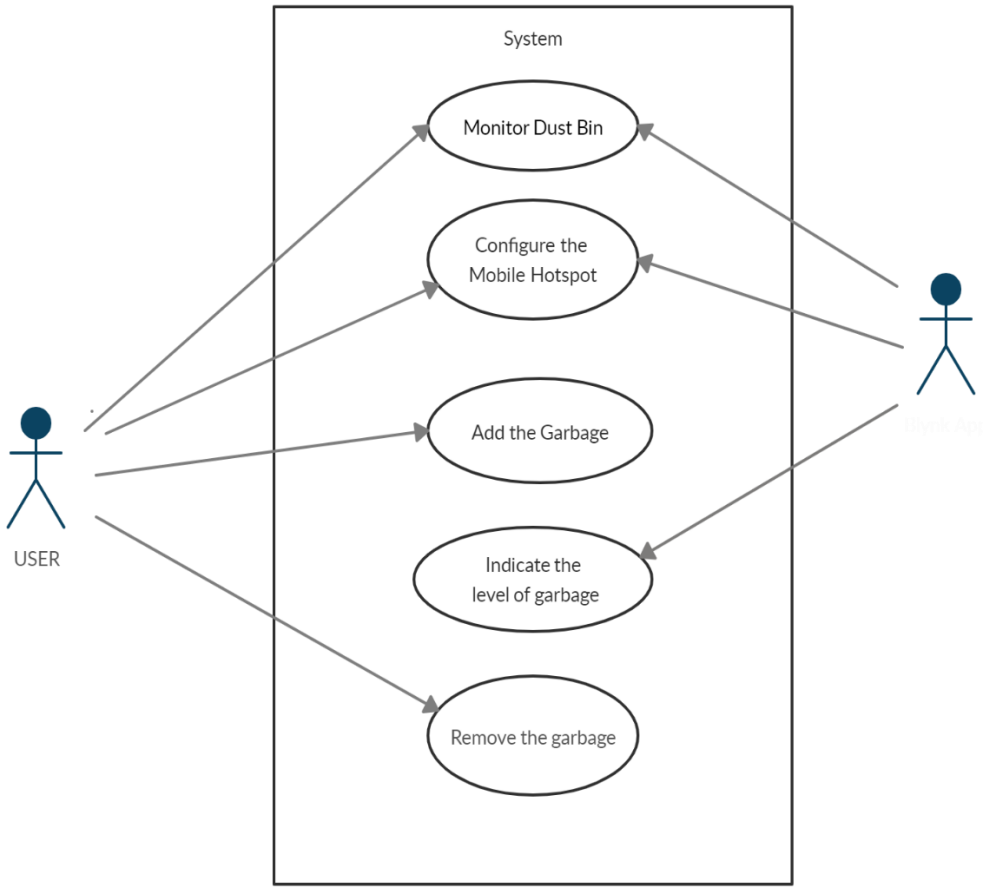


Fig 4.2 Waste Management System Use Case Diagram

4.3 Class Diagram

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

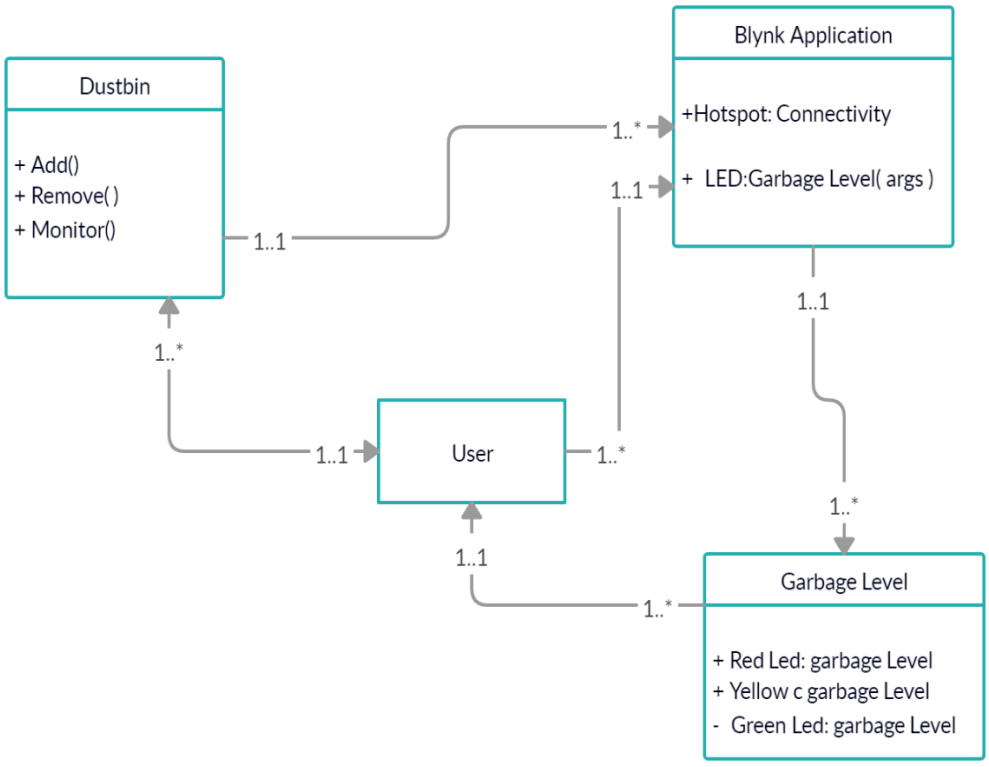


Fig 4.3 Waste Management System Class Diagram

4.4 Sequence Diagram

UML Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of a collaboration. Sequence Diagrams are time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when.

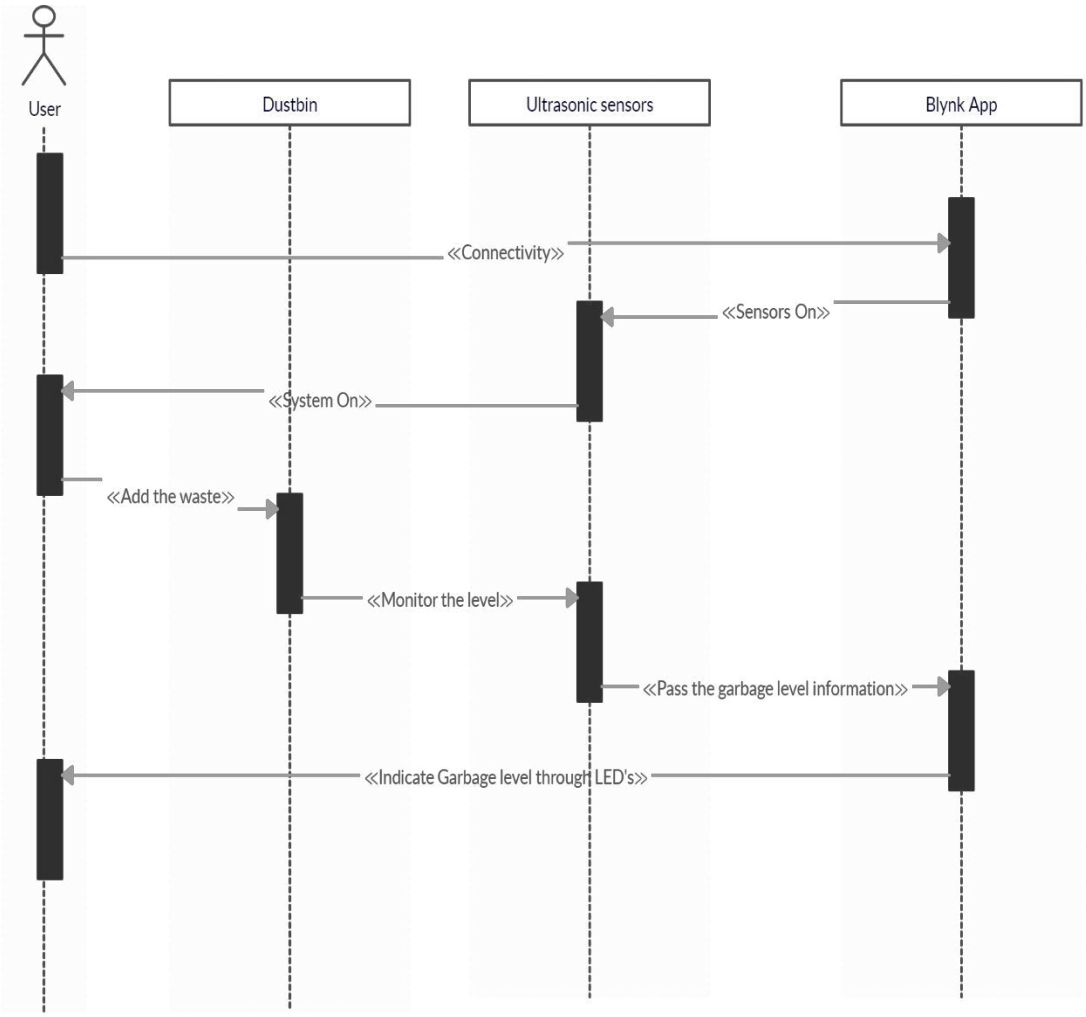


Fig 4.4 Waste Management System UML Sequence Diagram

4.5 State Diagram

Specifically, a state diagram describes the behavior of a single object in response to a series of events in a system. Sometimes it's also known as a Harrell state chart or a state machine diagram. This UML diagram models the dynamic flow of control from state to state of a particular object within a system.

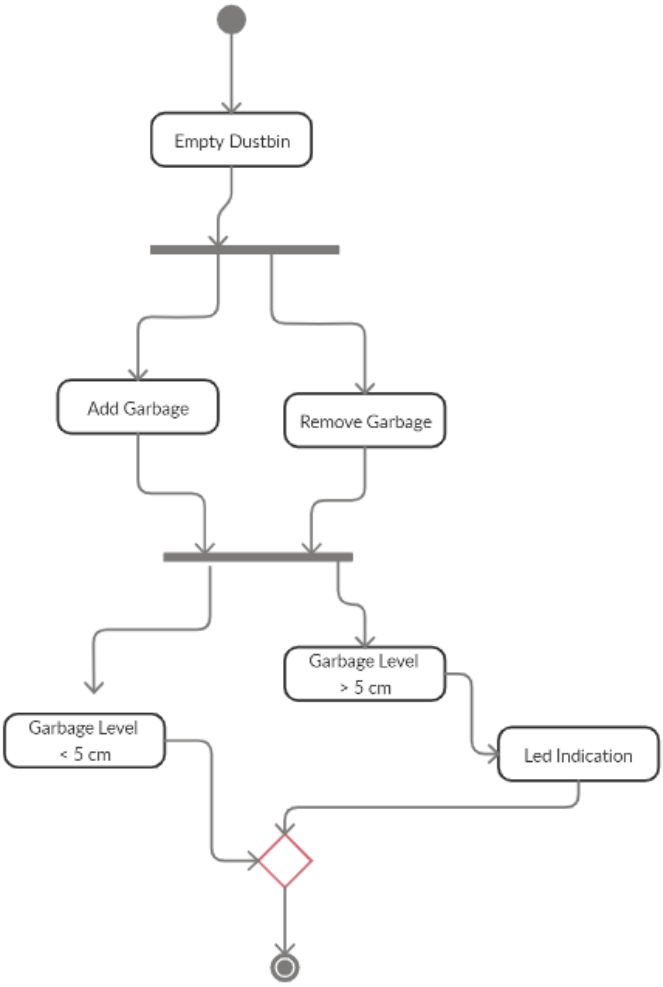


Fig 4.5 Waste Management System State Diagram

4.6 Block Diagram

A block diagram is a graphical representation of a system – it provides a functional view of a system. Block diagrams give us a better understanding of a system's functions and help create interconnections within it. Block diagrams derive their name from the rectangular elements found in this type of diagram. They are used to describe hardware and software systems as well as to represent processes. Block diagrams are described and defined according to their function and structure as well as their relationship with other blocks.

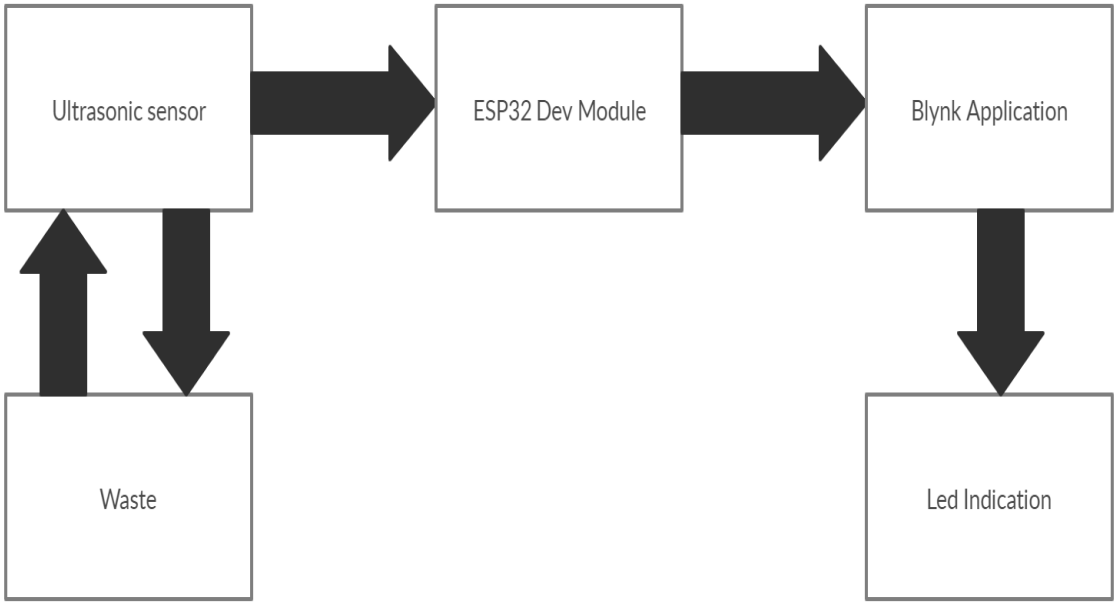


Fig 4.6 Waste Management System Block Diagram

CHAPTER 5

SOFTWARE AND PROGRAMMING

5.1 Description

The Arduino Integrated Development Environment (IDE) is the main text editing program used for Arduino programming. It is where you'll be typing up your code before uploading it to the board you want to program. Arduino code is referred to as **sketches**. Arduino programs can be divided in three main parts: **Structure, Values** (variables and constants), and **Functions**. Software structure consist of two main functions −

- Setup( ) function
- Loop( ) function

1) Setup(): - The **setup()** function is called when a sketch starts. Use it to initialize the variables, pin modes, start using libraries, etc. The setup function will only run once, after each power up or reset of the Arduino board.

2) Loop(): - After creating a **setup()** function, which initializes and sets the initial values, the **loop()** function does precisely what its name suggests, and loops consecutively, allowing your program to change and respond. Use it to actively control the Arduino board.

5.1.1 PROGRAM CODE

```
#define ULTRASONIC_TRIG_PIN     23   // pin TRIG
#define ULTRASONIC_ECHO_PIN     22// pin ECHO
#define BLYNK_PRINT Serial

#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>

char auth[] = "RpkJb3FSutshkn3HzENBBaW7pz3sSKI4";
char ssid[] = "MMP";
char pass[] = "abhay9309";
WidgetLED led0(V0),led1(V1),led2(V2),led3(V3),led4(V4);

void setup() {

  Serial.begin (9600);
  Blynk.begin(auth, ssid, pass);
  pinMode(ULTRASONIC_TRIG_PIN, OUTPUT);
  pinMode(ULTRASONIC_ECHO_PIN, INPUT);

}

void loop() {
```

```
 long duration, distance;
 digitalWrite(ULTRASONIC_TRIG_PIN, HIGH);
 delayMicroseconds(50);
 digitalWrite(ULTRASONIC_TRIG_PIN, LOW);
 delayMicroseconds(50);
 duration=pulseIn(ULTRASONIC_ECHO_PIN, HIGH);
 distance=duration*340/20000;

  if (distance <= 5) {
   led0.setValue(200);
}
 else {
   led0.setValue(0);
  }

if (distance <= 10) {

   led1.setValue(200);
}
 else {

   led1.setValue(0);
  }

  if (distance <= 25 ) {
  led2.setValue(200);

}
 else {

   led2.setValue(0);
```

```
  }



  Serial.print(distance);
  Serial.println("Centimeter:");
  Blynk.virtualWrite(V5, distance);
  delay(100);
  Blynk.run();
}
```

CHAPTER 6

SYSTEM DEVELOPMENT AND WORKING

6.1 Project Development

Fig 6.1 Project Development I

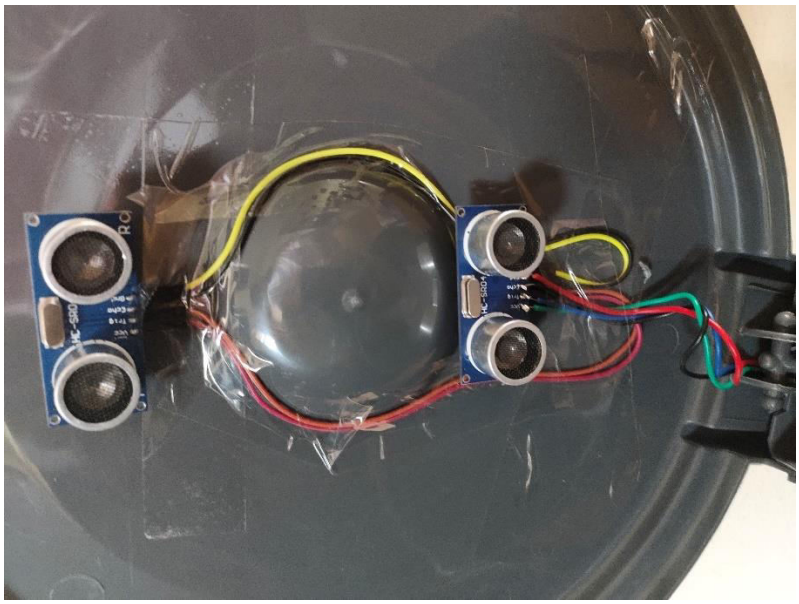


Fig 6.2 Project Development II

6.2 Project Working

In IOT based garbage management, we are showing live garbage bin. This system is based on Garbage Monitoring system which will show the data on Monitor through using ESP 32 Dev Module. And In this system we have given the 5v Supply through Arduino Mega 2560 and ultrasonic sensor which transmits the sound waves. When we put the garbage into the dust bin ultrasonic sensor will senesce the garbage with the help of the ultrasonic sensor which transmit the sound wave which will sense the garbage in the dustbin.

Then it will give the level of indication of garbage with the help of ESP 32 Dev Module and transfer data on to the android application which is BLYNK App. If it is empty then it will show all 3 LED OFF. If the dustbin is half full it will show 2 LED ON and 1 LED OFF. It will show the all 3 LED ON if the garbage of the dustbin is full.

6.3 Project Advantages

1. Monitors the garbage bins and informs about the level of garbage collected in the garbage bins.
2. Keeps our Environment clean & green.
3. Cost & Effort are less in this system.
4. Reduces the human efforts required for garbage disposal management.
5. This project is also helpful in the government project of **"SWACHH BHARAT ABHIYAN''.**

CHAPTER 7

TESTING

7.1 Formal Testing

Software testing is the process of executing a program or application with the intent of finding the software bugs. It can also be stated as the process of the validity and verifying the software program or a product. It meets the business and technical requirements that guided its design development.

A formal technical review is a software quality assurance activity performed by software engineers. The objectives of FTR are –

1. To uncover the error in function, logic, implementation for representation of the product.
2. To verify that the product under review meets its requirement.

3. To ensure that the hardware has been represented according to predefined standards.
4. To achieve project that is developed in uniform manner.
5. To make project more manageable.

The FTR also serves to promote backup and continuity because a member of people become familiar with the parts that they may not have otherwise seen. The FTR is actually a set of reviews that includes walkthrough, inspection, etc. Each FTR is conducted as a meeting and will be successful only if it is properly planned, controlled and attended. In the section that follow, guideline similar to those for a walkthrough are presented as a representative formal technical.

7.2 Test Plan

The test plan identifies the following: -

1. Items required for testing.
2. Instructions to set up the items that will be used during the test.
3. General description for how to operate the systems under test.
4. Specific actions and events that will take place during the test.

7.3 Testing

What is Testing?

Testing is the process of evaluating a system or its component(s) with the intent to find whether it satisfies the specified requirements or not. In simple words, testing is executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements.

7.3.1 Hardware/Software Testing

Hardware testing is usually more detailed and thorough than verification. Testing is needed to ensure that every component of a system is operating as it should, and that the system is performing exactly in accordance with the specific local requirements.

A comprehensive structured testing program is one that ensures that all aspects of a system are tested. This is especially important for key systems such as electronic voting systems. Testing measures that could be followed include:

1. Developing a set of test criteria. Applying 'non-operating' tests to ensure that equipment can stand up to expected levels of physical handling, such as transit drop tests.
2. Examining if appropriate any code 'hard wired' in hardware (this code is sometimes known as firmware) to ensure its logical correctness and to ensure that appropriate standards are followed.
3. Applying functional tests to determine whether the test criteria have been met. Applying qualitative assessments to determine whether the test criteria have been met.
4. Conducting tests in both 'laboratory' conditions and in a variety of 'real life' conditions.
5. Conducting tests over an extended period of time, to ensure systems can perform consistently.
6. Conducting 'load tests', simulating as closely as possible a variety of 'real life' conditions and using or exceeding the amounts of data that could be expected in an actual situation.
7. Verifying that 'what goes in' is 'what comes out', by entering known data and checking that the output agrees with the input.

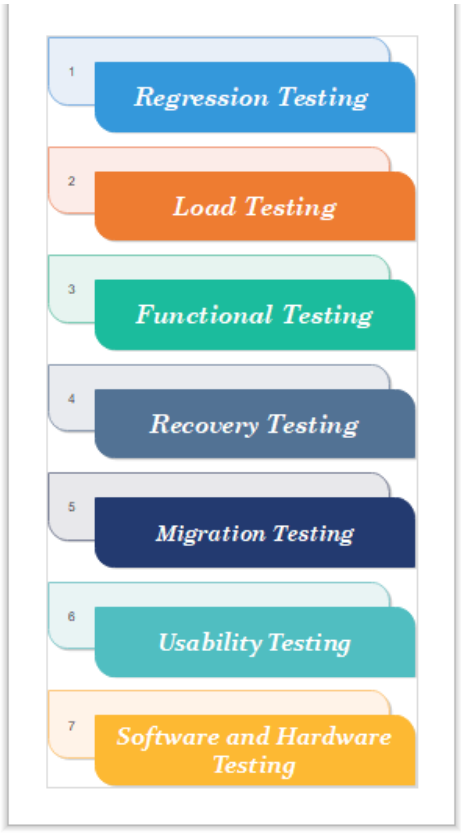


Fig. 7.1 Types of Hardware Testing

8.4 Testcases

A TEST CASE is a set of conditions or variables under which a tester will determine whether a system under test satisfies requirements or works correctly. The process of developing test cases can also help find problems in the requirements or design of an application.

Following are testcases for " Waste Management System Using IOT "

Test case no	Test case objective	Pre requisites	steps	input	Actual result	Expected result	status
1.)	to check the Arduino working or not	Device should be available	1.)connect wire to Arduino 2.) give power supply to it	give power supply	Arduino showing light	Arduino showing light	pass
2.)	to check ESP 32 working or not	Device should be available	1.)connect ESP 32 with Arduino 2.) give power supply to it	give power supply	ESP 32 show light	ESP 32 show light	pass
3.)	to check right blynk app installed or not	Internet must be on	1.)go to playstore 2.)search blynk app 3.)download the app	Click to install	right app install	right app install	pass

4.)	to check proper installation of Arduino ide	Internet must be on	1.)go chrome search Arduino ide click to download 2.)download it	click to down load	Arduino ide installed	Arduino ide installed	pass
5.)	To check project required libraries are installed in Arduino ide or not	Internet must be on	1.)go at Arduino ide 2.)install the required libraries for project	Click to instal l	Libraries are installed	Libraries are installed	pass
6.)	To make proper connection s	All device connection block diagram should be ready	1.)collect all device and wires 2.)make the connection	Mak e conn ectio n	All connection ready	All connections are ready	pass
7.)	To upload proper code	Code should be ready	1.)check the code 2.)make correction in code 3.)upload it into esp32 with help of wire	Click to uploa d	Proper code uploaded	Proper code uploaded	pass

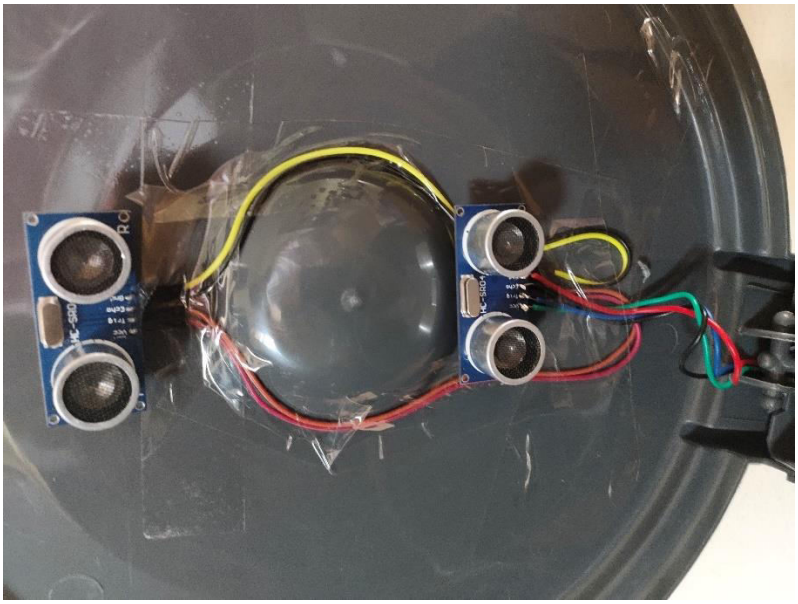
8.)	To create account in blynk app	Blynk app should be installed	1.)signup to blynk with Gmail account	signup	Account created	Account created	pass

9.)	To make proper setup in blynk app	Blynk app should be installed	1.)take 3 led 2.)assign 1,2,3 no for led 3.)assign three different color to it red, green, ,yellow	Proper setup	Blynk app setup are ready	Blynk app setup are ready	pass
10)	To check working of blynk app	Blynk app should be installed	1.)start the Bluetooth	Start Bluetooth	Token are generated	Token are generated	pass
11.)	To check showing of light when dustbin is empty	All requirement should be completed required for project	1.)take dustbin empty	Empty dustbin	Not showing any light	Not showing any light	pass
12.)	To check showing of light when dustbin fill at low level with garbage	All requirement should be completed required for project	1.) Fill the dustbin only low level	Low filled dustbin	Showing green light	Showing green light	pass

13.)	To check showing of light when dustbin fill at medium level with garbage	All requirement should be completed required for project	1.) Fill the dustbin only medium level	Medium filled dustbin	Showing yellow, green light	Showing yellow, green light	pass
14.)	To check showing of light when dustbin fill at medium level	All requirement should be completed required for project	1.) Fill the dustbin only full level	Full filled dustbin	Showing green and yellow, red light	Showing green and yellow, red light	pass
15.)	To check working of ultrasonic sensor	All requirement should be completed required for project	1.)fill dustbin level by level	Power supply	Detect proper level of garbage	Detect proper level of garrbage	pass

CHAPTER 8 ACTUAL

PROJECT SNAPSHOT



CHAPTER 9

CONCLUSION

This project task is the execution of Waste management system using IOT (sensor, microcontroller). This system satisfies the cleaning of dustbins soon when the waste level reaches its highest. By execute this present system we can expand the smart city idea and price will also be lower. If using this mechanism, it is a step towards making smarter cities with the primary concepts of internet of things and sensors, as fundamentals parameters are cleanliness and disinfection which is subject of cover for smart cities. We trust that this research paper will inspire others to do work on related subject. So for perfect lifestyle, hygiene is required, and hygiene is start with Dust Bin. This project will assist to eliminate or reduce the Waste disposal issue.

CHAPTER 10

BIBLOGRAPHAY

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WASTE MANAGEMENT SYSTEM USING IOT

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ABSTRACT

Waste management is one of the main issue that the entire world challenge of the case of developed or developing cities. Raise amounts of recyclables that are not maximized and indifference in proper waste division has led to the crowd in flourish a solution to this. This project Waste Management system using IOT is new systems which will cooperation to keep the cities hygienic. This system monitors the dust bins and notify about the level of waste collected in the dust bins via a blynk app. To avoid dereliction of the waste and to increase the disinfection of the humanity, Waste management system is designed. In the suggested system, the level of the waste is identified with the help of ultrasonic sensor.

KEYWORDS: Recyclables, IOT, hygienic, blynk app, dereliction, ultrasonic sensor.

I. INTRODUCTION

A massive challenge in the developing cities is waste management. Hence, Waste management using IOT is a system which can trash this issue or at least decreases it to the smallest level. Waste may contain of the unacceptable material left over from home, Public place, College, industries etc., due to these wastes there will be deadly gases expand from them which is damaging for the neighboring residents which leads to serious diseases. Hence, we desire such a system that can destroy or at least reduce this issue to some expansion. With the build-up in technology it is high time that we use technology for waste management systems. The Waste management system is a perfect solution to the exact and curious issues in waste management.

II. LITERATURE SURVEY

This Section provides a brief survey on the existing dust bin monitoring systems proposed in the literature by the researchers in the past. For instance [1]. Kannapiran Selvaraj has presented the Smart Dustbin Monitoring System using LAN Server and Arduino [2]. Eveneet Johar has presented the IOT Based Intelligent Garbage Monitoring System [3]. Shubham Choudhary has presented Smart Garbage Bin [4]. Sapna Suryawanshi1 has presented Waste Management System Based on IOT [5]. Nikita Nathrani has presented Waste Monitoring System using Internet of Things [6]. Akshatha.C. S1 has presented Garbage Bin Monitoring System for Dry Waste [7]. Neha shinde has presented A Survey on Garbage Collection and Monitoring System for Smart cities using IOT [8]. Sagar R has presented Efficient Trash Management System Using Smartbin [9]. Fetulhak Abdurahman has presented Automated Garbage Monitoring System Using Arduino [10]. Swati Sharma has presented Smart Dustbin Management system.

III. SYSTEM COMPONENTS

There are primarily four components which are used for the designing of our Waste management system, and they are:

a) Ardunio At Mega:

Arduino Mega 2560 is a micro-controller board build on the ATmega2560. It comes with 54 digital input/output pins (of which 15 are useable as PWM outputs), 16 analog inputs, a USB (Universal Serial Bus) connection, a power supply jack, an ICSP (In Circuit Serial Programming) header, 4 UARTs (hardware serial ports), and it is also having reset button. It contains all things that is needed to support the micro-controller and simply connect it to a computer system with a USB cable and having good configuration and give power supply with an AC-to-DC adapter to get started.

Figure:1 Ardunio At Mega

b) ESP 32 Dev Module:

A ESP32 Dev Module is a sequence of with less cost efficiency, less power system on a micro-controller chip with integrated Wi-Fi module and a dual-mode Bluetooth system.. ESP32 is designed and developed by Espressif Systems, and it is manufactured by TSMC. The ESP32 sequence use a Tensilica Xtensa LX6 microprocessor in the both dual-core and single-core variations and includes in-built antenna switches, RF balun (a contraction of balanced-unbalanced), power amplifier, low-noise receive amplifier, filters, and power-management modules.

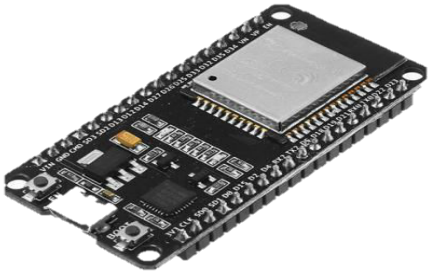

Figure:2 ESP 32 DEV Module.

c) Ultrasonic Sensor:

An ultrasonic sensor is an electronic component that calculate the distance of an aimed object by emitting an ultrasonic sound waves, and convert the reflected sound into an electrical signal. An Ultrasonic wave traverse faster than speed of audio sound (i.e. that sound humans can hear). Ultrasonic sensors have two main components i.e. transmitter (which emits the sound using piezoelectric crystals) and receiver (which destroy the sound after it have been travelled and from the target).

Figure:2 Ultrasonic Sensor

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IV. WORKING

In IOT based garbage management, we are showing live garbage bin. This system is based on Garbage Monitoring system which will show the data on Monitor through using ESP 32 Dev Module. And In this system, we have given the 5v Supply through Arduino Mega 2560 and ultrasonic sensor which transmits the sound waves.

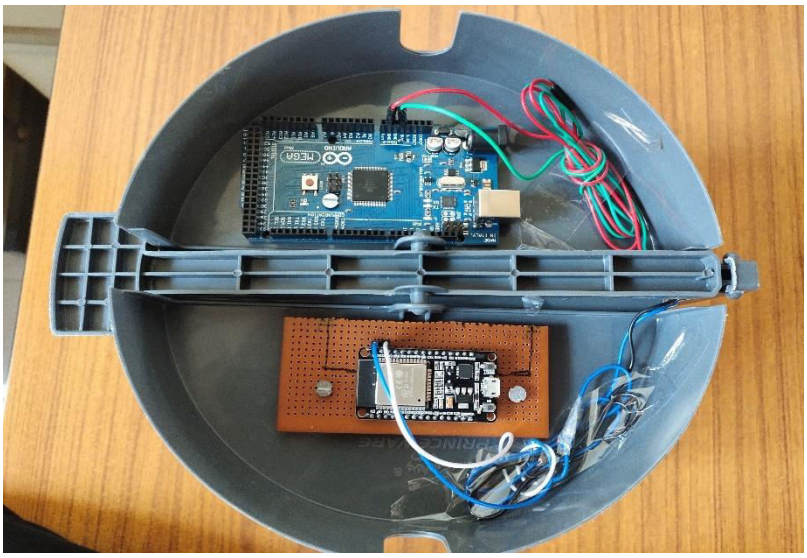

Figure:3 Circuit Diagram

When we put the garbage into the dust bin ultrasonic sensor will senesce the garbage with the help of the ultrasonic sensor which transmit the sound wave which will sense the garbage in the dustbin. Then it will give the level of indication of garbage with the help of ESP 32 Dev Module and transfer data on to the android application which is BLYNK App. If it is empty then it will show all 3 LED OFF.

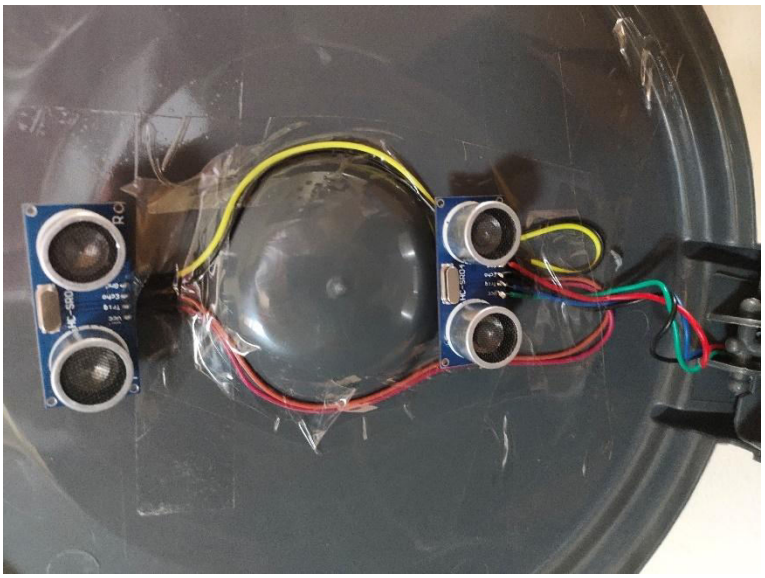

Figure:4 Circuit Diagram

If the dustbin is half full it will show 2 LED ON and 1 LED OFF. It will show the all 3 LED ON if the garbage of the dustbin is full.

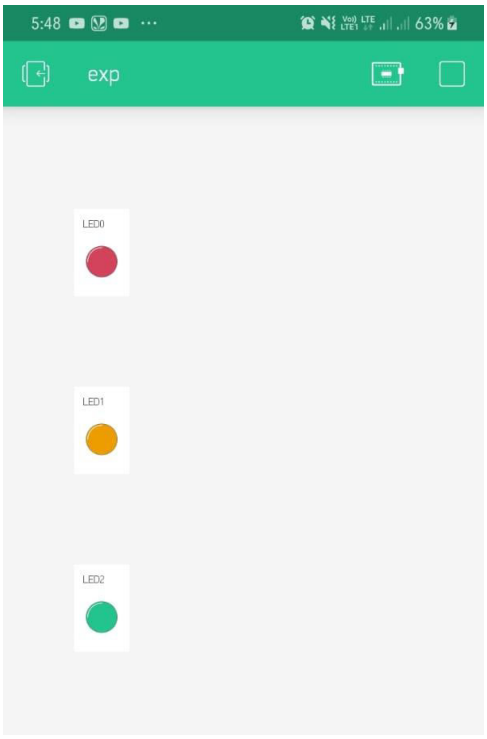

Figure:4 Circuit Diagram

V. CONCLUSION

This project task is the execution of Waste management system using IOT (sensor, microcontroller). This system satisfies the cleaning of dustbins soon when the waste level reaches its highest. By execute this present system we can expand the smart city idea and price will also be lower. If using this mechanism, it is a step towards making smarter cities with the primary concepts of internet of things and sensors, as fundamentals parameters are cleanliness and disinfection which is subject of cover for smart cities. We trust that this research paper will inspire others to do work on related subject. So, for perfect lifestyle, hygiene is required, and hygiene is start with Dust Bin. This project will assist to eliminate or reduce the Waste disposal issue.

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