REPORT

TEAM ID:PNT2022TMID19083

PROJECT NAME: Smart waste management system in metropolitan cities

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Chapter 1- INTRODUCTION

1.1 Project overview

The traditional waste management system operates on their daily basis,which is highly inefficient and costly.So this project aims at developing the smart controlled manner waste management system, in which the public as people utilizes in an effective manner.Waste has become has a reat concern for all of us.So using IOT(Internet Of Things) the usual waste management system is replaced which is embedded into the system to perform real time monitoring which is helpful for better waste management.Developed a communication protocol and tensorflow by using GPS.The GPS is used for easy tracking.Every bins that are kept for collecting the waste have individual ID names.Therefore conventional prototype of smart waste bins is suitable for conventinal waste management.

1.2 Purpose

The transformation of an urban habitation into a smart zone consist of multiple parameters for optimal implementation using the GPS module technologies.This system also adopts with network environment which is collecting information from waste management.Ultrasonic sensor is embedded into each waste sectors to monitor the filling level of the bin waste.

Chapter 2- LITERATURE SURVEY

2.1 Existing problem

The disposal of solid waste is a major issue in urban centres of most developing countries.The main goal was to monitor the waste content of bin using traditional removal waste method.The environment is harming people's health.One application displays the status of the garbage can, while the other displays the status of the recycling bin.

2.2 References

i)J. A. Nanthanson, Solid waste management (april 2019)
ii)L.A Manaf,M.A.A Samah, and N.I.M Zukki,"Municipal solid waste management in malaysia,pratices and challenges," waste management.,vol 29,no.11 pp.2902-2906, nov 2009.
iii)L.Mi,N.Liu and B.Zhou,"Disposal methods for municipal solid waste and its development trend",in

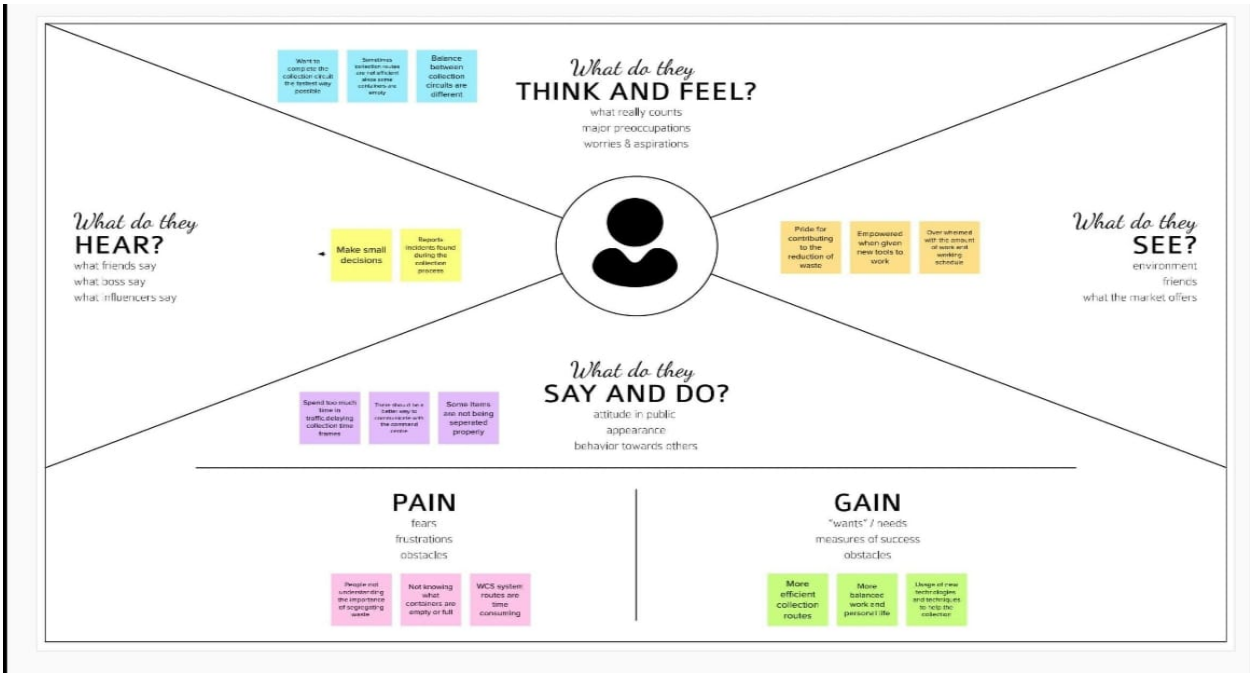
2010 4th november international conferenceon bioinformatics and biomedical engineering 2010
iv)K.Pardini,J.Rodrigues,S Koziov,N.Kumar, and V.Furtado. IOT based solid waste management solutions:A survey "J.Sens.actuator networks vol.8 no.1,p.5,2019.
v)H.Bacot,B Mccoy,and J.Plagman-alvin,"municipal commercial recycling".
vi)B.R.Balakrishnan ramesh babu,A.K Anand kuber parnand
vii)M.Ali, W.Wang N.Chaudry and Y.Geng,"Hospital waste management".

2.3 Problem Statement Definition

Waste management suffers from a pervasive under-pricing which means that the costs of waste management are not fully appreciated by consumers and industry an waste disposal is preferred over the other options.Few waste treatment options are available than landfills costs.Therefore the transformation of an urban habitation into a smart zone consist of multiple primary parameters including technology and datas.Sustainable development and a better future of humankind.

Chapter 3- IDEATION & PROPOSED SOLUTION

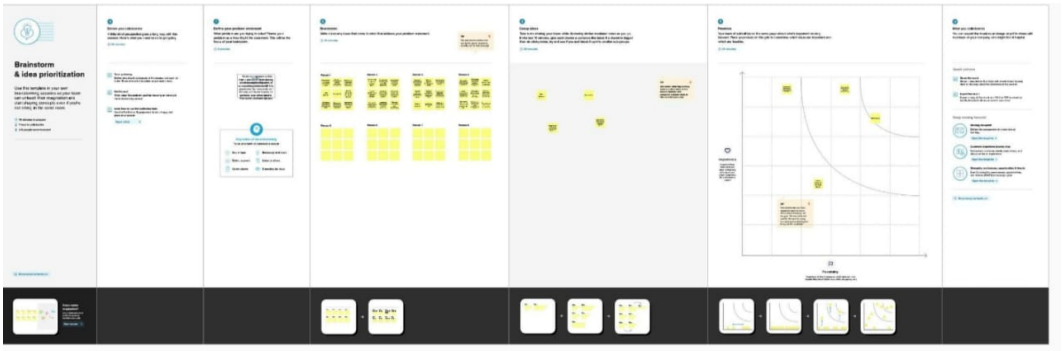
3.1 Empathy Map Canvas



In this recent world urbanization has increased tremendously.A the saame phase,thee is increasing amount of in waste production.The main think is that it want to complete the collection circuit the fastest way in possible manner.Sometimes collection routes are not efficient.The balance between collection circuits are different.The main thing what thet see here is pride for contributing to the reduction of waste. Empowered when given new tools to work. Overwhelmed with the amount of work and working schedule. What do they do is spend too much of time in traffic delaying collection time

frames.Some items are not being seperated properly. They hear that maka small decisions and report the incidents found during the collection process.The pain and the frustrations is not knowing what containers are empty or full.WCS system routes are time consuming.

3.2 Ideation & Brainstroming



Recycling not only saves energy but also prevents the materials from going to landfills & incineration, and provides raw materials for new products. Installing more bins for collecting recyclables like paper, glass, plastics, etc., and then recycling them can be a huge step.

The main idea was IOT (Internet of things) is a concept in which surrounding objects are connected through wired and wireless network.The objects communicate and exchange information to provide advanced services.Allow the user to fill level of each garbage bin in areas.And this technique is also cost effective and time saving.Saving the routess to the truck drivers.The proposed system consists of main sbsystems namely smart trash system.When waste bins ets filled this is acknowledged by placing the circuit at waste bin.Signal indicataes the status at the monitoring and controlling system.The administrator will be able to select the target destination of dustbin.The viewing infomation of a specific dustbin is also allocated.Web portal functionality technique is also managed by the system.

Municipalities can also deploy and maintain smart city infrastructure.Wireless network for data transferring is used.The waste trucks owing companies need a platform for organizing and for optimization.The roup ideas from person to person have varied in according to the perception of smart waste management system.It is cost effective in some point of view, Signal indicates the status of the monitorin the controlling system.The prioritization of work is important for managing certain things: When waste bins ets filled this is acknowledged by pricing the circuit at waste bins,is the first priority next the medium level includes the controlling the process of waste collection and checking the quality

and next priority given is time saving.

3.3 Proposed solution

The proposed solution has several parameters:

i)Problem statement

ii)Novelty / Uniqueness

iii)Social Impact / Customer Satisfaction

i)Problem statement

Waste management suffers from a pervasive under-pricing which means that the costs of waste management are not fully appreciated by consumers and industry and waste disposal is preferred over other options. Few waste treatment options are available than landfill costs.

The transformation of an urban habitation into a smart zone consists of multiple parameters for optimal implementation, where primary parameters include technology, data, and people. The genesis of smart cities has evolved from the need of sustainable development and a better future for humankind.The shortcomings and issues associated with the current urban waste management practices can be suitably dealt through the integration of tools such as the 'internet of things' (IoT)

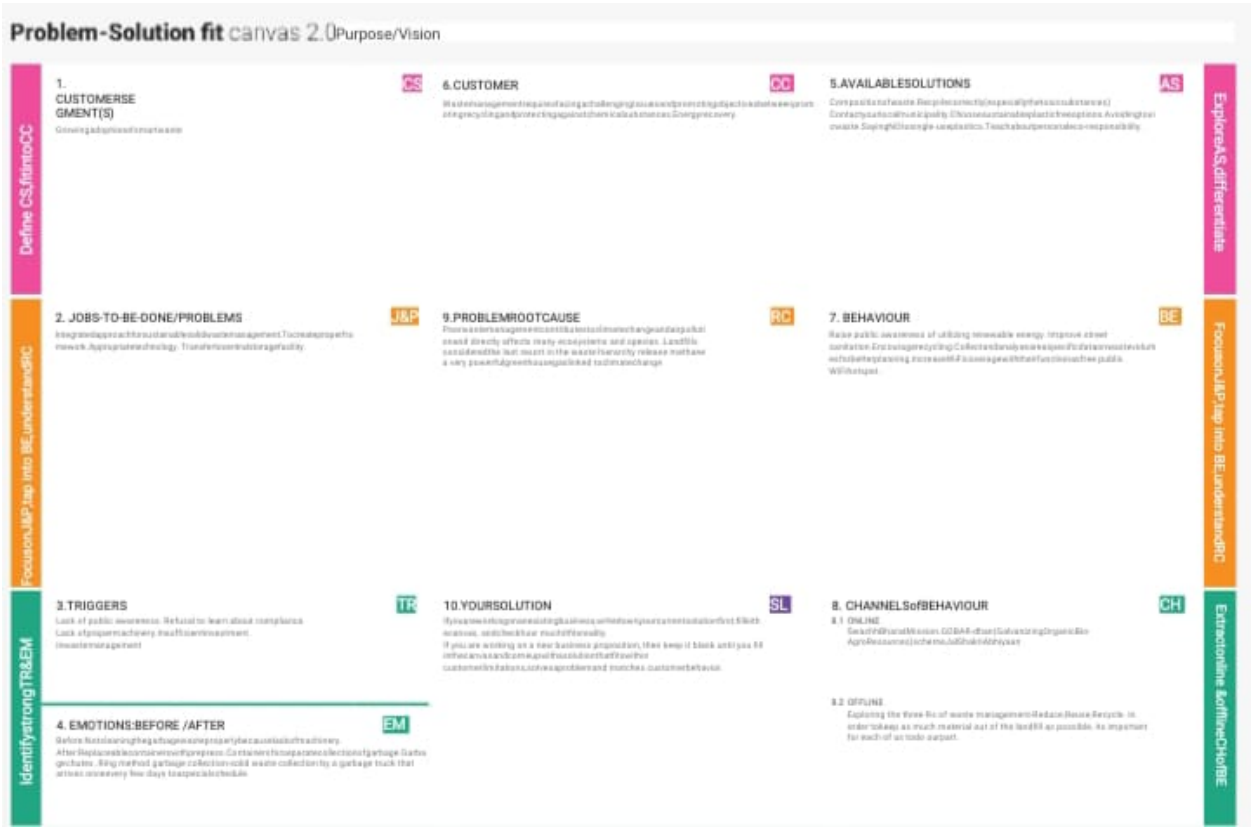
ii)Novelty / Uniqueness

The Proposed system consists of main subsystems namely Smart Trash System(STS) and Smart Monitoring and Controlling Hut(SMCH). In the proposed system, whenever the waste bin gets filled this is acknowledged by placing the circuit at the waste bin, which transmits it to the receiver at the desired place in the area or spot.
In the proposed system, the received signal indicates the waste bin status at the monitoring and controlling system.

iii)Social Impact / Customer Satisfaction

Consumers and households play an important role in the generation of waste from the products they consume. As end users they need to reduce, re-use and recycle waste wherever feasible, and dispose of this waste responsibly.A reduction in the number of waste collections needed by up to 80%, resulting in less manpower.

3.4 Problem solution fit



The problem solution fit mainly focuses on customer segments growing adoption of smart waste.Next it focuses on the jobs to be done and the problems to be solved in which it is integrated to approach for sutainable solid waste management.To create proper framework.Appropriate technology.Transfer to central storage facility.It also have some triggering factors in which lack of public awarness.Refusal to learn about compliance.Lack of proper machinery.Insufficient investment in waste management.The problem fit has also emotions, BEFORE:Not cleaning the garbage waste properly because lack of machinery. AFTER:Replacable containers with prepress.Containers for seperate collection of garbage.Garbage clutes.Ring method garbage collection-solid waste collection by a garbage truck that arrives once every few days to a special schdule.The avaliable solution consist of composition of waste.Recycle correctly(especislly the toxic substance).Contact your local municipality.Choose sustainable plastic free options.Avoiding toxic waste.Saying NO to single-use plastics.Teach about personal eco-responsibilty.Customers responsibility is waste management requires facing challenging issues and promoting objectives between promoting recycling and protecting against chemical substances.Energy recovery.Raise the public awarness about the waste management system and utilizing it in the best manner.Collect and analyze area specific data on waste volumes for better planning.Increase Wifi coverage with teir function as free public wifi hotspot.The channels of behaviour are of two modes i)ONLINE: Swach Bharat Mission.GOBAR-dhan(galvanizing organic bio-agro resources scheme) ii)OFFLINE: Exploring the three R's of waste management (Reduce,Reuse,Recycle). In order to keep as much material out of the landfill as possible,it is important to each of us to do our part.The

problem root cause is that poor waste management contributes to climate change and air pollution and directly affects many ecosystem and species.Landfills considered the last resort in the waste hierarchly release methane a very powerful greenhouse as linked to climate change.The solution for this is if you are working on an existing bussiness,write down your current solution first,fill in the canvas and check how much it fits reality.

Chapter 4-REQUIREMENT ANALYSIS

4.1 Functional requirement

i) Detailed bin inventory

All monitored bins and stands can be seen on the map and you can visit them at any time via the Street View feature from Google.You can see bin details in the Dashboard – capacity, waste type ,last measurement, GPS location.

ii) Real time bin monitoring

The Dashboard displays real-time data on fill-levels of bins monitored by smart sensors.In addition to the %of fill-level, based on the historical data, the tool predicts when the bin will become full, one of the functionalities that are not included even in the best waste management software.Sensors recognize picks as well;so you can check when the bin was last collected.
With real-time data and predictions, you can eliminate the overflowing bins and stop collecting half-empty ones.

iii)Expensivebins:

Collectioncosts.Thetoolcalculatesaratingforeachbinintermsofcollectioncosts.
The tool considers the average distance depo-bin-discharge in the area. The tool assigns (1-10)and calculates distance from depo -bin discharge.

iv)Adjust bin distribution:

Ensure the most optimal distribution of bins.Make sure all trash types are represent within a stand.Based on the historical data,you can adjust bin capacity or location where necessary.

4.2 Non-Functional requirements

i)**Usability:**

IoT device verifies that usability is a special and important perspective to analyze user requirements, which can further improve the design quality. In the design process with user experience as the core, the analysis of users' product usability can indeed help designers better understand users'potential needs.In waste management ,behavior and experience.

ii)**Security:**

Use are usable bottles. Use reusable grocery bags.Purchase wisely and recycle.

iii)**Reliability:**

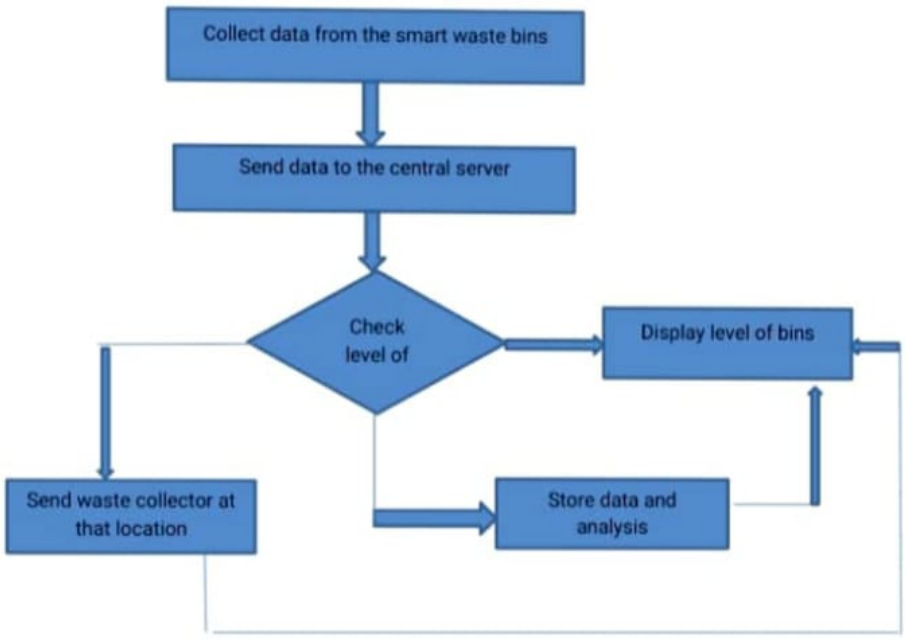
Smart waste management is also about creating better working conditions for waste collectors and drivers. Instead of driving the same collection routes and servicing empty bins, spend their time more efficiently ,taking care of bins that
Need servicing.

iv)**Performance**

The Smart Sensors use ultrasound technolog to measure the fill levels (alongwithotherdata)in bin several times a day.Using a variety of IoT networks((NB-IoT,GPRS),the sensors send the data to Sensoneo's Smart Waste Management SoftwareSystem, apowerfulcloud-based platform, fordata-driven daily operations, available also as a waste management app.
Customers are hence provided data-driven decision making, and optimization of waste collection routes,frequencies,and vehicle loads resulting in route
reduction by atleast30%.

Chapter 5- PROJECT DESIGN

5.1 Data flow diagram



The data flow diagram is designed in a easy flow manner for the users. First collection of data from the smart waste bins,then they send the data to the central server.The level check is done if yes means it send the waste collector at the location if no means and the waste cant be collected it will display the level of bins.Then atlast it stores the data and analysis.

5.2 Solution & Technical Architecture

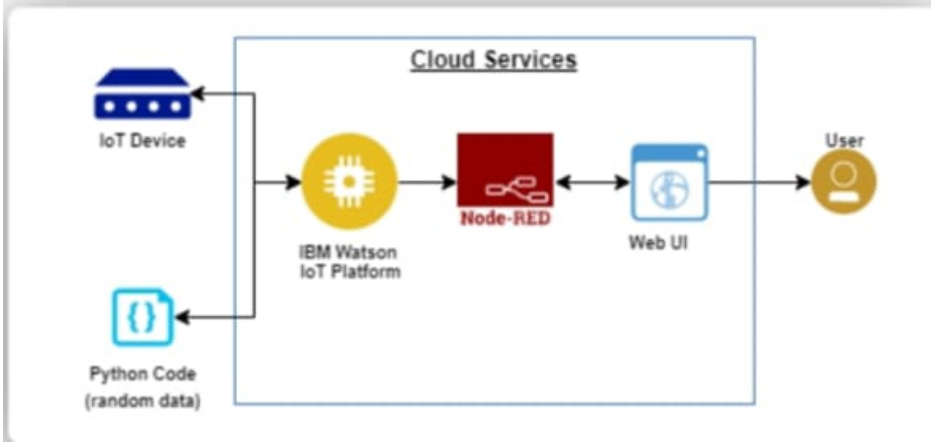
Plan waste collection

The tool semi-automates waste collection route planning .Based on current bin fill-level sand predictions of reaching full capacity, you are ready to respond and schedule waste collection.
You can compare and Identify any inconsistencies.

Availability

By developing & deploying resilient hardware and beautiful software we empower cities, business.And countries to manage waste smarter.

Technical Architecture



The technical architecture uses mainly of IOT devices and to run the python code is executed using the datas collected.Then the cloud account is created is IBM watson IOT platform for stimulating the codes.App is created and then synced in Node RED and stimulation is done.Then web ui is enabled and datas have been transformed and then it is avaliable for the users account.

5.3 User stories

i) As a Administrator, need to give user id and pass code for ever workers in the municipality.

ii) As a Co-Admin, I will control the waste level by monitoring them via the real time web portal.Once thefilling happens, it notifies trashtruck with location of binwith bin ID.

iii) As a Co-Admin, I will control the waste level by monitoring them via the real time web portal.Once thefilling happens, it notifies trashtruck with location of binwith bin ID.

iv) As a Local Garbage Collector, I will gather all the waste from the garbage, load it onto a garbage truck, and deliver it to Landfills

Chapter 6- PROJECT PLANNING & SCHEDULING

6.1 Sprint planning &Estimation

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on the selected project & gatheringinformation by referring the,technical papers, research publications etc.	28 SEPTEMBER 2022
Prepare Empathy Map	Prepare Empathy Map Canvasto capture the user Pains & Gains, Prepare list of problemstatements	24 SEPTEMBER 2022
Ideation	List the by organizing the brainstorming session andprioritize the top 3 ideas based on the feasibility & importance.	25 SEPTEMBER 2022
Proposed Solution	Prepare the proposed solutiondocument, which includes thenovelty, feasibility of idea, business model, social impact, scalability of solution, etc.	23 SEPTEMBER 2022
Problem Solution Fit	Prepare problem - solution fitdocument.	30 SEPTEMBER 2022
Solution Architecture	Prepare solution architecturedocument.	28 SEPTEMBER 2022

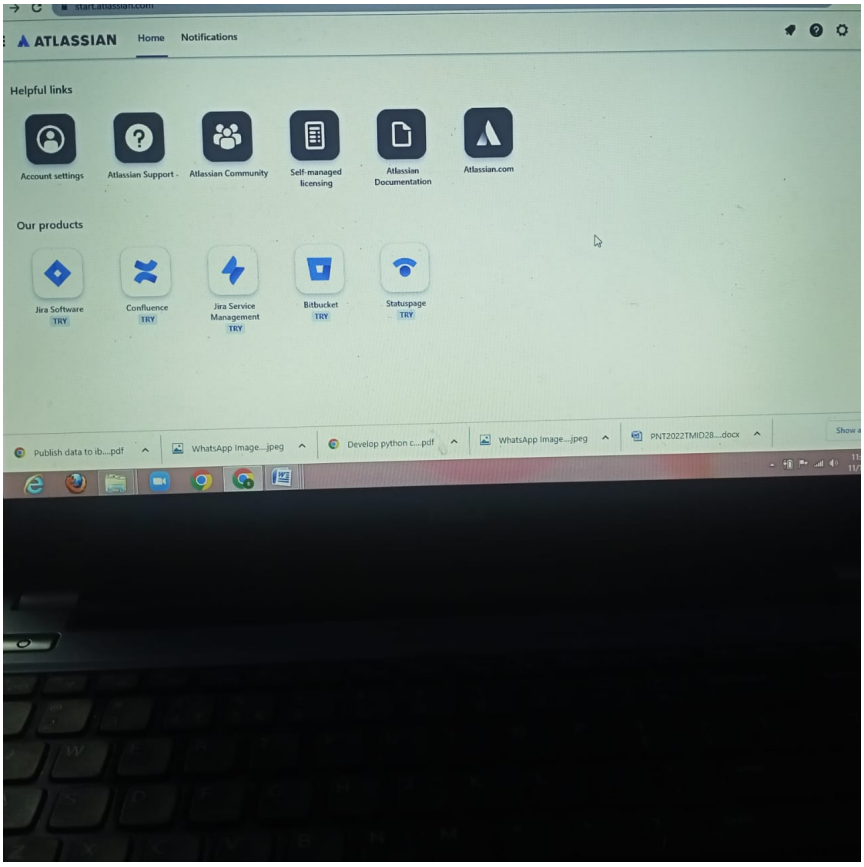
Customer Journey	Prepare the customer journeymaps to understand the user interactions & experiences with the application (entry to exit).	20 OCTOBER 2022
Functional Requirement	Prepare the functional requirement document.	8 OCTOBER 2022
Data FlowDiagrams	Draw the data flow diagrams and submit forreview.	9 OCTOBER 2022
Technology Architecture	Prepare the technology architecture diagram.	10 OCTOBER 2022
Prepare Milestone & ActivityList	Prepare the milestones and activity listof the project.	22 OCTOBER 2022
Project Development - Delivery of Sprint-1, 2, 3 &4	Develop and submit the developed code by testingit.	15 NOVEMBER 2022

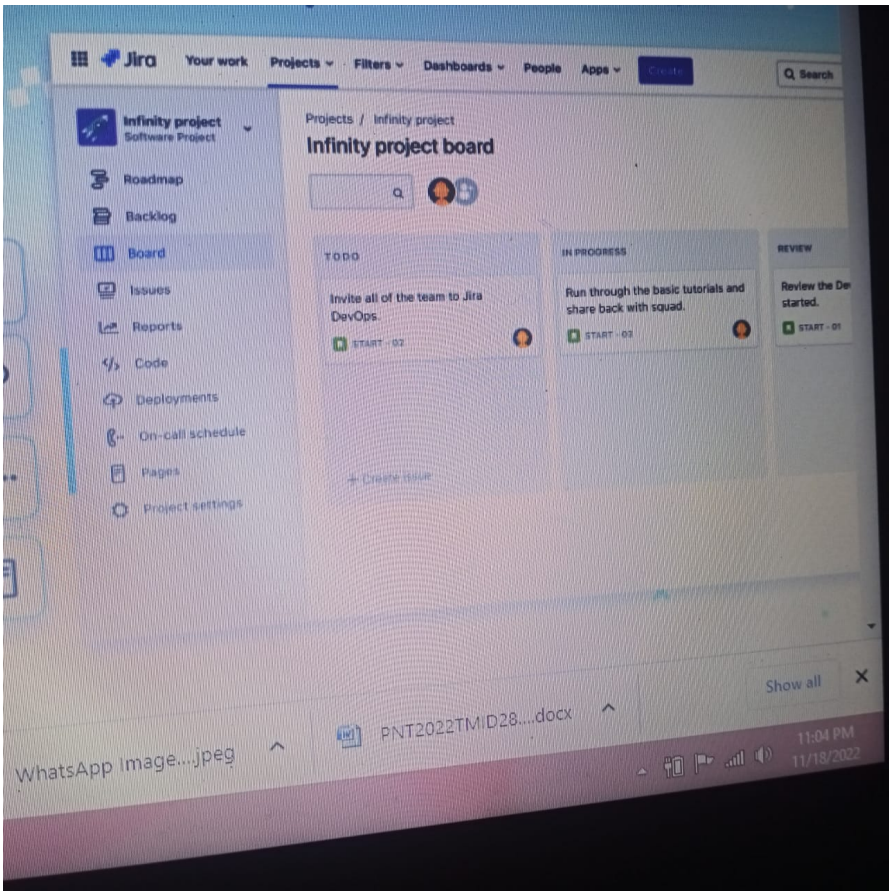
6.2 Sprint Delivery Schedule

Sprint	Functional Requirement (Epic)	User StoryNumber	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Login	USN-1	As a Administrator, need to give user id andpass code for ever workers in the municipality.	10	High	Srimathi
Sprint-2	Login	USN-2	As a Co-Admin, I will control the waste level by monitoring them via the real time web portal. Once thefilling happens, it notifies trashtruck with location of binwith bin ID	10	High	Sindhu
Sprint-3	Dashboard	USN-3	As a Truck Driver, I will follow Co-Admin's Instruction to reach thefilling bin in short roots and save time.	20	Low	Sajetha

Sprint-4	Dashboard	USN-4	As a Local Garbage Collector, I will gather all the waste from the garbage, load it onto a garbagetruck, and deliver it to Landfills.	20	Medium	Sasirekha

6.3 Reports from JIRA





Chapter 7-CODING & SOLUTIONS

7.1 CODE FOR REGISTRATION AND LOGIN CREDENTIALS:

```
<!DOCTYPE html>
<html>
  <head> <style> body{ background-
image:url('background.jpg'); background-
repeat:no-repeat;
background- attachment: fixed;
background-size:100% 100%;
  }
```

```
    </style>
    <base target="_top">
    <script>
      functionAdd
      Row()
    {
      var username = document.
getElementById("username").value;var password =
document.getElementById("password").value; varemail=
document.getElementById("email").value;                  var phone =
document .getElementById("phone").value;  if
(username==""|| password==""|| email==""|| phone=="") {
        return false;
      }
else {
      google.script.run.AddRecord(username,password,email,phone);
document.getElementById("page2_id1").className= "page2_id1-
off";document.getElementById("page3_id1").className =
"page3_id1";


    }


     function LoginUser()
    {
    var username = document.getElementById("username").value;
var password = document.getElementById("password").value;
google.script.run.withSuccessHandler(function(output)
```

```
  {
    if(output == 'TRUE')
    {
      var url1 ='http://www.google.com';
varwinRef= window. open(url1);
       winRef ? google.script.host.close() :
window.onload=function(){document.getElementById('url').href = url1;}
    }
    else if(output == 'FALSE')
    {
     document.getElementById("errorMessage").innerHTML = "Invalid data";
    }
  }).checkLogin(username, password);
  }

function function1(){    document.getElementById("page1_id1").className
= "page1_class1-off";    document.getElementById("page2_id1").className
= "page2_id1";
}

function function3(){ document.getElementById("page3_id1").className
= "page3_id1-off"; document.getElementById("page1_id1").className =
"page1_id1";

 </script>
 <style>
```

```
/page1/ .page1_class1-off{
    display:none;
  }



/page2/
.page2_class1{
    display:none;
  }

.page2_id1-
off{
display:non
e;
}

/page3/
.page3_class
    1{
    display:no
    ne;

}
.page3_id1-
off{
display:non
```

```
e;
}



input[type=text]:hover{        border-bottom:2px solid black;
     }
input[type=number]:hover{
       border-bottom:2px solidblack;

     }
input[type=password]:hover{
border-bottom:2px solid black;
     }
 </style>
<meta name="viewport" content="width=device-width, initial-scale=1.0">
  </head>
  <body>
    <br><br>
<!--page1-->
<center>
 <div class="page1_class1" id="page1_id1" style="background-color:rgb(135, 207,
235);border:2px solid gray;border-radius: 20px;width: 250px;padding-top: 10px;padding-bottom:
20px;padding-left:20px;padding-right: 20px;">
    <h1>Login Here</h1>
    <br>
    <p>Username</p>
   <input type="text" id="username" placeholder=" Enter Username" style=";outline:
none;textalign: center;font-size:0.9em ;width:50%;font-weight:bold;"/><br> <br>
```

```
    <p>Password</p>

    <input type="password" id="password" placeholder=" Enter Password" style="border-top:
none;border-right: none;border-left: none;outline: none; text-align: center;font-size:0.9em
;width:50%;font-weight:bold;"/>

    <br><span id="errorMessage" style="color: red" ></span><br>

    <br>

    <input type="submit" value="Login" onclick="LoginUser()" style="float: centre;padding-
top:1px;padding-bottom: 1px;padding-left: 10px;padding-right: 10px;font-size: 0.9em;font-
weight:bold;" /><br>

    <br><br>


    <b>If you don't have an account,</b><input type="button" onClick="function1()"
value="CreateNew" style="margin-top: 5px;font-weight:bold;" />

</div>



<!--page2-->

<div class="page2_class1" id="page2_id1" style="background-color:rgb(135, 207,
235);border:2px solid gray;border-radius: 20px;width: 250px;padding-top: 10px;padding-bottom:
20px;padding-left:20px;padding-right: 20px;">

<h1>Register Here</h1>

<p>Name</p>

    <input type="text" id="usernamee" placeholder=" Enter Name" style="border-top:
none;borderright: none;border-left: none;outline: none; text-align: center;font-size:0.9em
;width:50%;fontweight:bold;"/><br>

<br>

<p>Password</p>

    <input type="password" id="passwordd" placeholder="Create password" style="border-
top: none;border-right: none;border-left: none;outline: none; text-align: center;font-size:
0.9;width:50%;font-weight:bold;" /><br>

     <br>

<p>Email</
       p>

    <input type="text" id="email" placeholder=" Enter Email" style="border-top: none;border-
```

```
right:none;border-left: none;outline: none; text-align: center;font-size:0.9em ;width:
50%;fontweight:bold;"/><br>

<br>

<p>Phone Number</p>

   <input type="number" id="phone" placeholder="Enter number" style="border-top:
none;borderright: none;border-left: none;outline: none; text-align: center;font-size:0.9em
;width:50%;fontweight:bold;" /><br><br>                                    <br><br>

   <input type="submit" value="Create" onclick="AddRow()" style="float: centre;padding-
top:1px;padding-bottom: 1px;padding-left: 10px;padding-right: 10px;font-size: 0.9em;font-
weight:bold;" />

<br>

</di
  v>



<!--page3-->

 <div class="page3_class1" id="page3_id1" style="background:none;border:2px
solidgray;borderradius: 20px;width: 250px;padding-top: 10px;padding-bottom:
20px;padding-left:20px;paddingright: 20px;"><center>

   <h2> REGISTRATION SUCCESSFUL! Login to your account</h2>

    <input type="submit" onClick="function3()" value="Login" style="font-weight:bold;"><br>

</div>
</center>

</body>

</html>
```

7.2 Feature 2

Python Code

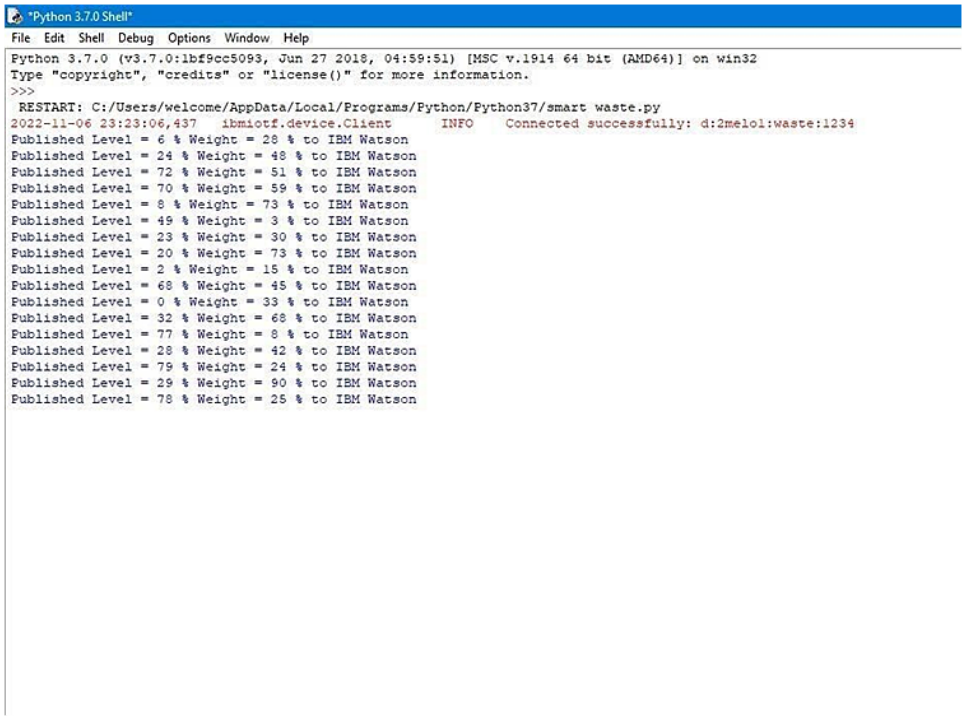
```
import time import sys

import ibmiotf.application
```

```
import ibmiotf.device

importrandom




#Provide your IBM WatsonDevice Credentials organization

= "2melo1" deviceType =

"waste" deviceId = "1234"

authMethod ="token" authToken =

"12345678"


# Initialize GPIO




def myCommandCallback(cmd):

print("Commandreceived: %s" %

cmd.data['command']) status=cmd.data['command']

if status=="waste level":

        print ("waste

    levelmonitored")else :

        print ("weight level monitored")


    #print(cmd)
```

```
try:

deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-
method":authMethod, "auth-token": authToken} deviceCli =
ibmiotf.device.Client(deviceOptions)
            #....


except Exception as e:

            print("Caught exception connecting device: %s" % str(e))
            sys.exit()


# Connect and send a datapoint "hello" with value "world" into the cloud as an event oftype "greeting"
10 times deviceCli.connect()


while True:

      #Get Sensor Data from DHT11



      level=random.randint(0,100) weight=random.randint(0,100)



      data = { 'level' : level, 'weight':
      weight }#print data
      def myOnPublishCallback():

         print ("Published Level = %s %%" % level, "Weight = %s %%"% weight, "toIBM Watson")
```

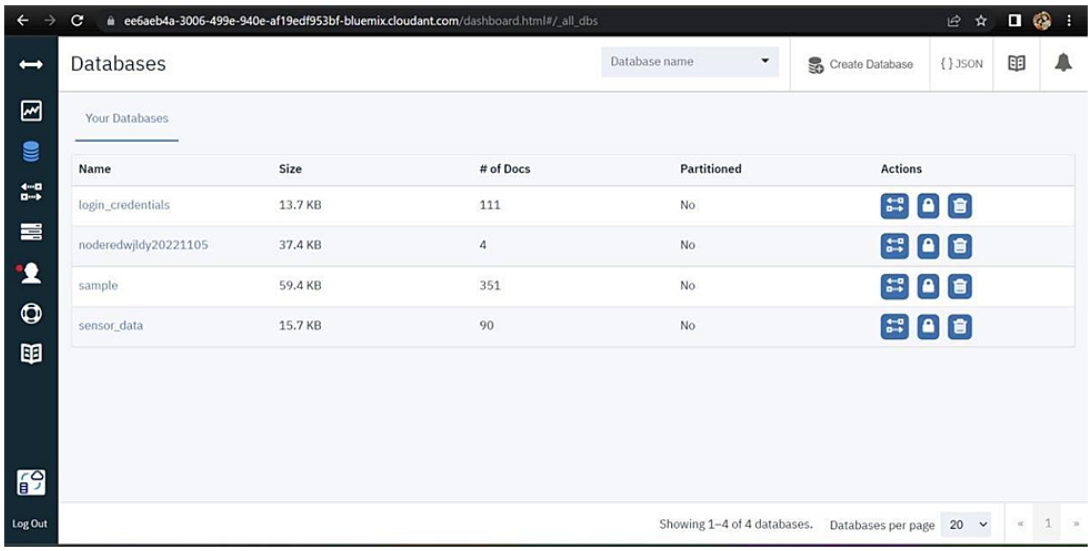
```
        success = deviceCli.publishEvent("IoTSensor", "json", data,
    qos=0,on_publish=myOnPublishCallback)
        if not success:

        print("Notconnected  to IoTF")

        time.sleep(20)

        deviceCli.commandCallback=

        myCommandCallback

# Disconnect the deviceand application from the clouddeviceCli.disconnect()
```

solution(output)

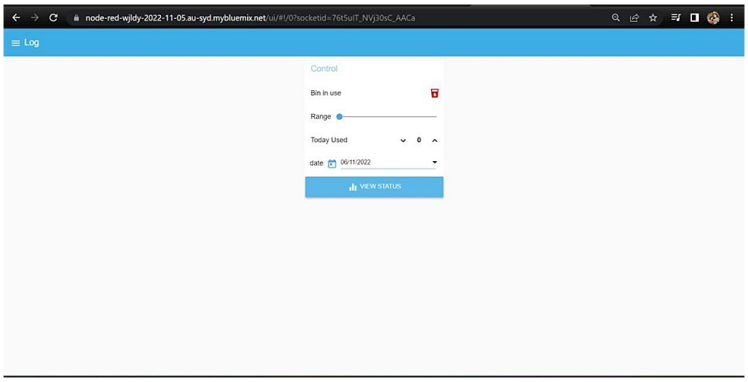


Chapter 8-TESTING

8.1 Test cases

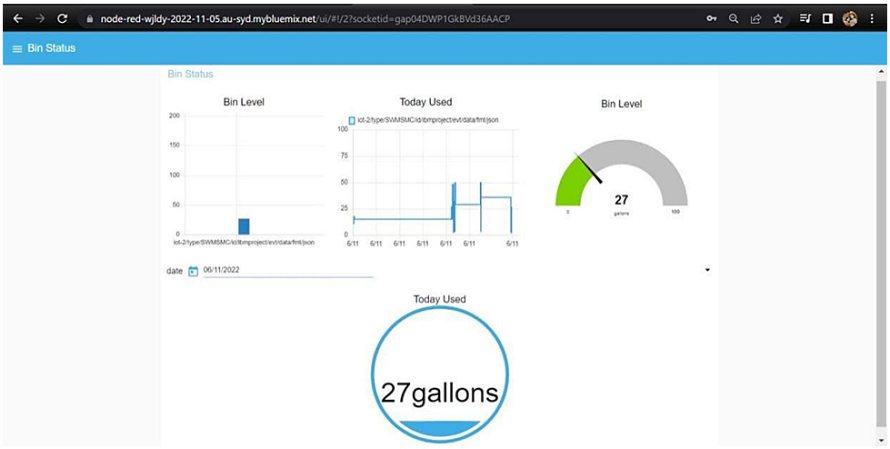


8.2 User acceptance testing



Chapter 9- RESULTS

9.1 Performances metrics



- Waste Prevention. The ideal waste management alternative is to prevent waste generation in the first place.
- Waste Minimization. In many cases, wastes cannot be outright eliminated from a variety of processes

Chapter 10- ADVANTAGES & DISADVANTAGES

A reduction in the number of waste collections needed by up to 80%, resulting in less manpower, emissions, fuel use and traffic congestion. A reduction in the number of waste bins needed. Analytics data to manage collection routes and the placement of bins more effectively.

Disadvantages:

According to the author there may be several disadvantages such as increasing cost of the dustbin. For example, if there are three different levels then three sensors has to be placed; one sensor for each level. Also rough action and usage of the user may cause damages to the sensors.

Chapter 11- CONCLUSION

A smart waste management system should provide an urban environment that delivers a high quality of life to residents while also generating economic growth. This means delivering a suite of joined-up services to citizens with reduced infrastructure costs.The efficacy of the smart waste paradigm in the remediation of environmental

issues.The recycle bin has also proved ineffectiveness in the public as people do not recycle their waste management system is replaced with sensors which is embedded with the real time monitoring which is helpful for better waste management.Ultrasonic sensor is embedded into each waste sectors to monitor the filling level of the bins. As a result the proposed prototype of smart waste bin is suitable for many kind of conventional waste bin.

Chapter 12- FUTURE SCOPE

With increasing population urbanization and expanding the economic activities.Solid waste disposal and management is a challenge in India. Here are some of which shows the solid waste management issues in India.

According to the central pollution control board of India the per captia generation of waste has increased from less percent to more percent.Close to 90% of waste is disposed of without proper treatment causing environmental pollution.Total approximity of municipal waste is generated daily.Therefore the future based on smart waste can be done using IOT sensors and can manage and control the level of garbage bins.

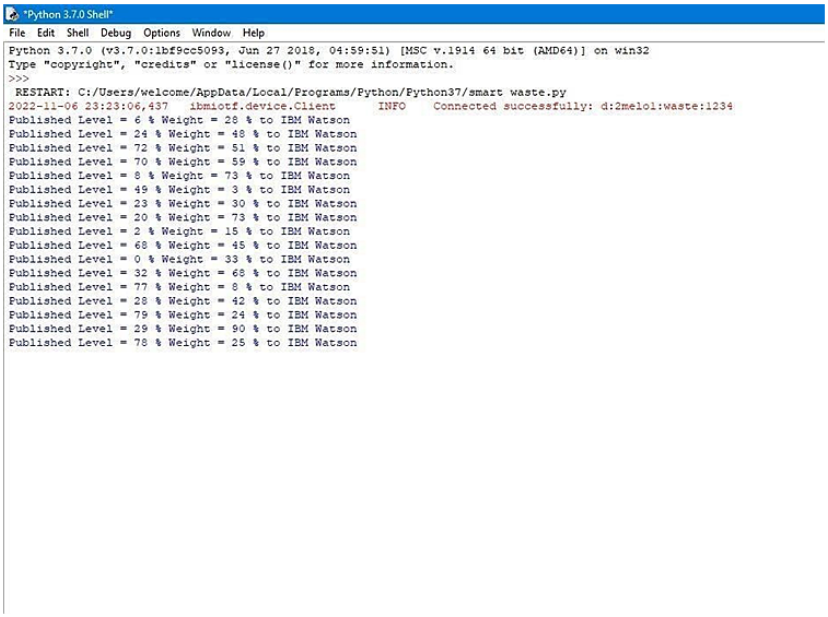
Chapter 13- APPENDIX

Python Code

```
import time import sys

import ibmiotf.application

import ibmiotf.device

importrandom



#Provide your IBM WatsonDevice Credentials organization

= "2melo1" deviceType =

"waste" deviceId = "1234"

authMethod ="token" authToken =
```

```
"12345678"


# Initialize GPIO



def myCommandCallback(cmd):
print("Commandreceived: %s" %
cmd.data['command']) status=cmd.data['command']
if status=="waste level":
        print ("waste
    levelmonitored")else :
        print ("weight level monitored")

    #print(cmd)



try:

deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-
method":authMethod, "auth-token": authToken} deviceCli =
ibmiotf.device.Client(deviceOptions)
            #....


except Exception as e:

            print("Caught exception connecting device: %s" % str(e))
```

```
            sys.exit()


# Connect and send a datapoint "hello" with value "world" into the cloud as an event oftype "greeting"
10 times deviceCli.connect()


while True:

        #Get Sensor Data from DHT11



        level=random.randint(0,100) weight=random.randint(0,100)



        data = { 'level' : level, 'weight':

        weight }#print data

        def myOnPublishCallback():

           print ("Published Level = %s %%" % level, "Weight = %s %%"% weight, "toIBM Watson")


       success   =   deviceCli.publishEvent("IoTSensor",   "json",   data,
qos=0,on_publish=myOnPublishCallback)
        if not success:

        print("Notconnected  to IoTF")

        time.sleep(20)

        deviceCli.commandCallback=

        myCommandCallback



# Disconnect the deviceand application from the clouddeviceCli.disconnect()
```


Python 3.7.0 Shell
File Edit Shell Debug Options Window Help
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:/Users/welcome/AppData/Local/Programs/Python/Python37/smart waste.py
2022-11-06 23:23:06,437 ibmiotf.device.Client INFO Connected successfully: d:2melol:waste:1234
Published Level = 6 % Weight = 28 % to IBM Watson
Published Level = 24 % Weight = 48 % to IBM Watson
Published Level = 72 % Weight = 51 % to IBM Watson
Published Level = 70 % Weight = 59 % to IBM Watson
Published Level = 8 % Weight = 73 % to IBM Watson
Published Level = 49 % Weight = 3 % to IBM Watson
Published Level = 23 % Weight = 30 % to IBM Watson
Published Level = 20 % Weight = 73 % to IBM Watson
Published Level = 2 % Weight = 15 % to IBM Watson
Published Level = 68 % Weight = 45 % to IBM Watson
Published Level = 0 % Weight = 33 % to IBM Watson
Published Level = 32 % Weight = 68 % to IBM Watson
Published Level = 77 % Weight = 8 % to IBM Watson
Published Level = 28 % Weight = 42 % to IBM Watson
Published Level = 79 % Weight = 24 % to IBM Watson
Published Level = 29 % Weight = 90 % to IBM Watson
Published Level = 78 % Weight = 25 % to IBM Watson