IoT Based Smart Trash Bin

I. Sivaprasad Manivannan, S. Ashok, R. Anuja

Assistant Professor, Department of Computer Science and Engineering, Rohini College of Engineering and Technology, Kanyakumari, Tamil Nadu, India

ABSTRACT

Dynamic increase in the amount of waste and despicable dumping of waste has become a matter of concern because of the threat it causes to the environment. There comes the pivotal role of an automated waste segregate which avoid this plight and also reduces the difficulty of recycling. The importance and the economic value of waste is realized only when it is segregated. Currently there is no such system for segregation of dry and wet wastes. This system proposes a spot automatic waste segregation unit that effectively gives a solution to this problem. . For the separation of wet and dry waste capacitive sensors are used. The benefits of this work are, the waste has a higher potential for recovery and the occupational hazards of waste separating workers is also reduced. IOT Based Smart Trash consists of sensors, microcontroller and SMS module. The sensors detect the garbage level if the level reaches its average or maximum. The waste segregator as the name suggests, segregates the waste into three major classes: dry, wet. Waste is pushed through a flap into the proposed system. The inlet section is provided with open and close mechanism to regulate the flow of waste on to the bin. Wet detecting sensor is used to detect or identify the waste. The signal from the sensor initiates the push mechanism to discard the waste.

Keywords : SENSOR, WIRELESS, EEG

I. INTRODUCTION

One of the major problems in developing countries is overflowing garbage bins and waste segregation. This is mainly due to the increase in population and improper waste management system. Untreated waste on open areas will lead to various diseases as insects breed on it. Thus, solid waste management is a big challenge in urban cities. Dynamic increase in the amount of waste and despicable dumping of waste has become a matter of concern because of the threat it causes to the environment. There comes the pivotal role of an automated waste segregate which avoid this plight and also reduces the difficulty of recycling. The importance and the economic value of waste is realized only when it is segregated. Currently there is no such system for segregation of dry and wet wastes. This system proposes a spot automatic waste segregation unit that effectively gives a solution to this problem. For the separation of wet and dry waste capacitive

sensors are used. The benefits of this work are, the waste has a higher potential for recovery and the occupational hazards of waste separating workers is also reduced. In a locality, around thousands of shops like restaurants, groceries shop, etc. Create huge amount of waste on daily basis, plastic waste itself is around two tones every day. People blame the municipal authorities for not taking proper action or their lack of interest in waste removal, but even after the removal of waste from an area, the next day it will still be a garbage dumping yard. The problem is that there is no proper systematic waste management. Uncollected garbage-pileup and stinking waste across both sides of national highways of various states in India is a normal scene today because of increase in population, lack of awareness and limited funding on waste management programs. Waste management is all about managing disposal of waste. Generally, municipalities pick up the trash on designated days on each and every trash cans of the locality whether or not the bins are full in order to keep the city clean. Thus wasting his time and number of trips he has to take for the garbage removal of all the dustbins. Hence IOT Based Smart Trash Can is used to reduce this problem to a minimum level. Since people have only limited time and attention, they are not very accurate when it is about capturing data about things in the real world. If computers were able to gather all these information without any human intervention, it would be easy for us to track everything and also reduce waste and cost. Internet has become an important part of today's lifestyle due to the tremendous demand and necessity leading to the beginning of Internet of Things (IOT). Internet of Things is where the surrounding objects can be connected through a wired or wireless network without any human intervention.

II. RELATED WORKS

Many projects were still ahead in development for the garbage monitoring system in metropolitan cities based on Internet of Things (IOT).

1. L. Navya Teja , Md. Muthaharunnisa Smart dustbin based on IOT published in international journal of engineering and technoloGY,2018 based on internet of things where bins are interfaced with microcontroller based framework with ultrasonic Sensors to identify level of waste material and detect and communicated through GSM module. Other modules are LCD to display the status of garbage level.

2. Kanchan Mahajan, Prof.J.SChitode-waste bin monitoring system using integrated technologies, published in international journal of innovative research in science, engineering and technology, July 2014.Involving the ultrasonic sensors connected to LPC2148 with the help of ZigBee technology. LPC is interfaced for the monitoring and with the help of GSM modem, the data is sent to the mobile phone where thereby immediate cleaning of bin continuous

3. Abhishek Apte, Dhiraj Ghodi, Devang Desai, Hiral Raveshiya, Nidhi Sanghavi-Waste management system using IOT, published in international journal of recent trends in engineering and research, April 2018.Involving an ultrasonic sensor at the dustbin top, then connected to the Arduino UNO where power supply is given with the battery, here using the Wi-Fi module for the transmission of data to the municipal corporation. With the help of Wi-Fi modem data is sent to the cloud where thereby sent to the workstation. With the help of GSM, they will come and collect the waste.

4. Mustafa M.R and Ku Azir-Smart Bin: Internet- of-things garbage monitoring system, published in ICEESI in 2017.The project utilized the ARM LPC1768 microcontroller where ultrasonic sensors are interfaced for finding the level of garbage. For monitoring there interfaced with the ESP8266 Wi- Fi module where thereby monitoring in the Things Speak

website. LCD display is also interfaced for the monitoring the level of garbage.

5. Smart Garbage Management System By Vikrant Bhor , Pankaj Morajkar , Maheshwar Gurav and Dishant Pandya uses a GSM module to send the data while in this project, the esP8266 module is used for sending the data.

III. PROPOSED SYSTEM

IOT Based Smart Trash consists of sensors, microcontroller and SMS module. The sensors detect the garbage level if the level reaches its average or maximum. The status of the trash can is then send to the municipal authority by using the SMS module. The municipal authority being the server can view all the trash cans that are controlled by this system. He/she can also add new trash cans and view the status of all the trash cans. When the trash can is full, a SMS alert can be sent to the corresponding garbage collector. SMS alert will also contain the location of the dustbin that requires waste removal.

The waste segregator as the name suggests, segregates the waste into three major classes: dry, wet. Waste is pushed through a flap into the proposed system. The inlet section is provided with open and close mechanism to regulate the flow of waste on to the bin. wet detecting sensor is used to detect or identify the waste. The signal from the sensor initiates the push mechanism to discard the waste.

Advantages of the proposed system

1. It helps in obtaining real time information about the level of the dustbin.
2. It helps to achieve cost reduction and resource optimization.
3. It improves Environment quality
4. Reduce foul smell in the environment
5. Cleaner cities
6. Effective and efficient usage of dustbins.
7. Fully automated waste segregation

8. Segregation helps authority for recycling process

This system helps to reduce the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. This ultimately helps to keep cleanliness in the society.
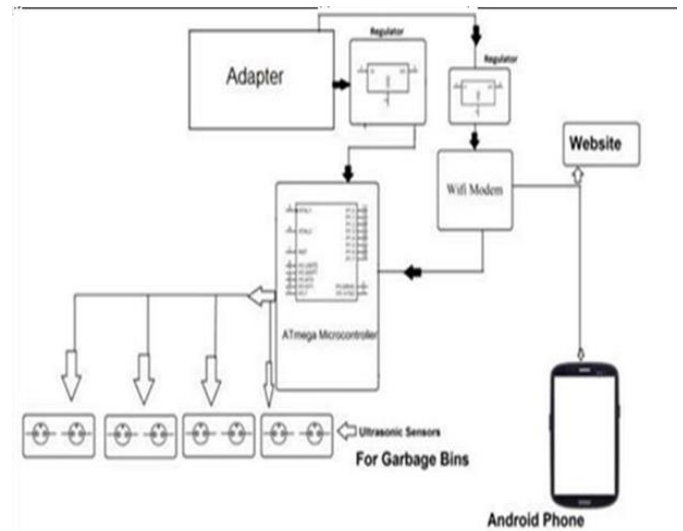

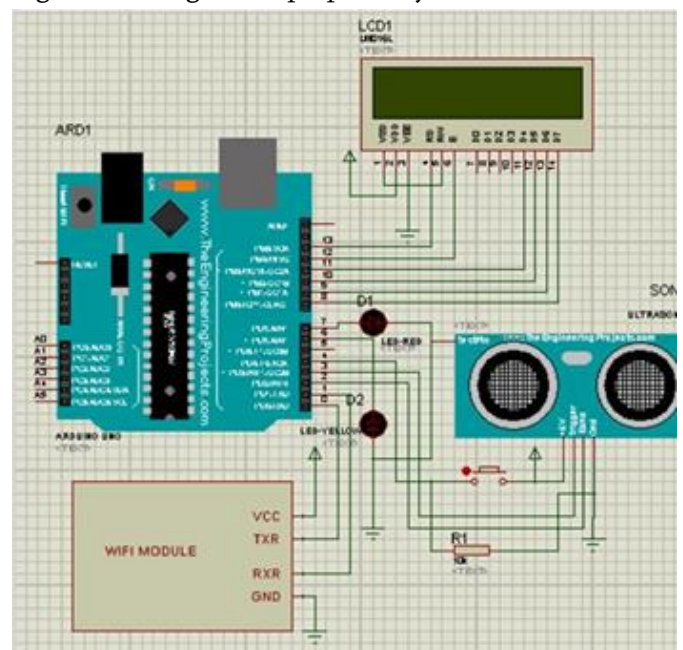
Fig : Block diagram of praposed system

Fig : circuit diagram of smart trash bin

Pin configuration:

Arduino has 28 pins, including 14 digital pins, 6 analog pins & supply pins.

Ultra sonic sensor have 4 pins, they are vcc, ground, trigger pin, Echo pin.

Vcc connected to 5v. Ground connected to 0v.

Trigger pin connected to D3 pin.

Echo pin connected to D2 pin. Lcd have 16 pins. They are:

1. 5v
2. Vss : gnd
3. Vo : contrast control connected to variable resistor.
4. RS – D13 (register select)
5. E-D12(enable pin)
6. R/W : connected to gnd(read/write)

D0-D7 (data pins) : Here D4 to D7 pins are connected to D11,D10, D9 D8 of arduino uno pins.

Wifi-module have 4 pins :

1.Vcc-3.3v
2.gnd-Ground
3. txr- connected to Rxr pin of arduino 4.rxr- connected to txr pin of arduino Hardware

1. Microcontroller
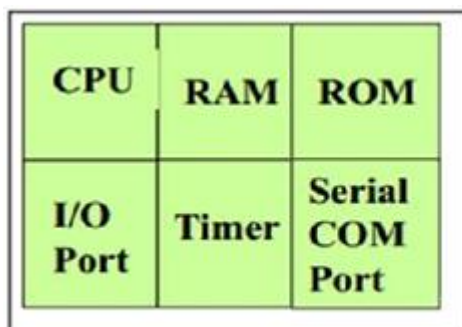
1. It is a smaller computer.
2. Has on-chip RAM, ROM, I/O ports Features of Atmega328
High Performance

· Low Power
· AVR 8-Bit Microcontroller
· Advanced RISC Architecture
· I/O Pins: 23
· Timers: Two 8-bit / One 16-bit
· External Oscillator: up to 20MHz

2. Ultrasonic sensor

Ultrasonic sensors (also known as transceivers) work on a principle of a target by interpreting the echoes from radio or sound waves respectively.
Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor.

3. Lcd

Microcontroller. Most common LCDs connected to the microcontrollers are 16x2 and 20x2 displays.
This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.
The standard is referred to as HD44780U, which refers to the controller chip which receives data from an external source (and communicates directly with the LCD.

4. Wifi module

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give

any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre- programmed with an AT command set firmware. The ESP8266 module is an extremely cost-effective board.

5. ardunio uno

All Ultrasonic sensors will be interfaced to Arduino Uno and will be the input section of the system.

Arduino Uno will be programmed to perform task to measure via sensor and give output.

Arduino Uno will be connected to Internet and will be logged into a server through WIFI modem.

PC will be configured as a Server and will send commands to Arduino Uno to monitor all events.

Working Procedure

1. In the smart dustbin hardware contains 16*2 LCD Display, Aurdino UNO, Bread Board, Power Supply, Wifi module and ultrasonic sensor.

2. In the smart dustbin ultrasonic sensors will continuously monitor the status of the bin.

3. When certain threshold level is reached, the level sensors will trigger the message to the concern authority.

4. ArduinoUno board provides a development environment for writing software for the board.

5. 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, and each and all levels are sent to server via wifi module.

6. In pc, there is a modem to receive the data coming from hardware and it directly give to server.

7. The status of the trash can is then sends to the municipal authority by using the WIFI module.

8. The municipal authority being the server can view all the trash cans that are controlled by this system.

IV. CONCLUSION AND RESULT

The smart city concept is still new in India. The prime need of a smart lifestyle begins with cleanliness and cleanliness begins with dustbin. A society will get its waste dispatched properly only if the dustbins are placed well and collected well. The main problem in the current waste management system in most of the Indian cities is the unhealthy status of dustbins. Various features such as durability, affordability, prevention against damage and maintenance issues are addressed when these smart dustbins are designed. This Smart Dustbin can contribute a lot towards clean and hygienic environment in building a smart city. The main advantage is that it control overflowing of trash cans in public areas and various localities, as smart trash cans ensures real time waste management. The time for filling and removing the trash of smart bin will also be minimized thus a clean environment

and empty dustbins available to common people. The number of trips required by the garbage collection truck.

I. CONCLUSION

In this monitoring and management for green environment.
Cite this article as :

II. REFERENCES

[1]. Prof. R.M.Sahu, Akshay Godase, Pramod CONTROL ENGINEERING, Vol. 4.
[2]. Kanchan Mahajan, Proff.J.S.Chitode, "Waste Bin Monitoring

Screen shots
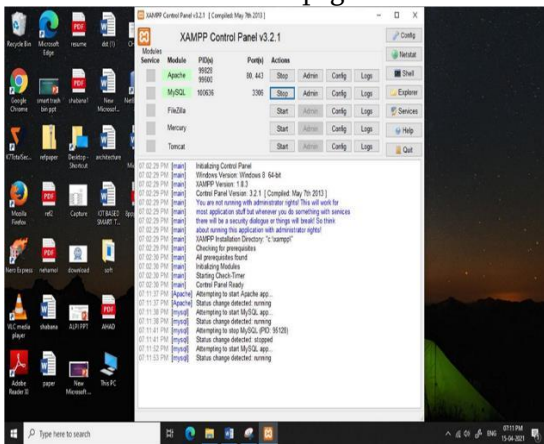1. Open the XAMPP Control panel4. Home page of the smart trash bin web page

Fig: XAMPP Control panel.
2. Login Page of SMART DUST BIN web page
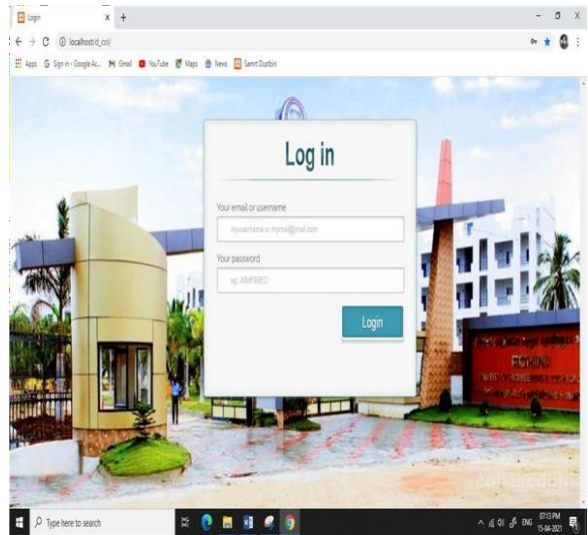
Fig: login page of the web page
3. Entering user id and password
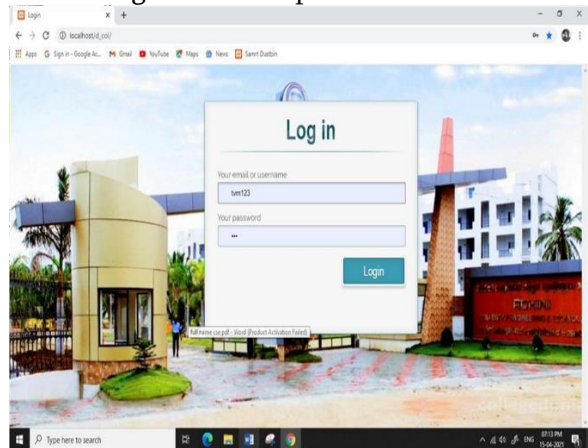
Fig: user id and password of the webpage
4. Home page of the smart trash bin web page
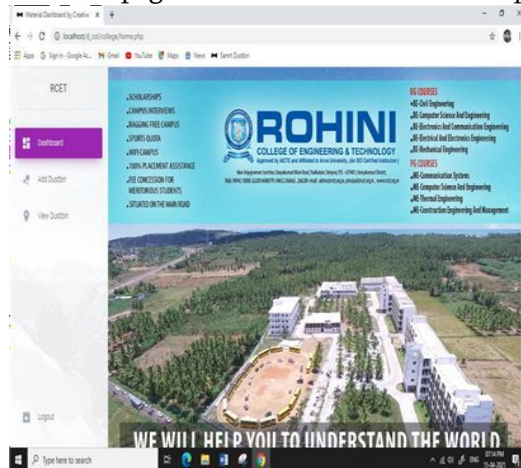
Fig: Home page of the web page
5. we can add trash bins in the add dust bin side
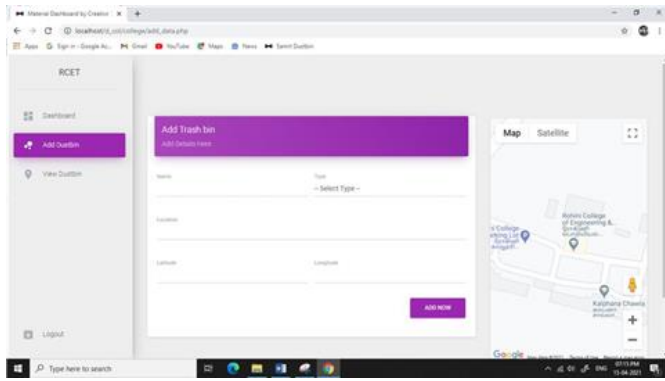
6. Finding the location of dust bin using Google Map
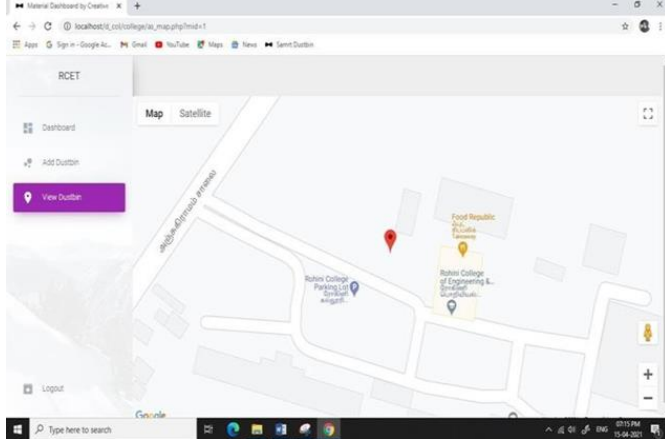
Fig: location of the trash bins.

7. the name of the dustbin in the list
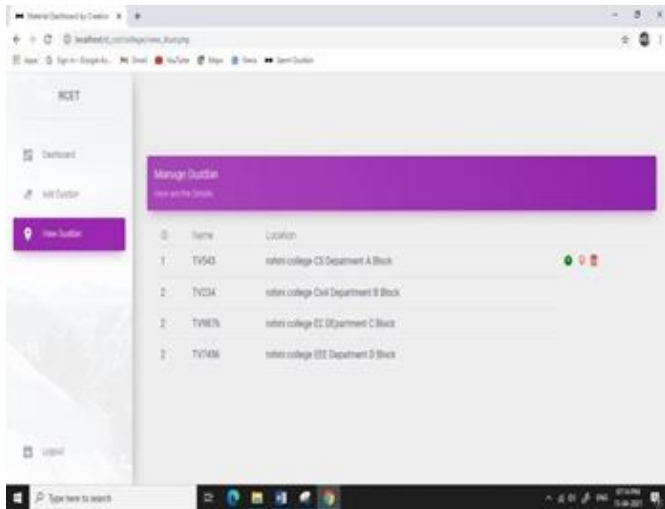
Fig: name and location of the dustbin in department wise
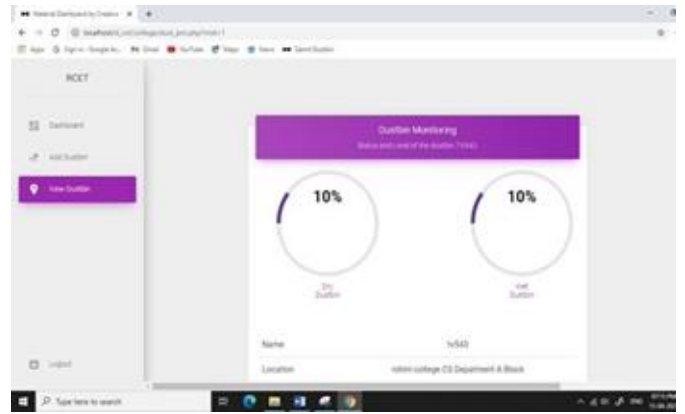
8. Garbage level monitoring of the dustbin

Fig: Analysis and segregating the waste
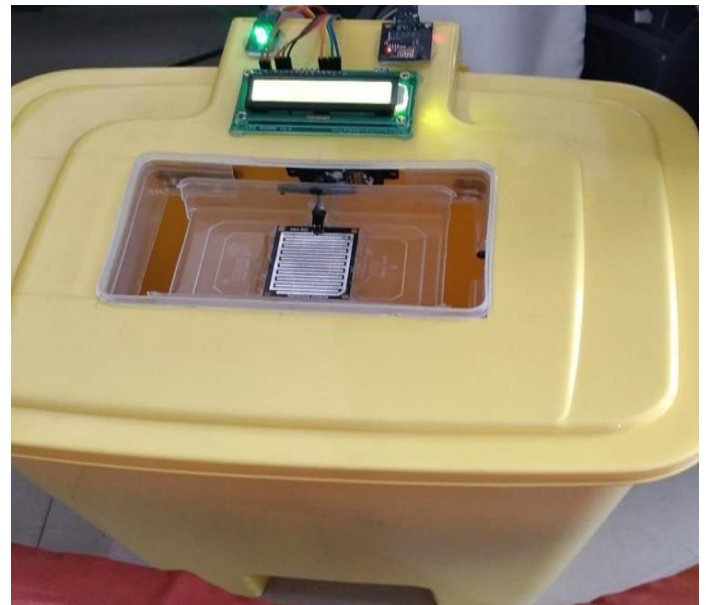
9. Screen short of the Garbage collector

Fig: smart trash bin
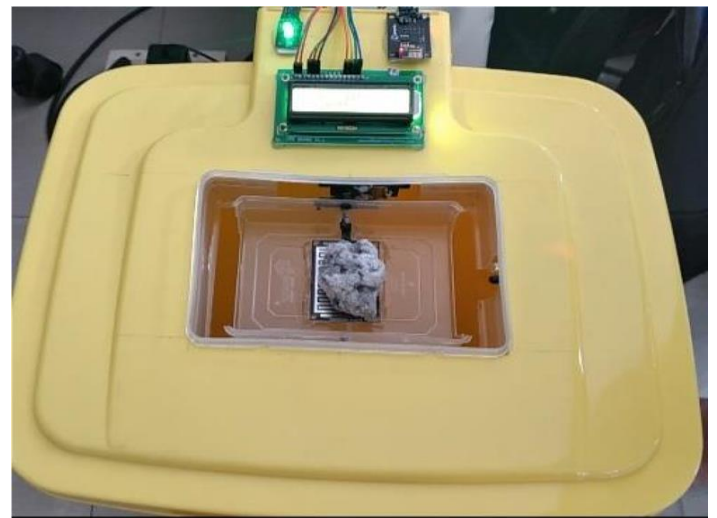
10. Detecting the type of waste in the flap

Fig: analysis of waste type
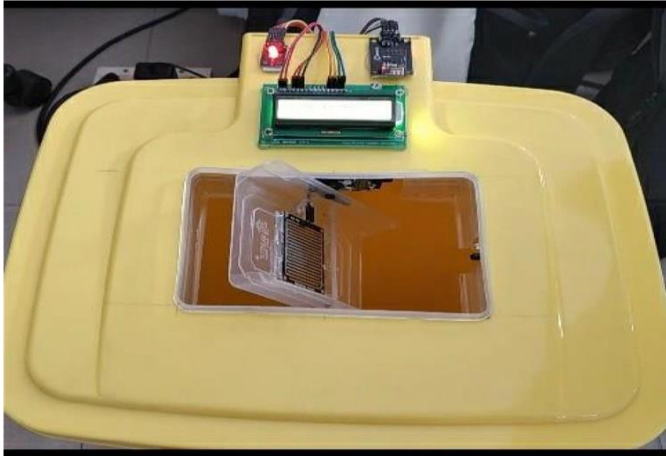
11. Analysis and segregating the waste

Fig: segregation of the waste

Cite this article as :