

System to Reduce and Manage Waste Food

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Abstract- A Dynamic and secure implementation of food waste management in which the user can register under any roles namely NGO, Agriculturists, Hotels, Events. They can effectively use this platform to manage the unnecessary wastage of food that takes place in various hotels and Events. The above can be achieved by donating the surplus food to the needy to reduce food wastage and using it to focus on targeted hunger zones and help in giving food to the people who do not have proper access to food. In this paper, we will be implementing an android application that will provide a user friendly interface to the various stakeholders for sharing the essential information like the address, type of food, time of delivery, expiration time etc. At a time a particular user can scan any other user and provide necessary details about different food items or can accept orders.

Index terms- NGO, Events, Hotels, Agriculturists, Hunger Zones, Android, Donation

I. INTRODUCTION

Food waste has been the most concerning issue all over the world that is affecting not only the poor but the rich as well. There are many countries in the world that are suffering from shortage of food. Two out of 8 children in the United States lives in families that do not have proper food access. By wasting food we also waste time, energy, and the natural resources that could have been used in more efficient way. Additionally, this waste has a strong financial impact and affects the environment in many ways and hence this issue needs to draw attention of people. The food waste can be controlled and managed in various ways one of which can be donation of food to the needy. The food prepared in hotels or various events is always in surplus amount. If this food is in a consumable state then it can be handled by donation. This food can be donated to the various hunger zones that could eventually reduce wastage of food and will

also help in reducing the scarcity of food in this category. If this food is no longer consumable then it cannot be donated instead it could be handed over to agriculturists who can utilize this food to prepare natural manure that will also help in restoring the soil balance that could be harmed by using chemical based fertilizers.

II. RELATED WORK

This section describes the related works addressing the issue of management of waste food.

Annakshetra a unique initiative proposed in [1] taken by Centre of Development Communication that focuses on reducing and managing the food waste by effectively collecting leftover food from weddings, parties etc. It aims at giving this excess food to the needy people of local society. This program's main intention is to provide effective food service, move towards zero waste economy and tries to ensure food security in order to support sustainable environment that will further help in the eradication of poverty and hungry local community.

In [2] an android based approach is proposed that tries to connect the donor with NGOs with a user-friendly and reliable android platform and matches people with more food to the people with less food. [2] is based on automatically sharing details of the food from the donor with the nearest communities of NGOs in that area in form of notifications.

In [3] the author has conducted a survey to investigate and compare the effectiveness of various existing systems of food waste management. While identifying the different methods the author has considered the insights of the areas in focus, behavioral change techniques, various ICT techniques and also set a goal beyond food waste reduction i.e user engagement. The studies in [3] provides insights about the waste generated at

different phases like production, distribution and consumption. Moreover, there has been a little research on user behavior experiences with food waste management applications, considering a study on all age group users like an elderly person or senior citizens are not engaged in any work or other studies. Such users might be the biggest contributors to food donations.[3] also describes the different techniques to create the necessary infrastructure that was required to develop the service.

III. PROBLEM DEFINITION

Food being one of the most important resources required for sustenance is also leading to some of serious problems that should be taken into considerations because if not it may harm the local community as well as the mother earth in many ways. The food that is non-consumable is one of the reasons that contribute in the emission of greenhouse gases. The resources required to produce this food also have carbon footprints. Globally, the effect of processing the food that is wasted is equal to about 3.3 billion tons of CO₂. Food wastage is one of the major issues of the society today that needs to be solved. The major participants that contribute in waste food generation are hotels and event halls. The important question is how to manage this food generated in such surplus amounts. The management of this waste food will help in reduction of the resources required to prepare that food, the prevention of emission of greenhouse gases to extent. To cut back on the effect, we can donate some of the leftovers to the local community, send the non-consumable food to the agriculturists so that it could be used in agricultural activities like production of manure.

Based on the existing approaches a proper solution can be provided to this problem using an android application which monitors the quality of food and provides a real-time communication between the actors of the system and will effectively help hotels and event halls to establish communication with NGOs and agriculturists which will help in getting rid of the excess food. According to the quality of food, if the food is consumable then it can be donated to the people in need through NGOs and on the contrary if the food is not fit for consumption then it can be given to the agriculturists which will be further used to make compost. This approach will

send the messages in real-time to delay the latency and provide effective communication between the users. The application will access the real-time location using the Google API geocoder that returns the precise location coordinates in the form of address that will help in increasing the efficiency.

IV. EXISTING SYSTEM

NO FOOD WASTE

No Food Waste crowd-sources data on hunger zones in India to facilitate surplus food donation. So far, the application has identified 80 locations in Delhi and the capital region. Users themselves can mark hunger spots, which the team verifies and enters in their databases. Users can also donate food or request the app to deliver the donation using its volunteer drivers. Usually, No Food Waste picks up excess food for a minimum of 50 people. For fewer than 50 people, users drop the food at designated collection points or local facility centers. So far, No Food Waste has fed 500-700 people saving 165 tons of food.

OLIO

For some people food waste is an unavoidable part of daily life but research shows that throwing food away causes disturbance for others. OLIO taps into the conscious consumer mindset to offer a food-sharing platform, connecting people with neighbors and local shops all over the world. Users can add a photo and description of their food item with the details of location from where the food is supposed to be picked up.

V. PROPOSED SYSTEM

This paper initiates a secure waste food management scheme over the internet, which supports multiple users to contribute in managing the waste produced in various hotels and events. Specifically, the system is distributed into 4 modules namely NGO, Hotels, Agriculturists and Events communicating over the internet network as shown in Fig.1. The details of the various Hotels, NGOs, Events and Agriculturists are stored in database. In order to obtain high search efficiency, we store all the details in firebase database that assist in building real-time collaborative system. One of the advantages of using the firebase database is that by using this real-time database we can secure the data by using

company's server-side-enforced security rules. The functionalities of the traditional server will be performed and handled by the Firebase Server as it will provide real-time database SDKs for lot of platforms including Android, iOS, and Web and thus there is no explicit need to configure a server. The feedback services will receive the feedback from NGOs, Hotels, Events, Agriculturists from one another that will allow them to improve the services according to the response given to them.

These feedbacks can be viewed by particular user at a time. The request and response services will enable effective message passing between different users of different modules providing the details of the food like type of food, the duration within which it should be consumed, quantity of food, the address of the donor, the address of receiver and so on that will help in connecting these actors quickly reducing the latency in communication.

The search facility is provided to the users that can be used in order to enable the various actors to search for the particular NGO, Agriculturists he wish to donate the food to , also the user can search for the respective Event halls and Hotels to view whether the Hotels and Event Halls have any food to offer for donation.

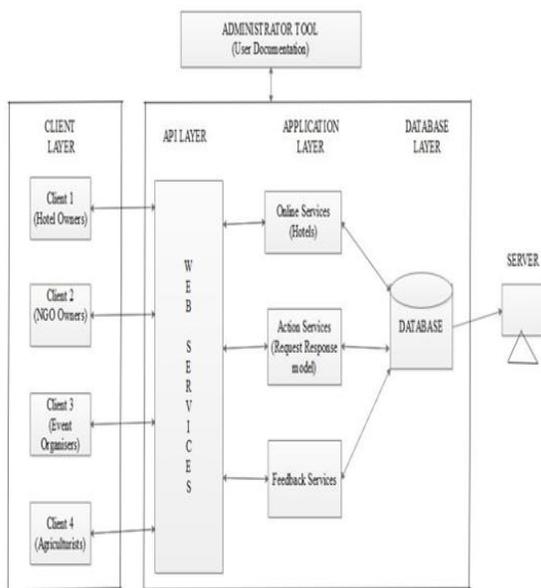


Figure 1: Architecture Diagram of Food Waste Reduction

Fig 1. The architecture of Food Waste Management Application

Access the location of user

```
public final class Geocoder
extends Object
```

```
java.lang.Object
↳ android.location.Geocoder
```

Public constructors

Geocoder

```
public Geocoder (Context context,
Locale locale)
```

Public methods

getFromLocation

```
public List<Address> getFromLocation (double latitude,
double longitude,
int maxResults)
```

getFromLocationName

```
public List<Address> getFromLocationName (String locationName,
int maxResults)
```

Using Firebase

- Adding the sdk in the project.
Add the following code to the PROJECT-LEVEL *build.gradle* of the app.

```
buildscript {
dependencies {
classpath 'com.google.gms:google-services:4.0.0'
}
}
```

- Add the following code to APP-LEVEL *build.gradle* of the app.

```
dependencies {
compile 'com.google.firebase:firebase-core:16.0.0'
}
...
// Add to the bottom of the file
apply plugin: 'com.google.gms.google-services'
```

Searching

```

<application ... >
  <activity android:name=".SearchableActivity" >
    <intent-filter>
      <action android:name="android.intent.action.SEARCH" />
    </intent-filter>
    <meta-data android:name="android.app.searchable"
      android:resource="@xml/searchable"/>
  </activity>
  ...
</application>

<?xml version="1.0" encoding="utf-8"?>
<searchable xmlns:android="http://schemas.android.com/apk/res/android"
  android:label="@string/app_label"
  android:hint="@string/search_hint" >
</searchable>

@Override
public void onCreate(Bundle savedInstanceState) {
  super.onCreate(savedInstanceState);
  setContentView(R.layout.search);

  // Get the intent, verify the action and get the query
  Intent intent = getIntent();
  if (Intent.ACTION_SEARCH.equals(intent.getAction())) {
    String query = intent.getStringExtra(SearchManager.QUERY);
    doMySearch(query);
  }
}

```

ADVANTAGES OF PROPOSED SYSTEM:

1. This system will act as a bridge between the Donors(Hotels and Events) and the acceptors(NGOs and Agriculturists) to establish a platform for the reduction of waste food and also can provide the management of the unsold food in hotels through internet.
2. The use of firebase provides the benefit of real-time database which support synchronization of data also. The major benefit of using real-time database is that the developers do not need the support of complex backend services. The Firebase also takes care of the configuration of the server as well.
3. The use of Geocoding API or the Place Auto-complete service in combination with Geocoding API allows us to create applications that offer

users the accurate geocoding results in form of the precise location as address using the longitude and latitude. This also helps in reducing the latency in the process of getting the locations.

4. The real-time message passing between the various users will reduce the time that was required for communication between these users without internet and will help the users to track and monitor the quality of food closely.

VI. RESULTS

Below shown figures represents the results of proposed system.

Fig.1 Addresses advance toward that work to reduce food wastage by proposed methodology. The stream considers the participation of NGO and Donor. Provider will disperse the available waste food to the cut-off time and quantity of food. Food producing units can send notice to NGOs about the accessibility of food

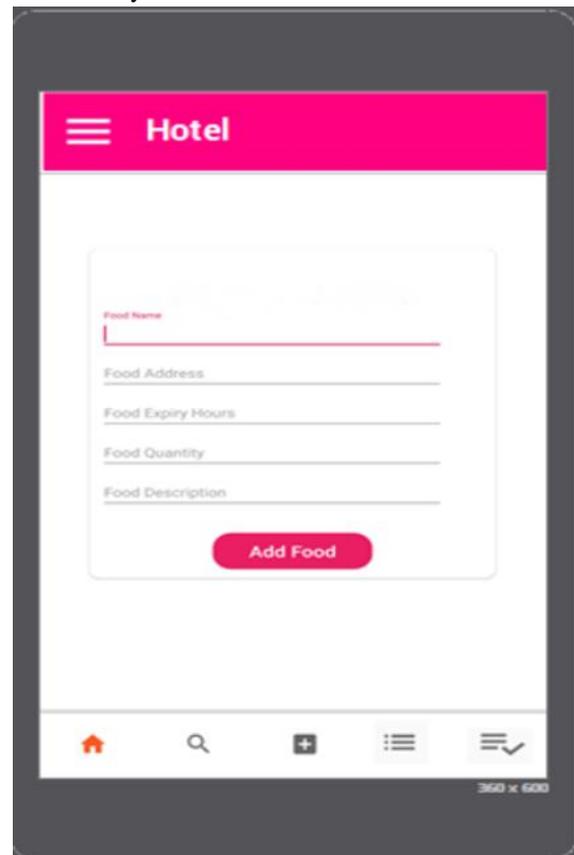


Figure 1: Result of donor in the participation of food reduction



Figure 2: Agriculturist panel showing the food orders/requests

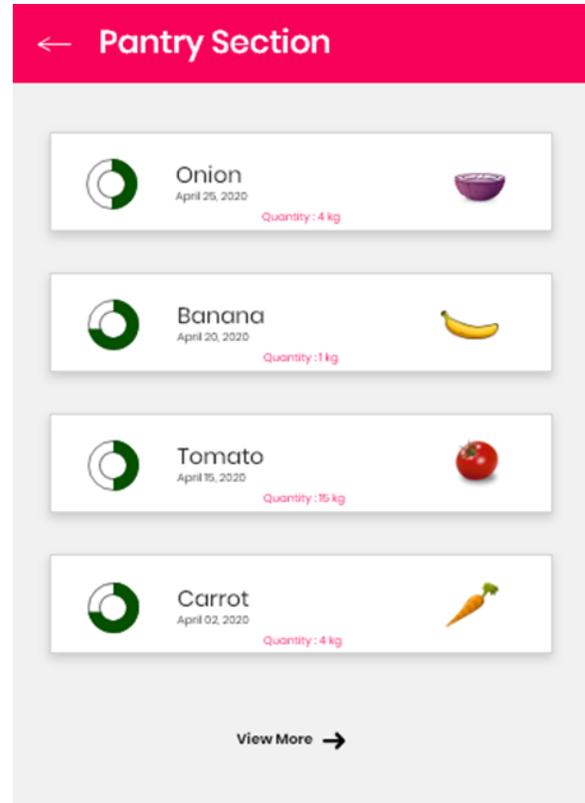


Figure 4: Pantry Section

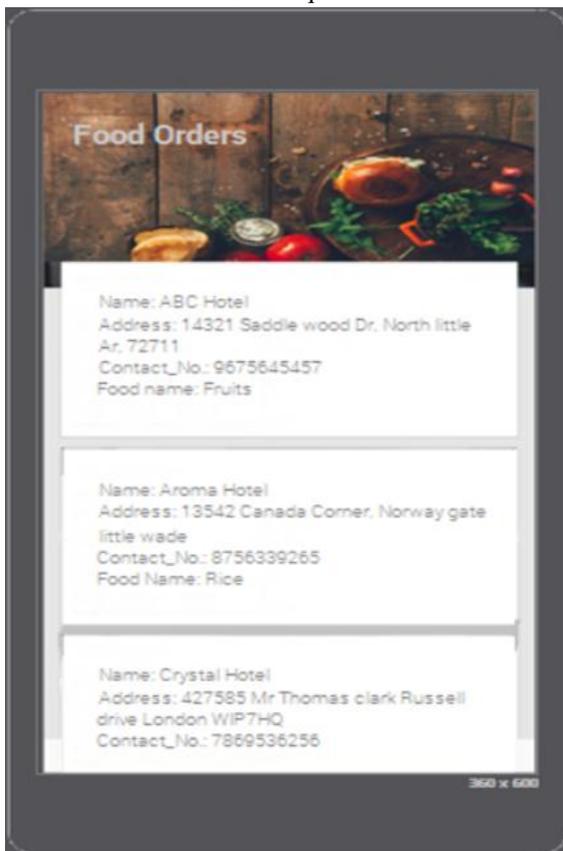


Figure 3: Showing the food orders/requests

VII. CONCLUSION

A user-friendly and efficient system is proposed that will support not only the functionality of donation of surplus food prepared in hotels and events to the people who do not have access to healthy food in the major hunger zones but also provide proper management of food that is not fit for consumption. The food that is no longer consumable is provided to the agriculturists who will use that food to prepare compost that will further help in restoring the balance of soil which is disturbed due the continuous usage of chemical based fertilizers. In order to provide accurate locations of the various users of the system Google geocoder API is used which provides the precise location and the comprehensive location data. The security of the user's data is assured by using Firebase database instead of a traditional database which also provide synchronization of data with various other functionalities like advanced cloud messaging, proper authentication and unlimited Google Analytics. In the proposed scheme the user is responsible for generating data, sending and receive request and managing the data in efficient way which

is achieved by the cloud services of Firebase and thus the users do not have to worry about the security of their data.

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