Garbage Collection System – Robust

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Abstract: We are building a Web-App consisting of two distinct units namely Server side and client side. The dashboard connected to the cloud should be a source for interaction between clients and Municipal Corporation acting as a Server to use the information for their specific requirement. This is an application which can collect data and send from user to Municipal Corporation (centralized hub) on a Web based platform with requirement of internet connectivity and GPS. Every garbage bin is assigned a Unique ID such that every time a citizen takes a picture on the phone and uploads it on the dashboard. Using the Google place APIs, the Web App is able to track the exact location and accordingly the information is processed and enacted upon by the Municipal Corporation on the server side. The GCM service handles all aspects of queuing of messages and delivery to client/server applications running on target devices. Accordingly the Municipal Corporation sends the garbage can collecting vehicle to collect the garbage.
**Index terms:** Cloud, Google place API, GCM, GPS.

I. INTRODUCTION

As long as human live, waste will be generated. Waste is defined as any material which could harm our environment. It represents no economic value to its owner or to an environment. Garbage management is the precise name for the collection, transportation and recycling of waste. Garbage management is the process of treating solid wastes and offers variety of solutions for recycling items that don't belong to trash. Garbage management is an area which needs education and awareness for global preservation. The education for waste management is very critical to perseverance of global health and security of human mankind. Improper waste management and disposal causes serious impact on health, children being more vulnerable to these pollutants. Uncollected garbage obstructs storm waters runoff, resulting in the formation of stagnant water bodies that ultimately affects the citizens in the surrounding area. This is why in this project, citizens and the corporation has collaborated with each other to take responsibilities of waste management. In this paper, a model has been proposed in which the collection of garbage has been made real time becomes breeding grounds of diseases. There is a lack of coordination and irregularity in cleaning of garbage bins and roads by Municipal Corporation which can be resolved by designing an effective web app. It ultimately affects the citizens in the surrounding area. This is why in this project, citizens and the corporation has collaborated with each other to take responsibilities of waste management. In this paper, a model has been proposed in which the collection of garbage has been made real time.

II. ARCHITECTURE DIAGRAM`

The architectural block diagram shows the two end users including Database storage for government bodies. It shows the overall process of how client and government communicate through the dashboard.
The central database has the timer in order to keep a watch on timely bases on the server and if the work is being delayed it sends the appropriate notification to the system.
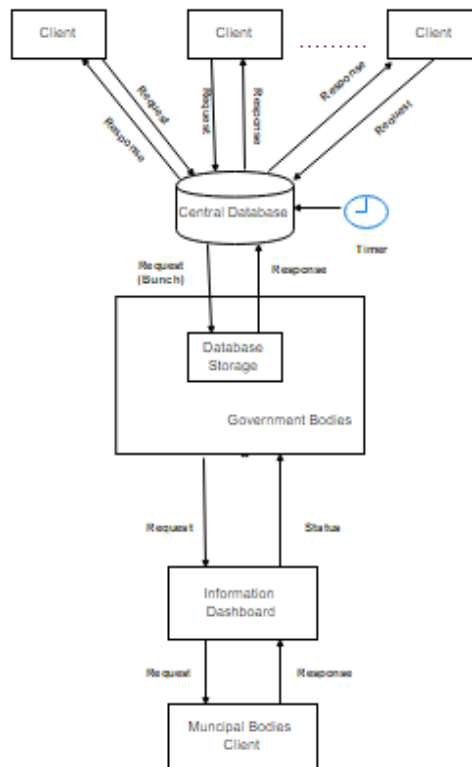
III. CLOUD SYSTEM

The system which we propose to implement will be mainly based on the Cloud System. The following are the technologies which will be used during implementation.

A. GCM

Google Cloud Messaging is a mobile service developed by Google that enables developers to send notification data or information from developer-run servers to applications that target the Google android operating system.

It enables developers to send data from servers to both client applications or Chrome apps and extensions.The server side of Google Cloud Messaging (GCM) consists of two components:

- *GCM Connection Services*: It is provided by Google. These servers take messages, images and notification from the municipal corporation server side and send them to a client app running on a device.
- *Phone Gap:* With the help of Phone gap, we are implementing a web app that will have same features and GUI as that of website. Due to this, there will be no changes in app, if user tries to access our app either from computer or mobile devices.

B. Google APIs

The Google APIs is set of methods that helps to track the location of the image uploaded.

C. Interactive Voice Response (IVR):

It is an technology that lets server to interact with clients via voice calls which are pre generated and stored on the server side. It consists of Voice Response Unit (VRU) which will take input from user via keypad dialer on mobile device and according to the input it will do processing and will give corresponding stored voice message as output to client.

IV. IMPLEMENTATION METHODOLOGY

The web app is implemented in a hybrid system which means the features will be same for user using app through mobile device or web. The user clicks the image with the camera of the overflowing garbage bin. He then logs in to the app, and uploads the selected image.

Along with image, the location of the image and the note (if any) written by the user will be stored as one request in the database with the help of APIs. The GCM now PUSH the request from database to the dashboard of the municipal corporation and Municipal Corporation will now see the notification.
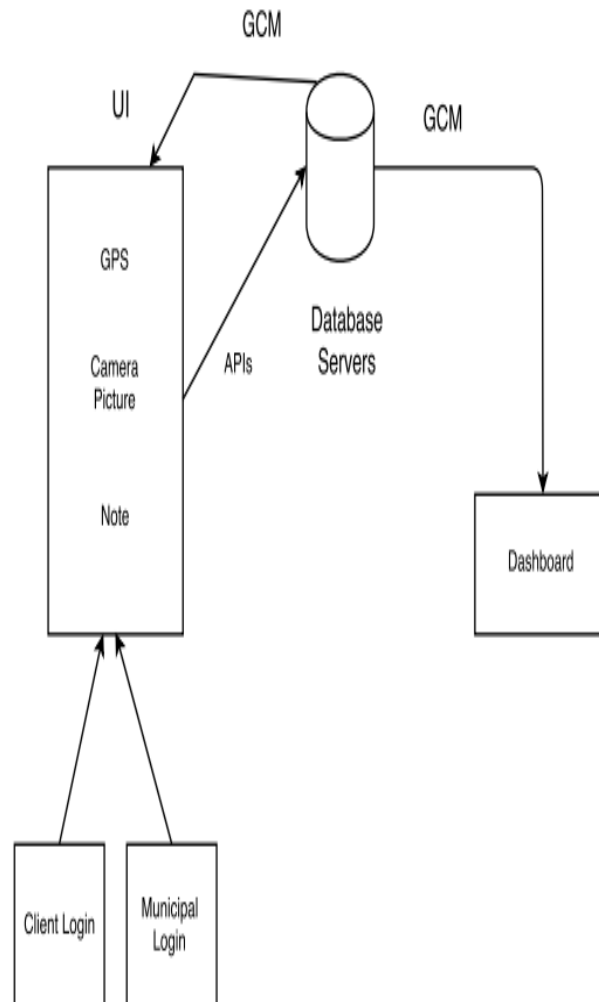

Fig: Module Diagram

After receiving the request, the municipal will act accordingly and after the completion of cleaning process, the municipal will acknowledge the client that the request is completed. This acknowledgement will be stored in database and GCM will PUSH this acknowledgement to client side and user will receive the notification. If the request is not processed within 48 hours, then the user can complain via IVR.

V. MOTIVATION

Swachh Bharat Abhyaan: A strive by the government to achieve cleanliness through implementing digital awareness for our nation motivated us to create this web app.

Through the app we are trying to collaborate with the actions of the citizens with the municipal corporation, thereby spreading awareness and also indulging a larger section to protect our environment.

In order to motivate people to come forward and use this app for the clean environment, we have come up with the idea of "virtual money". As soon as the request of the user is successfully completed, the users account will be credited by certain amount of virtual money and when the certain amount of money is collected by user, he can redeem it for its personal use.

VI. SCENARIO

A scenario of a user taking a picture of a overfilled trash is considered. A user clicks a picture from the mobile phone's camera while the GPS is on. He puts the caption if any and uploads it. The request of uploading a image goes to the Web UI and if the request for the same is granted, user gets the notification of image being uploaded. The image uploaded in the UI then moves to the Database Server/Cloud. From the Database server the image request is than PUSHed into the Dashboard system at the server end of Municipal Corporation. A person from this end needs to login into the app and take the necessary action. After cleaning that particular place person takes picture from the phone and PUSHes into the Database server. The process is explained in the sequential diagram given below
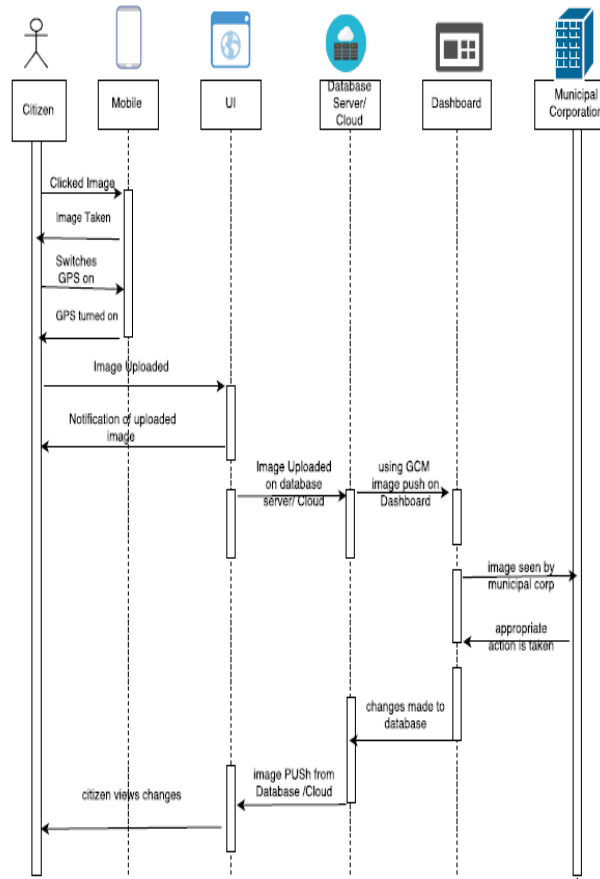

Fig: Sequence Diagram

VI. DATA FLOW DIAGRAMS

A. DFD Level 0

The citizens upload images of garbage through our app, resulting in municipal corporation receiving notifications and alerts, to which accordingly the corporation takes necessary action by resolving the query. Also the citizens get the images and feedback for their queries after completion of the activity thereby providing an appropriate feedback through the web app.
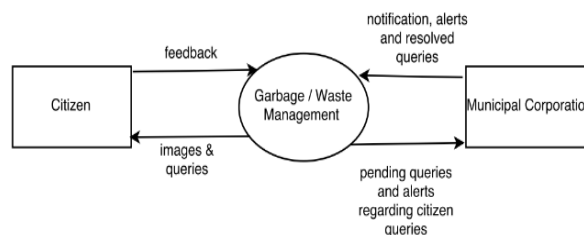
B.   DFD Level 1

The municipal corporation and software professionals both are provided with a separate login and registration to ensure only authorized users get access to the web app in the 1st process.

In the 3rd process citizens post queries ,issues and images relevant to garbage collection or lack of proper cleanliness to which the municipal corporation responds accordingly. This is managed effectively by managing a database indicating a status of the queries and images by citizens, thereby solving it in appropriate sequential order .In the 2nd process municipal corporation sends appropriate alerts and notifications regarding new and upcoming events or cleanliness drives organized or even the feedbacks to citizens.
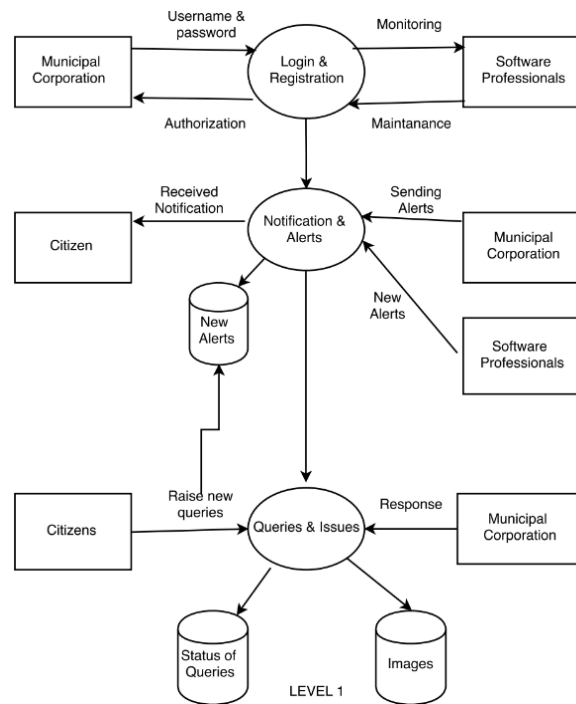
VII. CONCLUSION

By implementing this project we will avoid over flowing of garbage from the container in residential area which is previously either loaded manually or with the help of loaders in traditional trucks. Thus, we have proposed to implement this system.

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