

# SMART WASTEBIN

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**Abstract** - The main objective of this project is to manage the waste filled in the dust bin in a smarter way. We achieve this task by using the concept of IOT. Here we monitor the waste present inside the bin in an effortless way and take certain actions which is predefined in this system. Based on the monitored data the further analysis can be made in order to maintain the waste bin system in a better way. The system even includes the features like automatic SMS alert, lodging up of any related complaints and request for a new bin. Hence in this busy world the saving of time can be done in this system and even a tension free automatic management of waste.

**Key Words:** IoT, SMS, Monitored data, maintain the waste, Sensor.

## 1. INTRODUCTION

Internet of Things is combination of any physical thing connected to electronic device and communicated through internet. IoT makes life very easy to lead by providing access to everything on our finger tip. IoT consists of five components Things, Sensors, Actuators and storage component. Things are the living and non-living objects, made smart by combining with electronic device. Sensors are the interface for IoT implementation. Data collected from these sensors acts as stimulating event to perform any task. Actuators are major components of IoT, where it transforms electrical signals into functional energy. Since IoT is a collection of large number of device, large amount of data is generated. In order to store these data, storage devices are required which can be cloud or big data or any other large storage device.

Usage of smart devices has changed the way of living of the people. A person with busy schedule has to depend upon these smart devices in order to manage their value for time they have. The waste management is one of the major roles in daily living management. In order to maintain a clean and sanitized environment in this busy world, the monitoring of the waste bin is important. The major problem is to provide proper waste container to the civilian's in order to avoid environment pollution.

To overcome all these limitations we have come up with a smart waste bin which is being provided to individual home. This consists of ultrasonic sensors to detect the filling of bin and GSM to send alert message. By this the civilians need not

dump waste in environment and on full of bin the authorized person will come and collect the waste.

## 2. PROBLEM STATEMENT

To implement a model as an alternative approach to solve the waste management and collection issues in the society by developing a smart wastebin that checks on the level of filling of wastebins using ultrasonic sensors and updates the same to the admin database, and on reaching a threshold level, the notification message is being sent to the authorized person via GSM and report is generated based on the data stored in the database.

## 3. ARCHITECTURE DIAGRAM

Architecture diagram provides the general description on how the components of the system are related with each other.

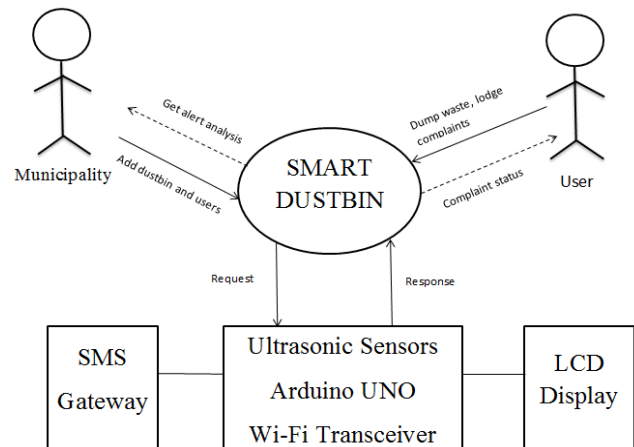


Figure 1: Architecture Diagram for Smart Wastebin

The Figure 1 shows the architecture diagram of the proposed system where initially, the user registers himself to the system and requests for the waste bin. The request is acknowledged by the municipality and they provide the waste bin to the requested user.

The smart waste bin detects the filling of bin using ultrasonic sensors and on reaching the predefined level, the status is being updated and displayed on LCD display attached to waste bin. On reaching the threshold level the alert

notification is send to the authorized truck driver to collect the waste. The municipality keeps track of all the process. The user may also lodge complaints regarding any flaw in the bin and this complaint is notified to the municipality. Based on the collected data, report is being generated.

The Figure 2 shows the data flow diagram for user of the proposed system. The user logs in to the system and on success, can lodge complaints by providing the complaint description and view status which is based on the level filling of the waste bin. The complaint status can also be viewed by the entity during the process.

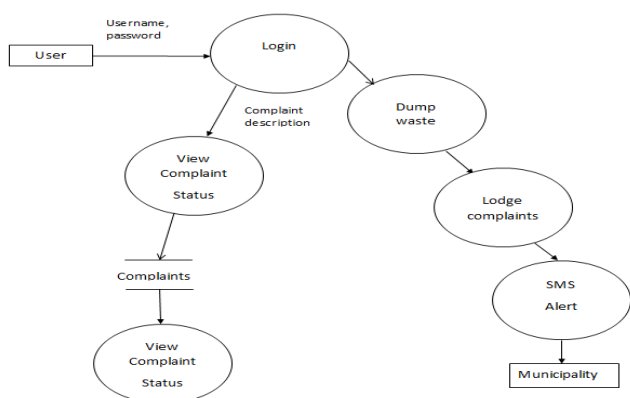


Figure 2: Dataflow Diagram for users of Smart Wastebin

The Figure 3 shows the data flow diagram for municipality of the proposed system. Municipality logs into the system. The entity can allot dustbins, view complaints, view users and view reports. The details needed to run the process are stored in the data store.

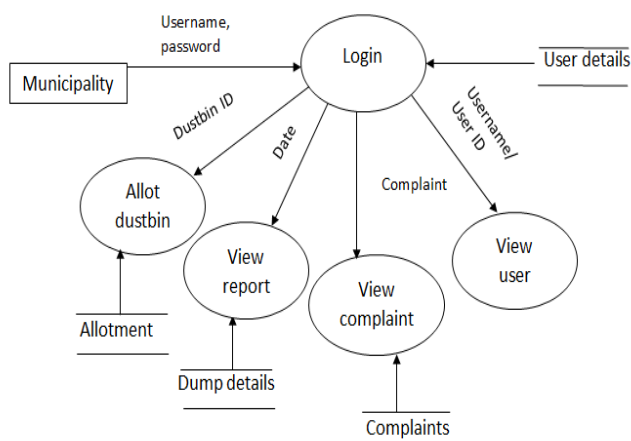


Figure 3: Dataflow Diagram for Municipality of Smart Wastebin

#### 4. METHODOLOGY

##### 4.1 Pseudo Code for Login

Begin Enter username and password

Click on login button

If Valid username and password then

Display Smart Wastebin page

Else

Display error message

Endif

End

##### 4.2 Pseudo Code for Smart Wastebin

Begin

If Bin is full then

The lid gets closed

Result is displayed and message is sent to the authenticated person

Lid can be opened by sending the authentication message

Else If

Close the lid and display the status

Endif

End

#### 5. RESULT AND ANALYSIS

The results of the prototype generated are shown in the table. The Figure 4 consists of three fields namely door no, bin no and username. Here, for the registered user and the Respective door no, the allotted bin no is being displayed. The Figure 5 consists of two fields namely the date and the description based on the status of the bin. The current date is being generated.

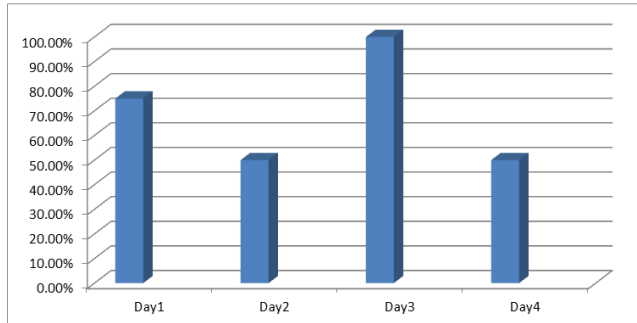
Name	Door No	Bin No
sanita	123A	101
suhas	722B	102
rannitha	896C	103
akhil	28	104

Figure 4: Table for View Users

transaction_id	description	date
1	Half	27-04-2018
2	Half	30-04-2018
3	75%	30-04-2018
4	Full	30-04-2018
5	75%	30-04-2018

Figure 5: Table for View Report

The graph in the Figure 6 tells about the amount of waste that is being filled in the wastebin on a average scale. The shown graph is plotted taking four days into consideration. The x-axis describes the days taken into account and y-axis describes the level of the wastebin fill in percentage.



**Figure 6:** Graph for Average Filling of Waste per Day

## 6. CONCLUSION AND FUTURE WORK

Web based waste management has become a necessity because of the hectic schedule of civilians. This prototype not only manages collection of waste but also provides an application where in all the queries of the user is taken care of and where municipality and user can work hand-in-hand. This proposed system is developed using ultrasonic sensor, Arduino UNO and GSM, which sends alert messages to the authenticated person and on his acknowledgement, the system goes back to its initial state. It generates reports based on the filling of the wastebin.

Concerning the results of both the application and wastebin, we can improve them by providing higher capacity bins and minimizing the cost. Since the prototype has all its components connected outside the device, in future it can be integrated within the bin.

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