

SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES

IBM NALAIYA THIRAN PROJECT REPORT

Submitted by

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COMPUTER SCIENCE AND ENGINEERING

ANAND INSTITUTE OF HIGHER TECHNOLOGY

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CHAPTER-1

INTRODUCTION

1.1 PROJECT OVERVIEW

According to Google an average household in India produces at least 670 grams of waste everyday .Cleaning all these wastes daily is a tedious process .The traditional method of disposing the wastes is being modernized by the use of technology in this modern era . The wastes in the bin are not being emptied on time as a result it has resulted to so many problems , to overcome all these problems we have come up with a solution called smart waste management system .

Internet now has become a part of every day activities in our life . Using the same internet for waste collection can make it more easier process.

In this system with the help of Internet-of-Things we monitor the levels of the bin and empty it on time by giving a notification when it reaches a threshold value .The main moto of this project is to reduce the bin from overflowing and reduce the workload of the cleaning staffs by giving them the exact status of all the bin their area.

It uses a sensing mechanism to sense the data and a Wifi Module to send sensed data to Admin who can have a note on all the bin levels under his area and Truck driver too has a view to all the bin level through his mobile application designed for this purpose specifically.

This system can have a huge impact in the society when implemented by timely emptying the bin and reducing the risk of overflow .

1.2 PURPOSE

The main use of this system is to monitor the level of the bin regularly and update it to the admin and truck driver frequently and give a notification if reaches a minimum threshold limit mentioned .

CHAPTER-2

LITERATURE SURVEY

2.1 EXISTING PROBLEM

Around 80% of waste collections happen at the wrong time.

Late waste collections lead to overflowing bins, unsanitary environments, citizen complaints, illegal dumping, and increased cleaning and collection costs.

Early waste collections mean unnecessary carbon emissions, more traffic congestion, and higher running costs.

The old way of doing waste management is highly inefficient. And in today's ever-technological world, an innovative and data-driven approach is the only way forward.

Traditionally, municipalities and waste management companies would operate on a fixed collection route and schedule. This means that waste collection trucks would drive the same collection route and empty every single waste container – even if the waste container did not need emptying.

This means high labour and fuel costs – which residents ultimately pay the bill for.

This is also an unsustainable way of working - the more vehicles on the road carrying out unnecessary collections means more carbon emissions are released into our planet's atmosphere.

2.2 REFERENCE

1-Smart Waste Management System Using IoT

AUTHOR- Tejashree Kadus, Pawan Kumar Nirmal, Kartikee Kulkarni – MIT Academy of Engineering ,Pune

2-Smart Waste Management System using ARDUINO

AUTHOR- ShwetashreeVijay , Sam Raju , Pilla Nitish Kumar , Vivekanandan – VIT , Vellore ,India

3-Smart Waste Management : Garbage Monitoring using IoT

AUTHOR- Sarmila , Siva Kumar , Kumaur – K.L.N College of Engineering , Tamil Nadu, India

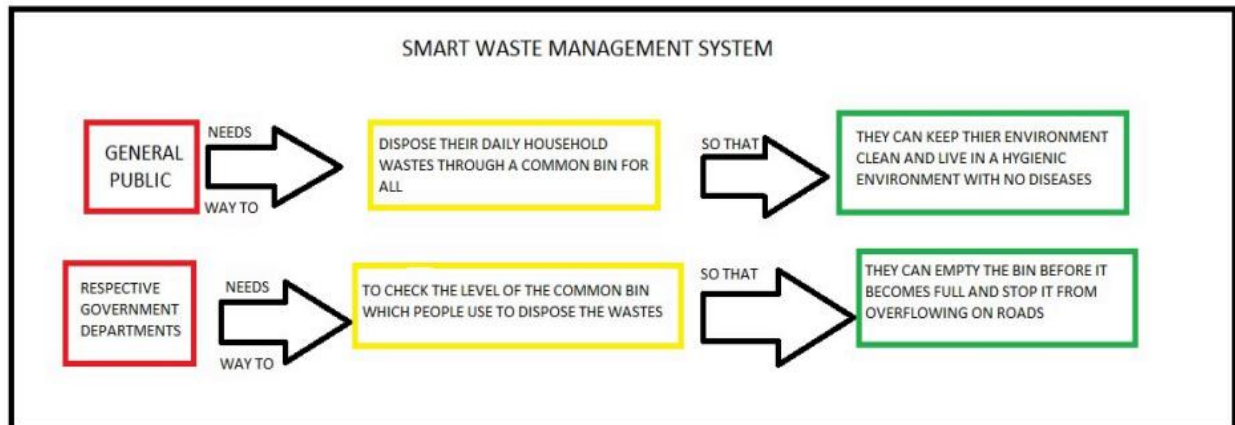
4-Smart Waste Management System

AUTHOR- Ankit Kumar , Hrithik Soni , Deepanshi Srivastava – Raj Kumar Goel Institute of Technology , Ghaziabad , India

5-Smart Waste Management

AUTHOR- RiteshDhadiwal ,Pandhari Gaurav , Shubham Gaurav , Avadhut Joshi – Viva Institute of Technology, Thane

2.3 PROBLEM STATEMENT DEFINITION

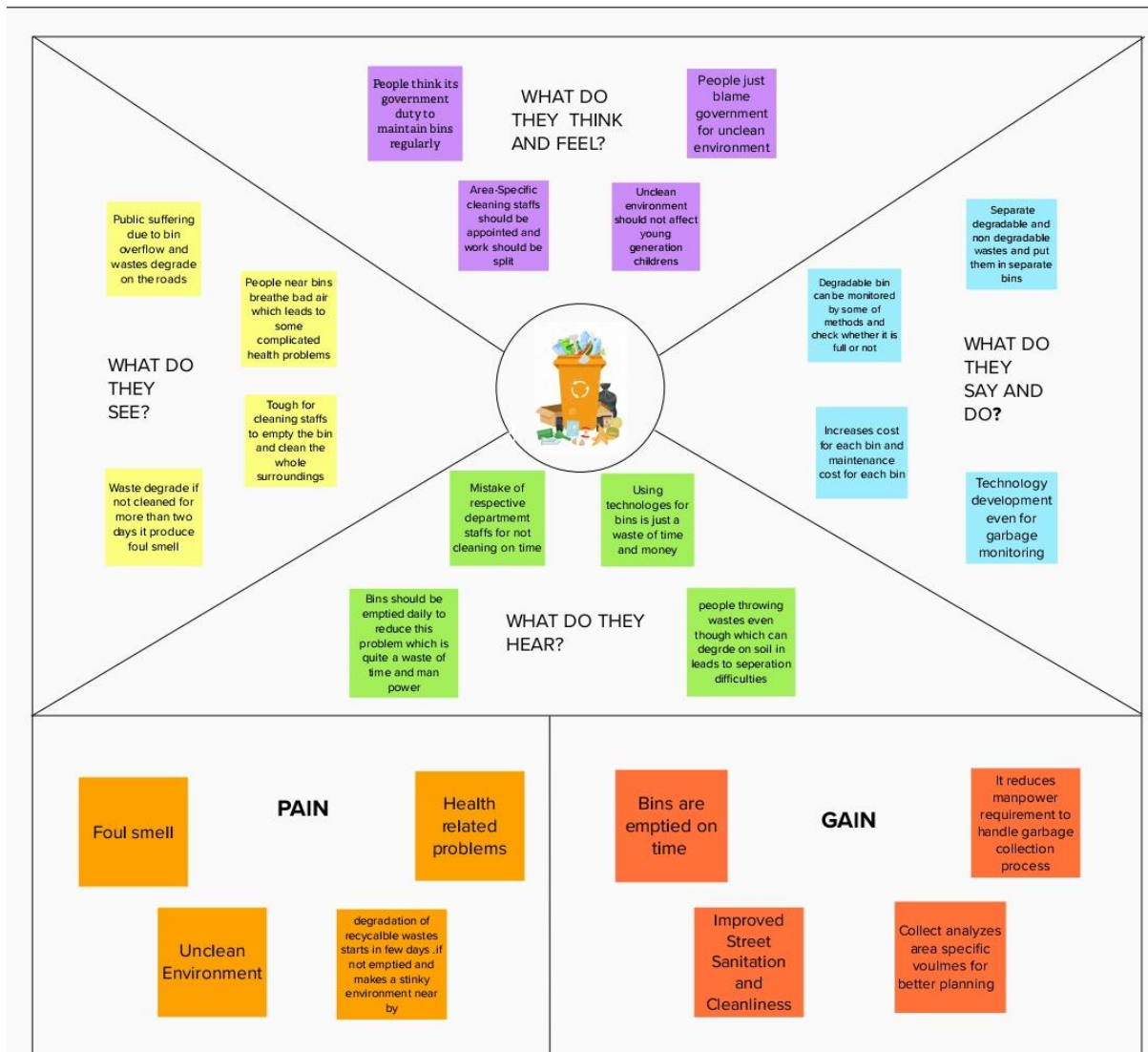


The general public needs to dispose their day to day wastes so that they can keep their household clean and live happily in a safe place . For that they need a common way to dispose them properly . The government should take necessary steps to have a safe way of disposal , so they need to have a system to monitor all the bins in a single area to clean them on time with less time and fuel wastage .


CHAPTER-3

IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION AND BRAIN STORMING



SMART WASTE MANAGEMENT FOR METROPOLITAN CITIES

TEAM LEADER : SR RAM.B
TEAM MEMBER 1 : ROHIT.C
TEAM MEMBER 2 : RAMKUMAR.D
TEAM MEMBER 3 : SIVARAJ.V

🕒 10 minutes to prepare
🕒 1 hour to collaborate
👤 2-8 people recommended

[Share template feedback](#)

➔

Before you co-laborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes

A Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.


B Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

C Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.


[Open article](#) ➔

1 PROBLEM STATEMENT

To manage the bin and to avoid the overflowing of wastages we need a monitoring system which can check the level of the bin regularly and give notification to the respective department staff before it overflows. By emptying the bin on the time we can avoid the overflow of wastages on the road and help the government to maintain a clean and healthy environment for the peoples

**Key rules of brainstorming**
To run a smooth and productive session

- ➔ Stay in topic. ➔ Encourage wild ideas.
- ➔ Defer judgment. ➔ Listen to others.
- ➔ Go for volume. ➔ If possible, be visual.



Need some inspiration?
See a finished version of this template to kickstart your work.

[Open example](#) ➔

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

⌚ 10 minutes

Rohit

A beeping system fixed in the bin for collecting the wastages in time or when it gets filled

We can arrange the order of the bins based on which bin is about to be full first and assign the staffs that bin to be emptied first.

Keep a Smart card system where people who give waste plastics will be rewarded

Arrange the order of the bins in a manner in which the bin with highest waste level will be emptied first.

Sriram

Using sensors for identifying the space presented in the bin

Amount of the garbage collected is recorded

By using compressing technology we can store extra wastages

Design a application through were the workers can find out the nearest the bin which is fully filled

Ramkumar

Using ventilation for bins to prevent the foul smell

Imposing the fine against the people who throwing their garbage wastages on the bin

Digital boards around the bin to improve people attention to disposes the wastages correctly on the bin

With the use of bio waste we can generate the electricity

Sivaraj

Using solar panels to gain energy for the electrical equipments which is present in the bin .

Using radiant colors for bin to prevent visibility issues from night

Automatic locking system will be enabled in the bin

Increasing the count of the bin to prevent the overflow of wastages around the bin



3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

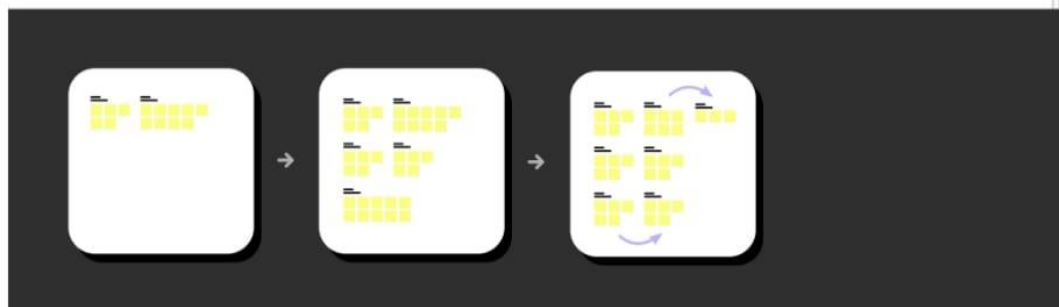
⌚ 20 minutes

A beeping system
fixed in the bin for
collecting the
wastages in time
or when it gets
filled

Using sensors
for identifying
the space
presented in
the bin

Digital boards
around the bin to
improve people
attention to
disposes the
wastages correctly
on the bin

Using solar panels
to gain energy for
the electrical
equipments which
is present in the
bin .

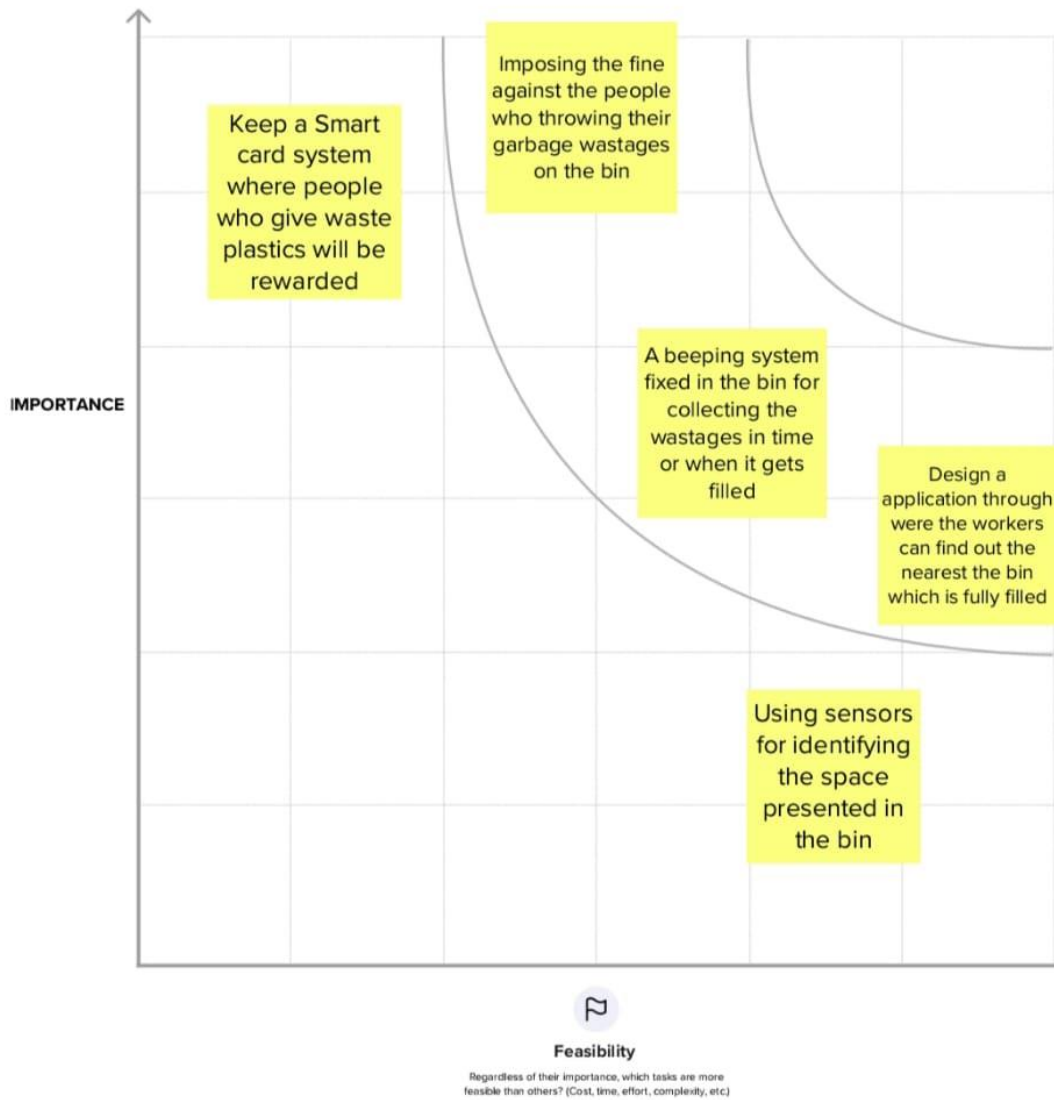


4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⌚ 20 minutes



3.3 PROPOSED SOLUTION

Idea / Solution description:

To overcome this problem we are introducing a smart waste management system through which the bins can be monitored frequently and emptied on time before the bin overflows. The main idea of this solution is :

- Monitor the level of the bin by frequently by using a appropriate sensor mechanism
- The level of the bin is frequently updated to the authorized person using a LoRaWAN
- The door of the bin uses a hydraulic system which opens and closes only when the button is pressed , the button can be at bottom of the bin so the people can use their feet to open the door when needed.
- The web application is created in such a way that the bin with highest level is displayed first
- The cleaning staffs are given duty based on the nearest bin which has the highest level first to ensure efficient usage of fuel and reduce the work pressure for them
- A mobile application for the users(public) to complaint which only gets their location and tell the admin directly through notification if the wastes are spread on the roads and if they are unhygienic .

Novelty / Uniqueness

The unique idea of this solution is ,

- The hydraulic opening and closing of the bin door which can have a good impact in this system
- The application is efficient as it gives the nearest full bin first that should emptied by person
- A mobile application for the general public to notify the admin directly if the wastes are spread across the roads even before when the bin has become full .

Scalability of the Solution

The solution can help the people have a clean and hygienic environment . Wastes are disposed properly and in an efficient way

3.4 PROBLEM SOLUTION FIT

Problem-Solution Fit canvas		Purpose / Vision	Version:
Define CS, fit into CL	1. CUSTOMER SEGMENT(S) The Public people who use the public dust bins to dispose their daily household wastes	6. CUSTOMER LIMITATIONS eg. BUDGET, DEVICES When the bin becomes full the people are forced to throw away the wastes on the roads which leads to dirty and bad smells being spread across the roads.	5. AVAILABLE SOLUTIONS PLUSES & MINUSES AS There is no other solution found for the people in the past they just throw away the waste along other overflowing wastes. Some may complaint to department about it, else no solution is found in the past.
	2. PROBLEMS / PAINS + ITS FREQUENCY PR The bin being full and wastes being overflowed on the roads is a main concern of many people as it produces bad smell and disease spreading concerns to the <u>people</u> living near-by.	9. PROBLEM ROOT / CAUSE RC The main reason for this problem is the bin not being emptied by the staffs in that area on time due to which it overflows on <u>roads</u> . More number of bins can be placed but that makes the cleaning process a little more <u>complex</u> . A advanced sensing and managing technique can help them overcome this <u>technique</u> .	7. BEHAVIOR + ITS INTENSITY BE Directly-Related: People tend to just throw away the wastes along with the other overflowing wastes around the bin and walk <u>back</u> . Indirectly-Related: Some public volunteers tend to clean them if not cleaned for a long <u>time</u> , some people may complain to cleaning staff that the bin is overflowed on roads.
Focus on PR, map into BE, understand RC	3. TRIGGERS TO ACT TR Seeing other people being lethargic and throwing wastes outside the bin is forcing others to do the same.	10. YOUR SOLUTION SL <ul style="list-style-type: none"> The bins can be monitored frequently with the help of a sensor through which the admin or the authorized person can check the level of the bin and report it to the area cleaning staffs about the fullness of the bin so that they can empty the bin on <u>time</u>. To make it a little easier the web application shows the highest level bin and then the <u>others</u>. To make it more unique a solar panel can be used for the electrical circuits for this mechanism. 	8. CHANNELS of BEHAVIOR CH ONLINE The administrator looks for the levels of the bin and orders for the <u>highest level</u> bin to be emptied first. OFFLINE The cleaning staffs receive the message and location of the bin that is full and arrives and empties the bin <u>accordingly</u> .
	4. EMOTIONS BEFORE / AFTER EM People tend to close their nose when they move across a overflowing bin due to bad <u>smell</u> . After cleaning people tend to move freely and live happily with their kids.		Extract online & offline CH of BE

Problem-Solution Fit canvas is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. Designed by Galle (galle@idea) / (galle@idea) - the better ideas to customer solutions and increase solution adoption probability.

IdeaHackers .in

CHAPTER-4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Bin Monitoring	The dashboard at the admin end shows the level of the bin frequently and gives the bin which is about to be full at the top . With real-time data and predictions we can eliminate the risk of bin overflowing .
FR-2	Details of the bin	The complete details of the bin (i.e its location , its frequency of becoming full , percentage of the current bin etc) are displayed in it .
FR-3	Check bin level	The sensor placed in the bin checks the level of the bin frequently and updates it to the admin end and truck driver API .
FR-4	Complaint Notification	When a user gives a complaint via user application that wastes are being spread on roads it should directly be sent to the admin end and admin should assign nearest staff to take necessary action and clean them .
FR-5	Get Nearest bin location	Whenever a user uses the application to raise a complaint the application asks for the user location to track the bin location where the wastes are being spread on road .
FR-6	Nearest full bin at top	The application of truck driver is designed in a such a way that it shows the nearest full bin or the bin which is about to be full at the top .
FR-7	Full bin Alert	The truck driver application gives a notification when the bin is about to be full (For example a notification if it goes above 80% and another notification if it goes above 90% and frequently for every hour after 95%)

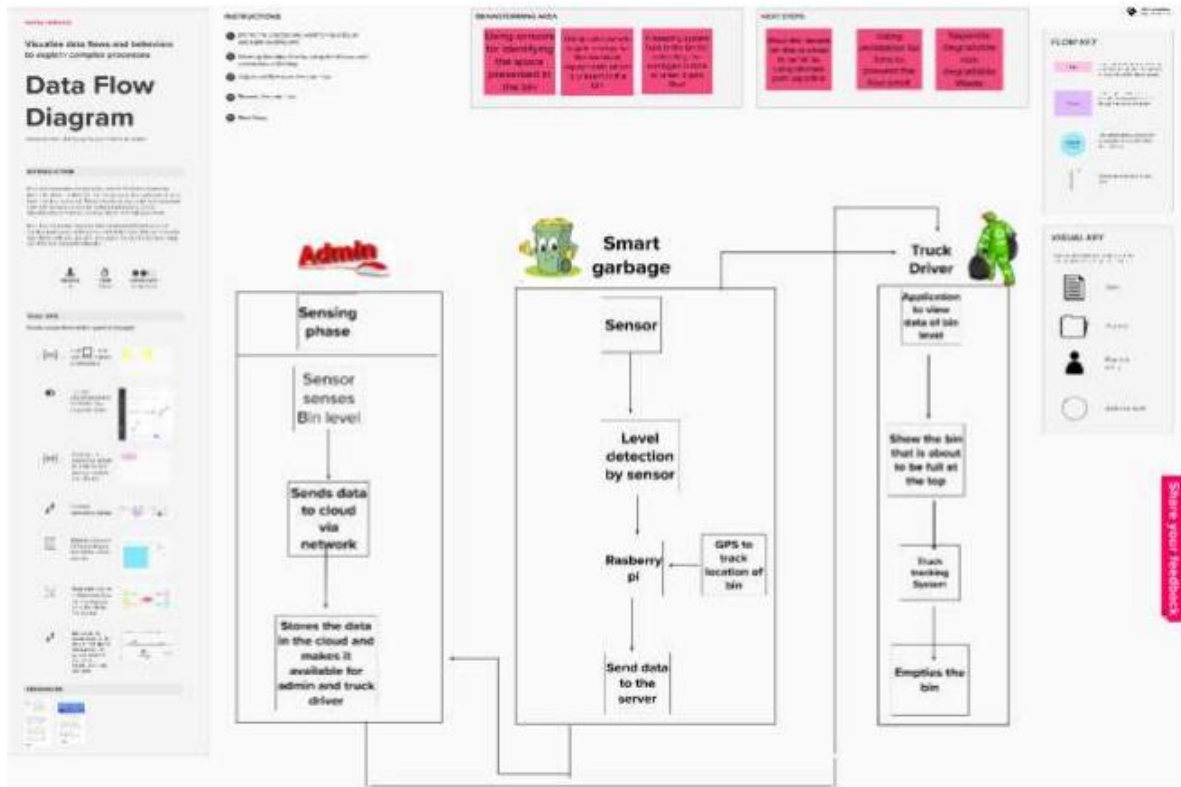
4.2 NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The web application at the admin end and truck driver end requires a log in which is quite easy for them to use with no further requirements needed they can use the application easily . The application for customer complaint is some more easy as it needs only location permission for raising a complaint.
NFR-2	Security	As the data processed is all about wastes level and bin location there is no fear of attacks in this mechanism . Though there may be some attacks for user location the application will have all sorts of security to maintain it confidentially.
NFR-3	Reliability	As the sensors and other components used has a chances of failure or stopped due to external reasons they must checked frequently . If a bin does not update its level for more than a day it should be checked . Maintaining less than 250 bins for a area is quite easy but if its more than that necessary precautions should be taken and frequently checked .
NFR-4	Performance	It should return the bin level frequently as much as possible if there is a delay in finding the bin , the bin should be repaired and it should be emptied according to its pass history of being full .
NFR-5	Availability	The user application is available almost all time as only a few times its being used in a day or week. The truck driver application should have a stable network coverage to frequently check for the bin level. The admin end system should have a high speed connection to receive all data and process all complaints and bin data .
NFR-6	Scalability	If there is less than 200 or 250 in a particular area it is quite easy to maintain them . If it goes above it or the area is big then the performance of the system gets slightly affected by it .

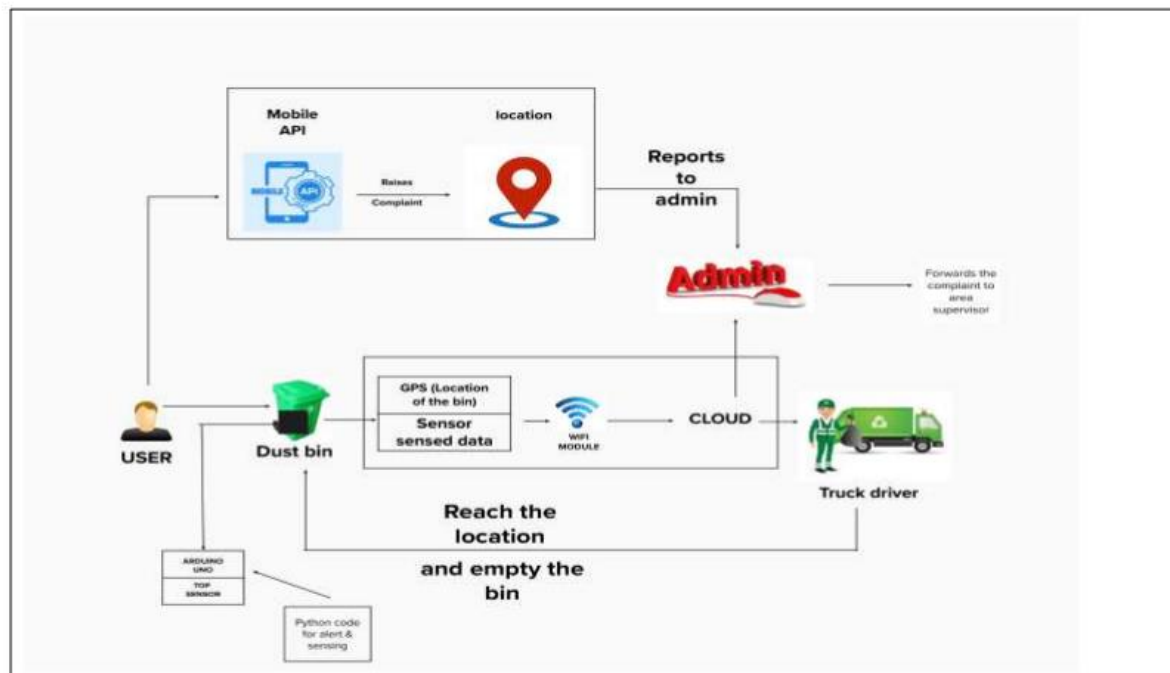
CHAPTER-5

PROJECT DESIGN

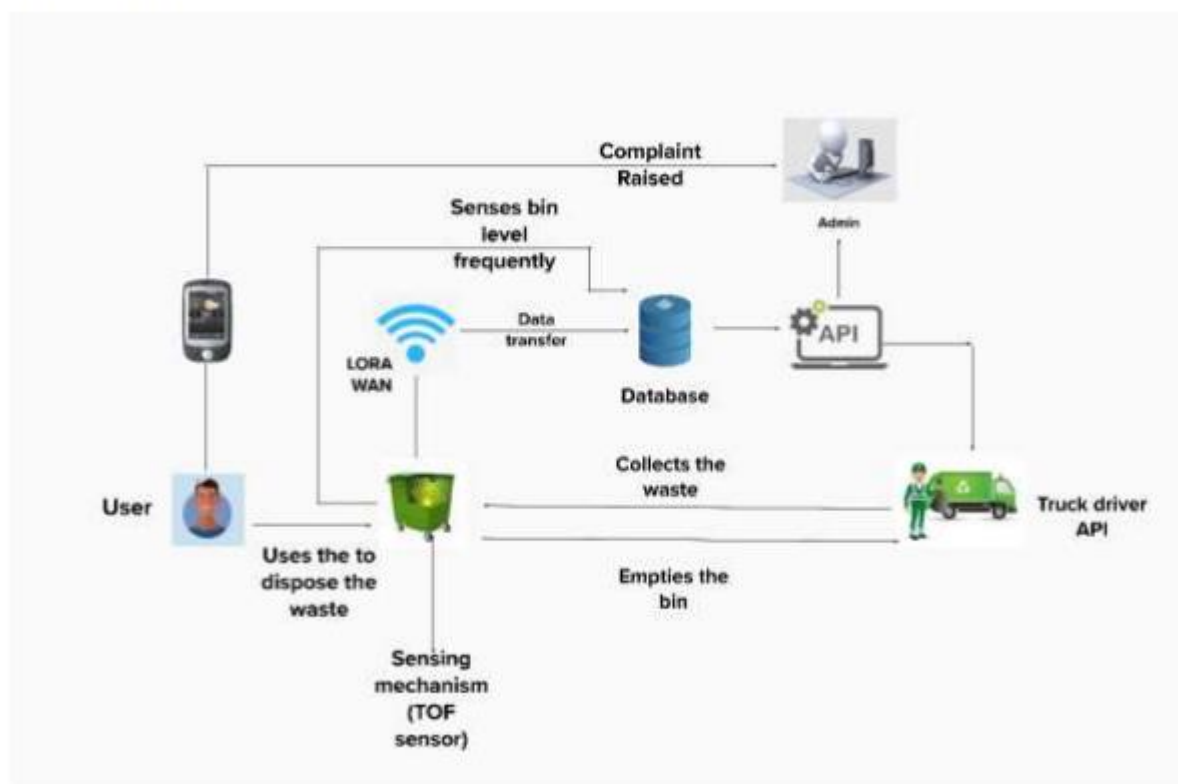
5.1 DATA FLOW DIAGRAM



5.2 SOLUTION AND TECHNICAL ARCHITECTURE



Solution Architecture Diagram:



5.3 USER STORIES

User Stories

Use the below template to list all the user stories for the product

User Type	Functional Requirements (Epic)	User story number	User Story / Task	Acceptance Criteria	Priority	Release
Admin	Login	USN-1	The admin manages all the details of bin and workers of each area.	If the log in details are correct then the admin can view the dashboard	High	Sprint 1
	View Complaint and take action	USN-2	If a complaint is received then the admin should assign the nearest possible staff to take immediate action	Get the location from where the complaint is received	Medium	Sprint 3
Truck Driver	Login	USN-3	The truck driver should log in with credentials provided by the admin to view the bin level data and empty them	Correct log in credentials as provided by the admin to each truck driver of that area	High	Sprint 2
	Empty bin and report in application	USN-4	After a emptying a bin they can report on cleaning details of the bin to the admin via application	The bin which is about to be full should have the highest importance	Medium	Sprint 2
User / Public People	Raise a complaint	USN-5	If the wastes are being spread on road then the user can raise a complaint through application .	The user should give location permission before raising a complaint.	Medium	Sprint 3

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CHAPTER-6

PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

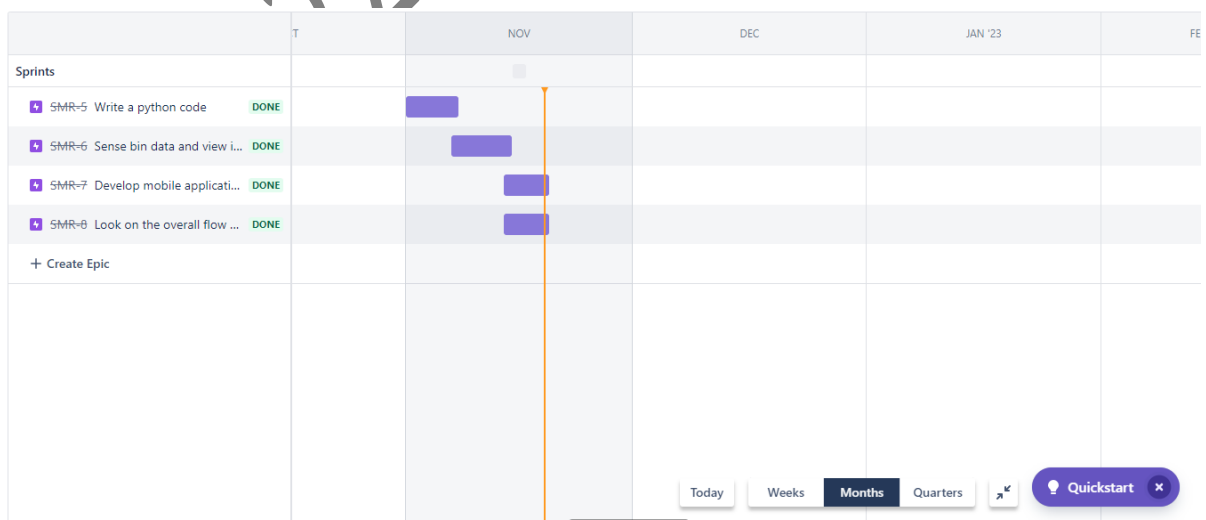
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	3	High	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-1	Send data from sensor(random input) to cloud	USN-4	Send data to cloud	2	Medium	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-1	Develop a python code	USN-12	Develop a python code to sense data using random function	2	Medium	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-2	Truck driver application log in	USN-6	Log in to the application created for truck driver	3	High	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-2	View bin data through cloud to application	USN-7	View bin data that is being uploaded to cloud to truck driver application	3	High	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-3	Create user application	USN-9	Create a user application for making a complaint on waste overflow	2	Medium	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-3	Raise a complaint	USN-13	To raise a complaint on bin overflow and other issue regarding waste cleaning procedure.	2	Medium	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-3	Test the user application	USN-10	Make sure the created application works as per the planning	2	Medium	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-4	Look after the overall flow of the applications	USN-11	Look down to all aspects of the applications and check whether it works as per the	3	High	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C

			design and flow			
Sprint-4	Check Login page of admin	USN-2	Check the registration page with both correct and wrong credentials to check its correctness.	1	Low	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C
Sprint-4	Test the truck driver application	USN-8	Test the application created for truck driver in all possibilities	1	Low	Sriram. B Sivaraj . V Ram Kumar.D Rohit.C

6.2 SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	7	6 Days	24 Oct 2022	29 Oct 2022	7	29 Oct 2022
Sprint-2	6	6 Days	31 Oct 2022	05 Nov 2022	6	05 Nov 2022
Sprint-3	6	6 Days	07 Nov 2022	12 Nov 2022	6	12 Nov 2022
Sprint-4	5	6 Days	14 Nov 2022	19 Nov 2022	5	19 Nov 2022

6.3 Reports from JIRA



CHAPTER-7

7-CODING AND SOLUTIONING

7.1 WARNING SYSTEM

while True:

 for i in range(10):

 Bin1Level= random.randint(0,100)

 Bin2Level = random.randint(0,100)

 Bin3Level = random.randint(0,100)

 data1={'Bin1Level':Bin1Level , 'Bin2Level':Bin2Level, 'Bin3Level':Bin3Level}

 if Bin1Level > 90:

 warn1 = 'alert bin full'

 elif Bin1Level > 60:

 warn1 = 'Time to clean'

 else:

 warn1= 'May be cleaned later'

 if Bin2Level > 90:

 warn2 = 'alert bin full'

 elif Bin2Level > 60:

 warn2 = 'Time to clean'

 else:

 warn2= 'May be cleaned later'

 if Bin3Level > 90:

 warn3= 'alert bin full'

```
elif Bin3Level > 60:
```

```
    warn3= 'Time to clean'
```

```
else:
```

```
    warn3= 'May be cleaned later'
```

This part of coding is the main part of project as this makes a alert whenever the bin level goes above the mentioned threshold limit . To make sure the bin goes unnoticed there are two levels to notify at 60% as the time to clean and 90% alert that the bin is full . This makes sure that no bin can go unnoticed from the notifications and becomes full.

7.2 MULTIPLE DEVICES

```
import time
```

```
import sys
```

```
import ibmiotf.application
```

```
import ibmiotf.device
```

```
import random
```

```
organization = "mfy87c"
```

```
deviceType = "device3"
```

```
deviceId = "1357"
```

```
authMethod = "token"
```

```
authToken = "12345678"
```

IBM DEVICE CONNECTION: This part of code make sures that the code is connected to admin and user interface and bin values are being shared to them frequently . The data can also be shared to mobile applications with the help of this code .

CHAPTER-8

TESTING

8.1 Test Cases

Test Case to be Executed	Data to be tested	Expected Result	Test Result
Test Case -1 Admin Login page	Test with incorrect Username and password	Show incorrect username and password	Pass
	Test with incorrect password	Show wrong password	Pass
	Test with correct credentials	Login successful	Pass
Test Case -2 Admin Dashboard	Test Whether the Output values are shown correctly	Values are shown correctly and in order	Pass
Test Case-3 Truck Driver Login	Login with incorrect Username and Password	Login Failed	Pass
	Login with correct username and password	Success	Pass
Test Case-4 Truck driver dashboard	Check whether the bin values are being shown	Bin values are shown correctly	Pass
Test Case-4	Check user application login with ID and Password	Success	Pass

8.2 USER ACCEPTANCE TESTING

8.2.1 TEST CASE ANALYSIS

Section	Total Test Cases to be tested	Failed	Pass
Admin End	4	0	4
Truck Driver End	3	0	3
User application	1	0	1

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CHAPTER-10

ADVANTAGES AND DISADVANTAGES

ADVANTAGES:-

- The bin can be emptied on time and the risk of bin overflow is reduced
- The bin level can be monitored and emptied only when it is about to be full
- Fuel cost , Man Power ,Carbon emission can be reduced
- Helps to keep the environment clean and neat
- Reduces the risk of foul smell in the bin surroundings

DISADVANTAGES:-

- Increased cost for maintenance of bins
- Production cost for the mechanism increases the bin value
- To make it safe from animals and rain a proper closed box needs to be used which further increases the cost
- Maintenance and Service for mechanism should be done frequently

CHAPTER-11

CONCLUSION

This system not only reduces the bin overflow but also helps in maintaining the environment clean and neat . This system can be more useful in areas where there are more people and use a common bin to dispose all their wastes daily .

This system can be implemented to avoid delay in emptying bins and reduce human efforts and time wastage in visiting all the bins daily . Though there may be more maintenance required to maintain the smart monitoring the amount can be collected as small amounts from those area peoples .

If implemented this could make a huge impact in maintaining cleanliness of the society and help in growth of our city . The all over scope of the project is to monitor and maintain all the bins in a area at one place with less human interventions .

CHAPTER-12

FUTURE SCOPE

- Digital boards around the bin to improve the attention of people to dispose the waste properly and keep the surroundings clean.
- Introducing a automatic sanitizing system which spreads sanitizer around the bin every 2 hours and reduces foul smell.
- Imposing fines against the people who do not dispose the wastes correctly inside the bin
- Using ventilations (a small opening covered with metal net) around the bin to reduce bad smell and dangerous gas forming inside the bin.
- A beeping system in the bin which makes sound if bin goes full and left un cleared .
- Using solar panels to maintain the electricity requirements for the bin.

CHAPTER-13

APPENDIX

SOURCE CODE:-

```
import time

import sys

import ibmiotf.application

import ibmiotf.device

import random

organization = "mfy87c"

deviceType = "device3"

deviceId = "1357"

authMethod = "token"

authToken = "12345678"

def myCommandCallback(cmd):

    print("Command recieved : %s"% cmd.data['command'])

    status = cmd.data['command']

    if status == "lighton":

        print("LED is on")

    else:

        print("LED is Off")

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()
```

```
deviceCli.connect()
```

```
while True:
```

```
    for i in range(10):
```

```
        Bin1Level= random.randint(0,100)
```

```
        Bin2Level = random.randint(0,100)
```

```
        Bin3Level = random.randint(0,100)
```

```
        data1={'Bin1Level':Bin1Level , 'Bin2Level':Bin2Level, 'Bin3Level':Bin3Level}
```

```
        if Bin1Level > 90:
```

```
            warn1 = 'alert bin full'
```

```
        elif Bin1Level > 60:
```

```
            warn1 = 'Time to clean'
```

```
        else:
```

```
            warn1= 'May be cleaned later'
```

```
        if Bin2Level > 90:
```

```
            warn2 = 'alert bin full'
```

```
        elif Bin2Level > 60:
```

```
            warn2= 'Time to clean'
```

```
        else:
```

```
            warn2= 'May be cleaned later'
```

```
        if Bin3Level > 90:
```

```
            warn3= 'alert bin full'
```

```
        elif Bin3Level > 60:
```

```

warn3= 'Time to clean'

else:

    warn3= 'May be cleaned later'

def myOnPublishCallback():

    print("\nPublished Bin1Level = %s "%Bin1Level,

          "Bin2Level = %s "%Bin2Level ,

          "Bin3Level = %s "%Bin3Level,"to IBM Watson")

    print("Bin1-%s"%warn1)

    print("Bin2-%s"%warn2)

    print("Bin3-%s"%warn3)

    success =

deviceCli.publishEvent("IoTSensor","json",data1,qos=0,on_publish=myOnPublishCallback)

if not success:

    print("Not cncted to IOTF")

    time.sleep(10)

    deviceCli.commandCallback=myCommandCallback

deviceCli.disconnect()

```

GITHUB AND PROJECT DEMO LINK:

GITHUB LINK	https://github.com/IBM-EPBL/IBM-Project-14157-1659543390
PROJECT DEMO LINK	https://drive.google.com/file/d/11uYcF9_C3l_Lq0wxerUp2qHh5_RkEhXI/view?usp=sharing

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