



An Android Based Public Submission System for Waste Collection in Indian Cities

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Abstract

India is a very populated country and the people in the country are increasing in number by day to day. As the number of the public is going increasing from time to time, the place and the surroundings of the people are filled with more amounts of dust and waste. And it is increasing with the number of people in the country from time to time. Maintaining cleanliness in the city gives the public with good health. If it is not cleaned, the people may get affected by various diseases during especially in rainy seasons. In order to maintain such things, the proper allocation of manpower for cleaning and performing such tasks is going to increase. Hence, an attempt has been made to make the collection of the presence of waste at various locations in the cities filled with more people was tried by developing a mobile application. As the application was a mobile application, it may reach to most of the people in the city. Garbage Management Systems by municipal corporations and other organizations face several problems in locating garbage, monitoring and assigning the work for recycling the garbage. An Android Based Public Submission System for Waste Collection is an Android application which is proposed to minimize these problems and monitor the cleaning activities in and around the cities for the safe and health consciousness of the public in cities.

Keywords: GPS, Waste Collection, Garbage Management, public system, Android, 3G, 4G.

1. Introduction

Mobile phones are the latest trend-setting in the country as every person in the country almost using a cell phone. It had started working in various decades, but it became very much simplified in the last few years. As most of the people are using these sorts of phones, the communication between the customers or the people became more comfortable and fast. By sending some messages through a mobile phone or cell phone, a person can reach to any person in the country and accurate within a brief period. Hence, this medium can be considered as the fast and very accurate model to contact with the general people or the public living in and around the city with various locations and working at various places in the city. This technology has become very popular and also very cheap such that any ordinary customer or familiar person can utilize this phone. Hence, the government or the private organizations are a now a day's using this sort of communication for contacting their customers or the people living in the various places in the cities.

The mobile phone consists of various types of applications like GPS navigating device and embedded mesh browser and immediate messaging consumer and handheld game console [6]. By connecting or using the GPS, the location of the customers or any customer's location can be identified quickly and also processed within very few seconds. The movement of the customers can also be tracked by using this technology. It can be utilized by any age group of the customers, so that it became more powerful and famous. The development of various applications for various purposes was being done in all these years for the further

development of the technology and making the customers more comfort facilities.

2. Methodology

An android-based public submission system for the waste collection was an Android Application that helps the users in the city to report the indisposed garbage locations to the concerned officers for cleaning purposes. If any user installs the application in their mobile phones, it allows the users to register first in the application by their essential details like their name, mail id, mobile number and their area of stay in the city. It allows the users who were registers in the application from their mobile device to report indisposed garbage location using Global Positioning System (GPS) [7] in their in and around surrounding areas. After login into the application, the user can describe the indisposed garbage location to the administrator of the application. Once the administrator gets the locations of indisposed garbage, he can assign this work to either any registered volunteer or any social service organisations like NSS, Scouts etc. If the volunteer or social service organisation do not do the assigned work within the specific period, then the administrator can notify the location of indisposed garbage locations to either the Municipal Corporations or nearby Panchayati offices [8,9]. The administrator can assign the work to the volunteers by sending push notifications. If the user has updated his profile to volunteer, then the user can send the status of the assigned work by the administrator using Gmail. If the user is interested in reporting the location of indisposed garbage near his surroundings, then he/she can install the



application in their Android mobile and report the location of indisposed garbage using GPS[10]. The reported locations stored in the firebase real-time database.

The user console consists of the following activities,

1. Registration Page for users registration
2. Login to Locate Garbage Areas.
3. Update the data in User Profile.
4. Report the location of the Garbage to the concerned officers
5. The condition of the Garbage disposal.
6. Notifications.

2.1. Working on Application

The workflow of the current application “Android-Based Public Submission System for Waste Collection” is primarily based on the GPS system for user’s location and Google Maps API to report the indisposed garbage locations. The usage of the application should have the little user knowledge about the application usage of mobile phones and the little knowledge of internet usage in the mobile phones.

The Android-Based Public Submission System for Waste Collection was showed in the figure 1 works as follows:

1. In step-1, the user observes the indisposed or the presence of garbage in his locality.
2. The user needs to login to the system with his credentials and reports the presence of garbage to the concerned people.
3. To identify the location of the customer or the user, the GPS of the Smartphone is used to locate the garbage area.
4. The location is reported or shared by the user.
5. The location of the garbage shown on the application map.
6. Cleaning activity assigned to volunteers or respective government offices like municipalities, Panchayati or social service organisations like NSS, Scouts through notifications. □
7. The locations where the garbage frequently disposed of are noted, and specific measures are taken to control it. □
8. If the garbage disposed of, the administrator updates the application and notifies the user.

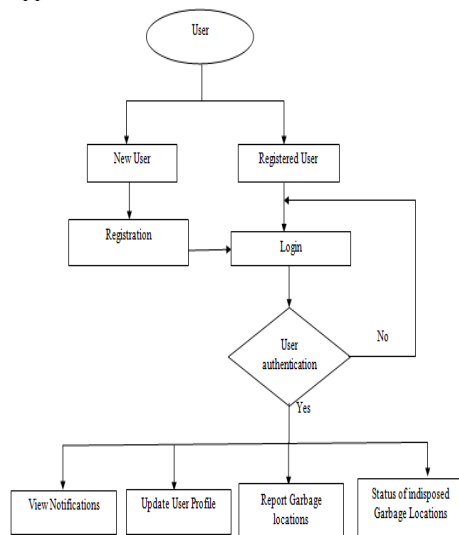


Fig. 1. The architecture of smart garbage locator □

3. Experiment Results

3.1. Home Page

Android Based Public Submission System for Waste Collection Home Page contains two categories namely Registration and Login. The existing users can use the direct login to the application for using the facility and for also to report the presence of the garbage in their locality. The second feature was the user need to register to the application if he does not register with the application already.

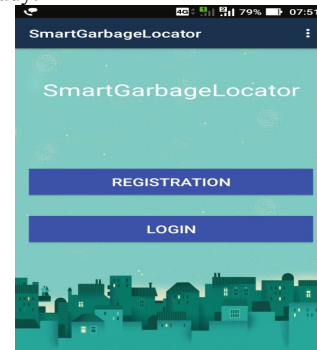


Fig.2. Home Page for Smart Garbage Locator System

3.2. Registration Page

In the current application, the user registration page provided which shown in the below figure. If the user wants to use the current application, then the user has to register by filling the details namely name, email, place, user type, password and confirm the password.

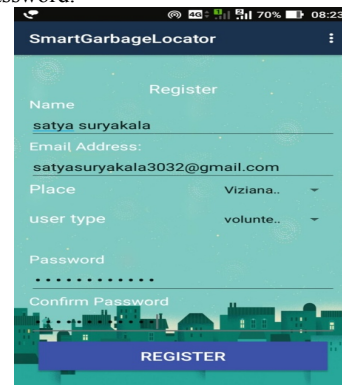


Fig. 3. New User Registration

3.3. Login Page

In the current application, a login page is provided for the users to login into the application which shown in the below figure for registered users. The users can log in by entering the name and password credentials.

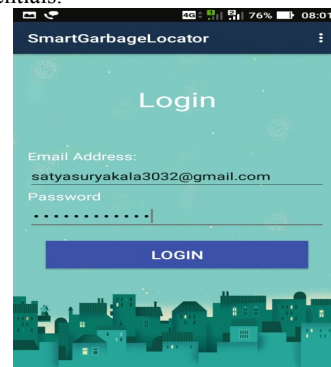


Fig. 4. User Login for Smart Garbage Locator System

3.4. Issue Registration Page

After the successful completion of the registration process of the users into the application, the user's needs to enter into the application with his registered credentials. The current page directs the user to report garbage location and report status.

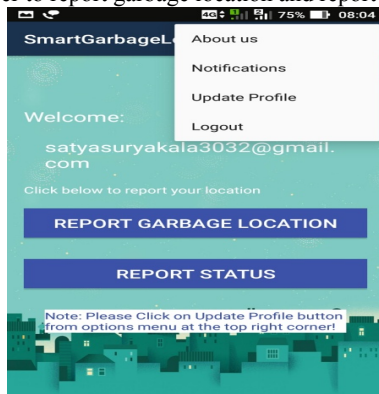


Fig. 5. Issue Registration in Smart Garbage Locator system

3.5. Update User Profile Page

In some cases, the registered users like to update their data or would like make some changes in the data which already submitted to the Android application. The current page provides the facility for the users to make such changes in the existing or the registered customer's data. The user can update the details after registering into the application.

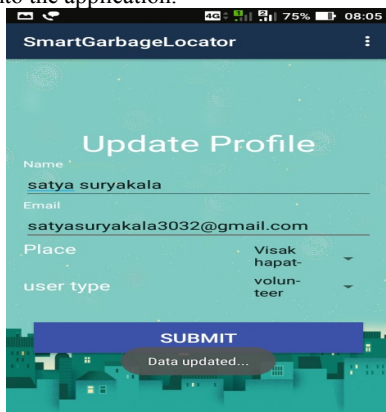


Fig.6. Update User Profile

3.6. Register Garbage Location Page

When the user clicks “REPORT GARBAGE LOCATION” button, then the application directs the user to his/her current location and locates garbage area.

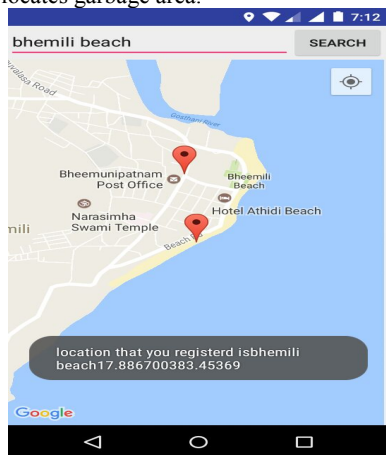


Fig. 7. Locating Garbage Area to Raise an Issue

3.7. Users Registered for Smart Garbage Locator System Application

For the controlling and order to make some changes to the existing application from time to time, the requirement of the administrator for the application highly needed. The administrator of the current application can view how many users were using the application.

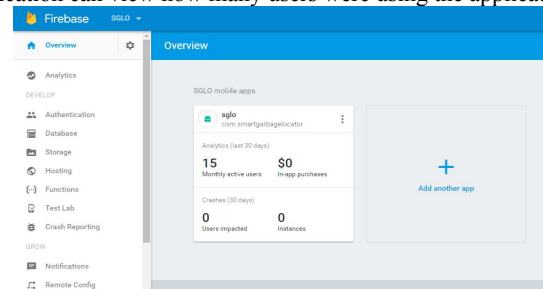


Fig. 8. Listing users for Smart Garbage Locator System

The administrator can view the total number of registered users for the application.

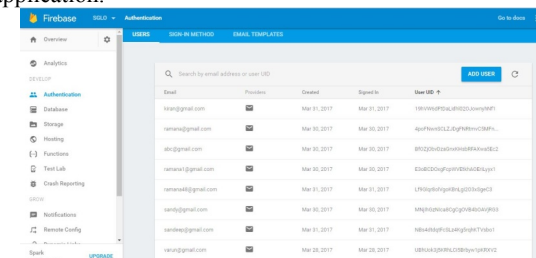


Fig.9. Details of Registered Users

The administrator can view user profile in the database file.

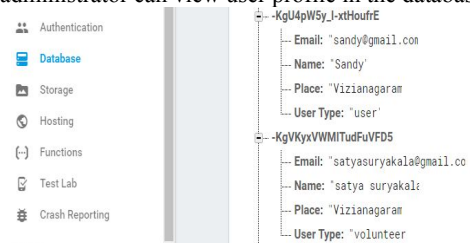


Fig. 10. Details of Registered Users Profile

The administrator can view user's reported locations file.

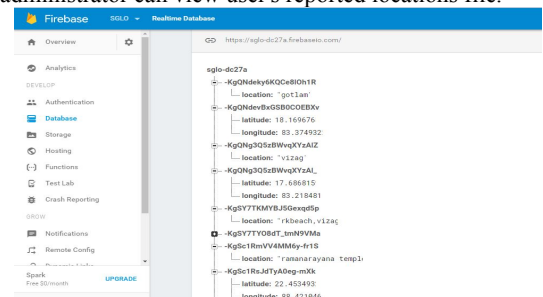


Fig.11. Details of Reported Garbage Locations

The administrator can send the notifications to the users.

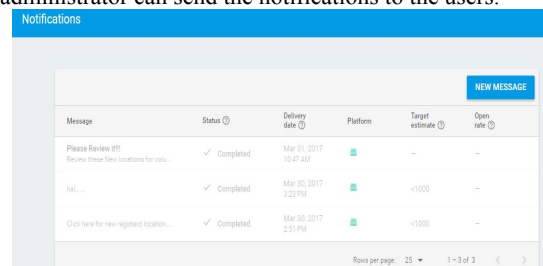


Fig.12. Administering Notifications

3.8. Popup Notification

Registered users can get popup notifications from the administrator of Smart Garbage Locator System.

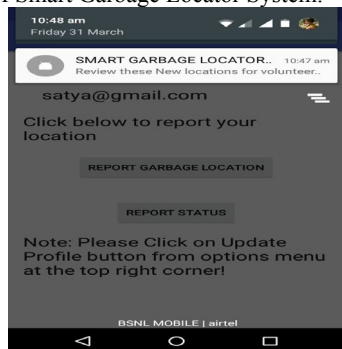


Fig. 13. Popup Notification

3.9. Notification Page

The notification form is used to receive the updates from the server and administrator.

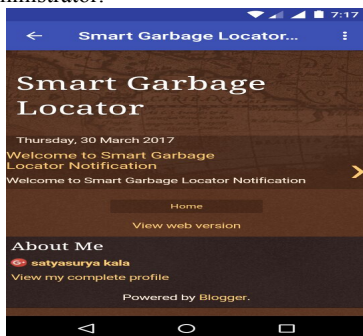


Fig. 14. Notification page with the list of Notifications □

The user can view complete details of the particular notification.

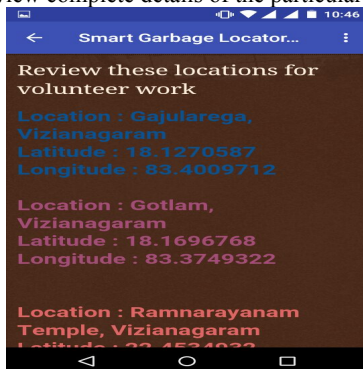


Fig.15. Notification Page with Garbage Locations Details

3.10. Status Report Page

The user can send the report status of the garbage disposed or not.

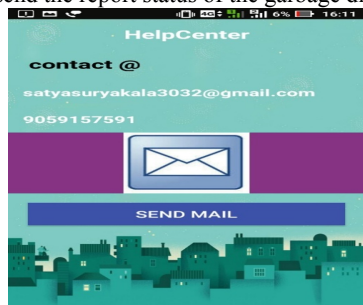


Fig. 16. Status Report of Garbage Disposal

The user can send emails to the administrator regarding the status of garbage disposal

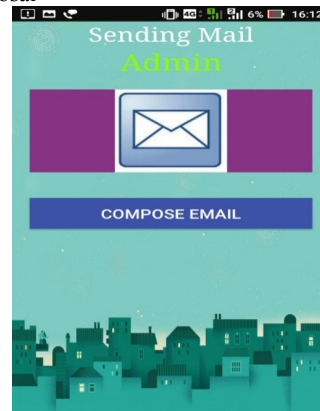


Fig. 17 .composing mail

The above diagrams are representing the total flow of the application working with various numbers of complaints being received and processed from various set of customers. It is not always possible to roam in and around the city every time and find the garbage from various locations as the size of the cities was very big. Hence, to reduce the problem of garbage, this android based application can be used for collecting the data from various locations with the help of the public or the citizens of the city.

4. Conclusion

In order to avoid the garbage waste in the cities, we had tried to develop an android based application such that the people in the city can notice and update the same to the municipal officers. By developing this application, almost every citizen will actively participate in making their environment clean and green. The utilization of this application ensures a clean environment in the city. Hence, the users can give or suggest the feedback and suggestions to the application development team and the people who were monitoring and controlling the application. This project ensures a clean environment and makes a city clean and healthy. □

References

- [1] Android Programming: The Big Nerd Ranch Guide by Bill Philips & Brian Hardy.
- [2] Android Design Patterns: Interaction Design Solutions for Developers by Greg Nudelman
- [3] Android User Interface Design: Turning Ideas and Sketches into Beautifully Designed Apps by Ian G. Clifton
- [4] Hello, Android: Introducing Google's Mobile Development Platform by Ed Burnette
- [5] Firebase Getting Started by Ray Wenderlich.
- [6] Java: A Beginner's Guide Sixth Edition by Herbert Schildt
- [7] Java: The Complete Reference Ninth Edition by Herbert Schildt
- [8] Reference Paper by Pune Municipal Corporation: MoVe (Monitoring of garbage Vehicles) □
- [9] Guidelines for National Waste Management Strategies Moving from Challenges to Opportunities -United Nations Environmental Programme, 2013. ISBN 978-92-807-3333-4.
- [10] IEEE Paper Smartbin: Smart waste management system Published in Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP), 2015, ISBN 978-1-4799-8055-0
- [11] IEEE Paper Efficient waste collection system Published in the Internet of Things and Applications, Electronic ISBN: 978-1-5090-0044-9.
- [12] https://en.wikipedia.org/wiki/Mobile_technology
- [13] <https://www.techopedia.com/definition/2920/forth-generation-wireless-4g>.
- [14] <http://searchtelecom.techtarget.com/definition/3G>.