



Food Serving Application

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FOOD SERVING APPLICATION SYSTEM

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Abstract— Food is an essential human need that is necessary for maintaining life and wellbeing. The problem of food waste has grown more widespread as society and the world's population continue to expand. Many people are eager to help mitigate this difficulty by giving extra food, but their efforts are sometimes thwarted by the absence of an efficient method. This research presents an innovative solution in the form of a digital application designed to connect individuals, Non-Governmental Organizations (NGOs), and those in need. The proposed application serves as a bridge between donors and NGOs, providing a diverse range of options for individuals eager to contribute. Through this platform, potential donors gain access to a multitude of donation avenues, fostering a sense of transparency and clarity in the process. Simultaneously, NGOs receive detailed information about prospective donors, facilitating the creation of a robust network between donors, facilitating entities, and the beneficiaries of the donated items. The proposed solution reflects a conscientious effort to leverage technology for social good, fostering a more efficient and effective system for channeling surplus food to those in need.

Keywords— Mobile Application, Internet, Surplus food, Donor connectivity, food, NGO

I. INTRODUCTION

A lot of food that is not used by anyone is wasted in the current circumstances, as we can see. Events, functions, and marriages are examples of wasteful activities. Many kids are dying from starvation and malnutrition as a result of improper handling of this wasted food. Taken into account, 7.5 tons of food are wasted daily in India alone. That isn't used or distributed to anyone. This whole meal is being squandered needlessly. Food waste in India is equivalent to the amount of food consumed in the United Kingdom. Indian deaths rank 95th in the world, according to recent surveys. In contrast, 7.5 tons of food waste are produced in India every day; if we include the entire world, this amounts to something inconceivable. Therefore, numerous NGOs have been established in an effort to decrease food waste. Still, the public is not aware of these NGOs. As technology advances, a growing number of food applications have begun. As a

result, through such applications, at least 20 people from all over the world came to freely donate food. Thus, we made the decision to create an application such as "20claiming some gift vouchers there; by using those vouchers, they can shop in any other applications" in order to boost the donation percentage. The major inspiration for this concept is the expectation that any user utilizing an application these days will reap some sort of benefit. Thus, by doing this, we are benefiting the user, cutting down on food waste, and assisting society.

II. LITERATURE REVIEW

The global challenge of food waste has spurred a growing body of research focused on developing effective and sustainable solutions. In this literature review, we examine key themes and findings related to food waste management, existing technological interventions, and the role of mobile applications in addressing this critical issue.

The magnitude of food waste has garnered attention across disciplines, with scholars highlighting the economic, environmental, and ethical repercussions of inefficient food disposal. Investigations by Parfitt et al. (2010) and Gustavsson et al. (2011) underscore the alarming statistic that roughly one-third of the world's food production is wasted annually, emphasizing the need for innovative strategies to curtail this trend.

The research paper titled "Smart eNose Food Waste Management System," authored by Shazmina Gull, Imran Sarwar Bajwa, Waheed Anwar, and Rubina Rashid, and published in July 2021, contributes to the discourse on innovative approaches to food waste management researchers have developed a low-cost approach using microcontrollers like Arduino UNO and eNose systems to detect gas emissions from various food items. The system uses a 5 kg strain gauge load cell sensor and an HX711 A/D converter to measure food waste. The sensors are calibrated to run in the environment, and a machine learning algorithm is used to predict food items

based on gas emissions. The system has a 92.65% accuracy rate, helping reduce food waste at home and in restaurants by providing daily reports.

Another research paper titled “On the Measurement of Food Waste” published in 2019, aims to develop a framework for systematically thinking about food waste and propose a more consistent and practical approach. The authors identify problems with extant measures of food waste, which they argue overstate the problem of food waste. To address this issue, they provide an alternative definition that focuses on actual wasted items rather than those removed from supply chains.

III. METHODOLOGY

3.1 Front End

3.1.1 Login and Registration page :

This app allows the user to have his/her account in the app using firebase email and password authentication. Both restaurant and users who need the food must register using the login page. During registration, some information about the users is saved to the real-time database such as age, name and gender under the unique user id generated by the firebase. So, each user profile information is saved into the database and when a user login we can get access to that user profile using its unique user id.

3.1.2 Authentication using Firebase

Credentials of restaurant and user will be authenticated in firebase authentication.

3.1.3 Donor's Role

The donor will be able to upload the food details to be donated. Such as delivery address, image of the meal/ food description, contact details. He will also be able to view the donation history.

3.1.4 Details of Donor

Informer will be able to view the details of donor through mapping function the list of nearby restaurant/donor who has registered to the application and are willing to donate food will be made available to the informer.

3.1.5 Profile

This is an activity where all the details of the donor will be shown. This activity contains profession, role, contact, location, history, most donations, setting, terms and conditions and log out. Also user can edit their profile.

3.2 Back End

3.2.1 Technology Stack:

- Java
- Android Studio
- Firebase

3.2.2 Server Architecture:

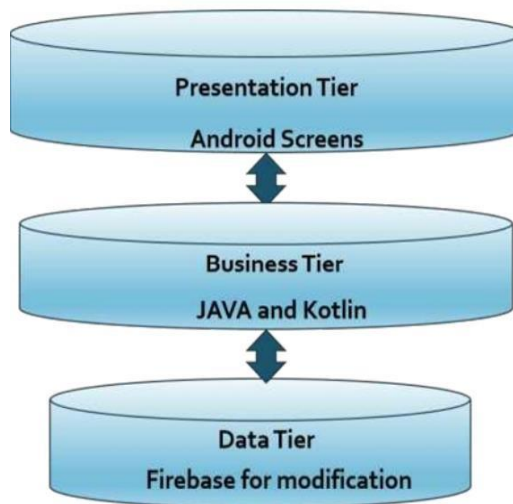


Figure 1: Three Tier Architecture

Presentation Layer (UI):

The interface that users use to interact with the application is the presentation layer. XML layouts define the user interface by dictating how elements like buttons and input fields are arranged. These layouts serve as the application's visual representation's blueprints and are made to be responsive, changing to fit different screen sizes and orientations. Events in the Android application are triggered by user interactions and are managed by the Activity and Fragment classes. These classes, which are components of the application logic, control the application's flow and interact with the system's other layers. The Android Studio integrated development environment (IDE) offers tools for visually designing, previewing, and fine-tuning user interfaces while facilitating the smooth integration of UI components with underlying Java or Kotlin code. The UI layer communicates with backend services to fetch and display relevant data, such as information about NGOs, available donation options, and details about the donation process. In essence, the presentation layer is a critical component of the Food Serving Application, bridging the gap between user interactions and the underlying functionality of the application.

Business Access Layer (BAL) or Business Logic Layer:

The Business Logic Layer, also known as the Business Access Layer (BAL), is essential to coordinating the application's main features. Because it implements and manages the business rules that control food donation procedures, user

interactions, and NGO partnerships, it is closely linked to the project. The BAL is in charge of applying business logic to process data received from the Data Access Layer (DAL) or outside sources in order to guarantee efficiency and transparency in the donation process. The BAL allows for smooth interactions and controls how the application reacts to user inputs through its integration with the user interface. The BAL is essentially the system's brain, making sure that the Food Serving Application runs smoothly and complies with the established business requirements.

Data Access Layer (DAL):

The Data Access Layer (DAL) acts as a crucial link between the application and data sources. It connects to databases, retrieves, and updates information in real-time, ensuring data accuracy. This layer facilitates efficient data management, enabling the Business Access Layer (BAL) to implement the defined business logic seamlessly within the Food Serving Application System.

3.2.3 APIs

Google Maps APIs:

Google Maps APIs are widely used in a variety of applications, including location-based services, navigation apps, e-commerce sites, and more, to provide users with interactive maps and location-related information.

3.2.4 Data Storage Firebase:

It is a real time database which is used to store, fetch, delete and modify the data. All data entered by users are stored in the firebase and it is shown to the volunteer. It is controlled by admin only.

3.2.5 Authentication and Authorization:

Firebase offers robust authentication and authorization services for app developers. Authentication is the process of verifying the identity of users, while authorization controls access to specific app features or data. Firebase Authentication allows users to sign in using various methods, such as email and password, social identity providers, or phone numbers, making it easier for developers to manage user access. Firebase also integrates with Firebase Realtime Database, Firestore, and Cloud Storage for fine-grained access control, ensuring that only authorized users can perform specific actions or access certain data. Firebase Authentication simplifies user management, ensuring a secure and seamless user experience while reducing the complexity of handling authentication and authorization tasks for app developers.

3.3 Tools and Technology

3.3.1 Android Technology

We opted for the development of an Android application, recognizing the widespread adoption of mobile applications in recent years. Android stands out as the most prevalent platform for mobile devices, with a rapidly growing user

base—approximately 1 million new users daily acquire Android devices for accessing digital content, including games, applications, and various services [6]. In response to this trend, we designed and implemented the "Food Share" app using Android Studio. The choice of Android as our development platform ensures that our application can reach a broad audience, given the prevalence of Android phones in the market. This strategic decision aligns with the contemporary user behavior, as the majority of individuals now use Android devices for their mobile needs.

3.3.2 Java Language

Java is a versatile, platform-independent programming language known for its portability and reliability. It is widely used in software development for building web applications, mobile apps, desktop software, and more. Java's key features include strong object-oriented programming support, a rich standard library, and the ability to run on multiple platforms through the Java Virtual Machine (JVM). It's a top choice for a wide range of applications, from server-side development to Android app creation.

IV. IMPLEMENTATION DETAILS

4.1 Project Setup:

- Set up your development environment with Android Studio.
- Create a new Android project

4.2 User Authentication:

- Implement user registration and login features using Firebase Authentication or a similar service.
- Users can create accounts and log in securely.

4.3 User Profile:

- Allow users to create and manage their profiles.
- Users can add their contact information, location, and other relevant details.

4.4 Donor and Volunteer Interfaces:

- Create separate interfaces for donors and volunteers.

4.5 Donation Listings:

- Allow donors to create listings for available food donations.
- Include details such as type of food, quantity, expiration date, and pickup location.

4.6 Map Integration:

- Integrate Google Maps to display pickup and drop-off locations.
- Provide navigation for both donors and recipients

The application presents users welcome page during its first opening.(figure 2)

4.7 Privacy and Security:

- Ensure data privacy and security, especially when handling user information and communication.
- Include details such as type of food, quantity, expiration date, and pickup location.

figure 2: login



figure3: Signup & OTP

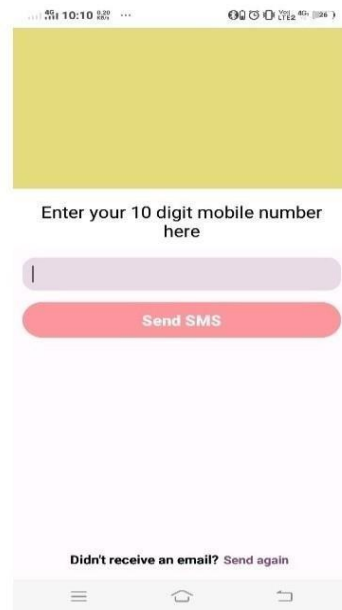


figure 4: Home page

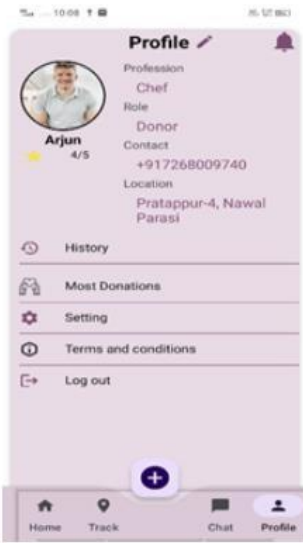


figure 5: Donation Details page

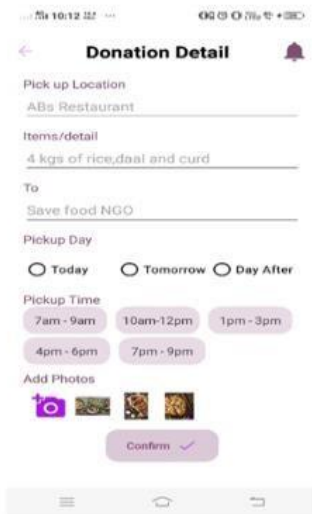


Figure 5: Tracking donar location

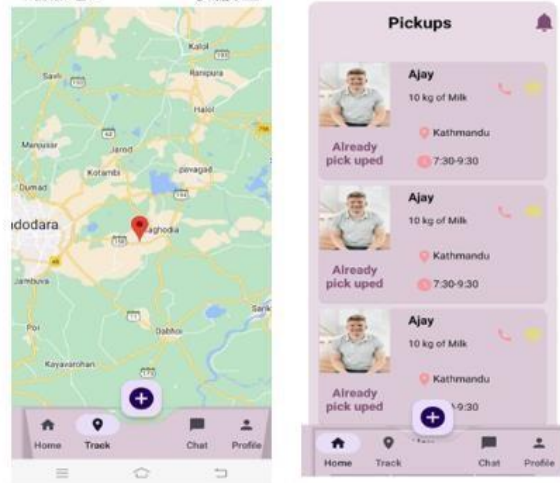


figure 6: Customer Feedback page



4.8 Flowchart:

- 1.The application start with user authentication which prompt user to log in or register.
- 2.It verify the account after login or register
- 3.After verification the application represents the home page with options:
 - Tracking
 - Place order
 - Donate food
 - Chats
 - Profile

- 4.User select donate food from home page and enter details for food donation and go to submit option
- 5.The NGO track the location of donars and pickup food .
- 6.User update the Profile information.

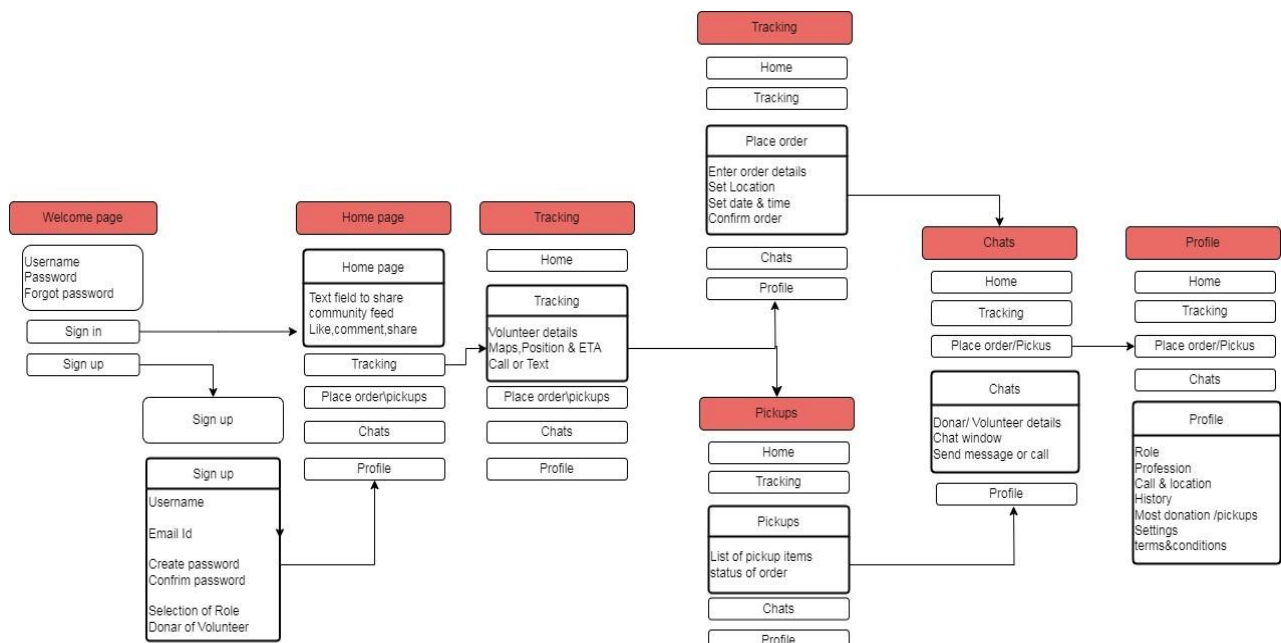
7.Then user logout from the application.

V. CONCLUSION

Concluding the implementation of a food donation Android app holds great promise in addressing the issue of food wastage and ensuring that surplus food reaches those in need. By creating a platform that connects donors with recipients, the app contributes to a more sustainable and compassionate society. In conclusion, the food donation app serves as a bridge between individuals and

Figure 7: Flowchart of Food Serving Application System

organizations willing to share their surplus food and those who require assistance. It not only promotes the responsible utilization of resources but also fosters a sense of community and empathy. Through its features like donation listings, real-time messaging, and user profiles, the app simplifies the process of donating and receiving food. By providing a user-friendly and efficient interface, the app empowers users to make a positive impact on both the environment and the lives of individuals facing food insecurity.



VI. FUTURE

WORK Enhanced User

Experience:

- Continuously gather user feedback to improve the app's user interface and overall experience.
- Implement user-friendly tutorials or onboarding screens for new users. **Social Integration:**
- Add social media sharing features to enable users to spread the word about the app and encourage more donations. **Integration with Food Banks and NGOs:**
- Collaborate with local food banks and non-governmental organizations (NGOs) to integrate their efforts and resources within the app.

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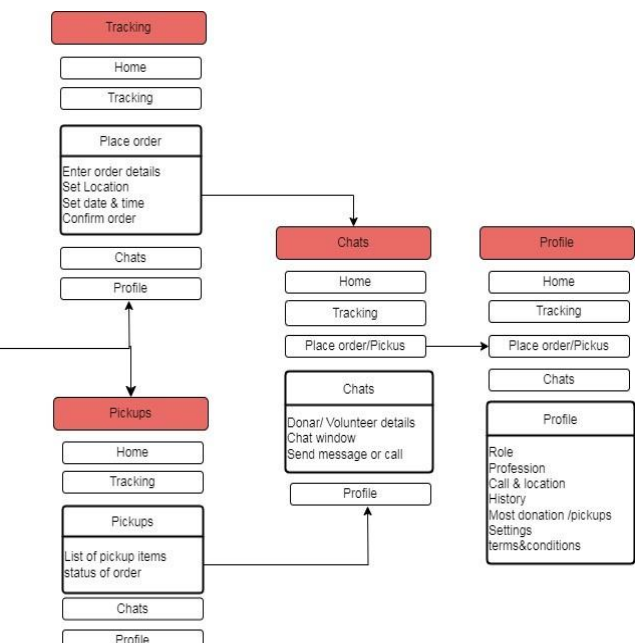
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