

Android Based Food Donation Application

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Abstract

This application harnesses the power of mobile technology to connect food donors, such as restaurants, grocery stores, and individuals, with local charities and food providers to the needy ones, thereby creating a more sustainable and utilizable food ecosystem. This becomes particularly crucial during crises, such as the COVID-19 pandemic. The system developed emphasizes the creation of an engaging and user-friendly mobile application interface. This app serves as a widespread platform, allowing users to access surplus food resources within their local communities. By doing so, it addresses two critical challenges: hunger and food waste. The application works by sending alerts for new food donation opportunities or updates on ongoing donations. Donors and recipients can communicate through the app to coordinate pickup or delivery. The major advantage of the application is providing a user-friendly interface for both users. The app eases a sophisticated matching algorithm that considers factors such as the nearest location, what types of food, and the urgency to connect excess food providers with nearby recipients in real-time as it works in the real-time database. The app also helps data analytics tools to track and analyze the impact of food donations. The application works as a community system between the donors and needy ones. We describe our food donation mobile app development using principles from Android OS, and database.

Keywords: XML, Java/Kotlin, Firebase, user-friendly, digital platform

INTRODUCTION

In a country where commercial practices have advanced to the point that tons of edible food are discarded as waste at every stage of the marketing process, it is estimated that 25% of the available nutritious food is wasted. Food is a crucial resource and highly energy-intensive product group. Against the backdrop of a world grappling with both food waste and hunger, the Food Donation Management Android application has emerged as a beacon of change [1]. Recognizing the disheartening contrast between surplus food and those in need, this initiative aims to harness the power of technology to create a more equitable and compassionate society. The app was born out of a profound understanding that every meal saved from being wasted can become a lifeline for someone in distress.

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LITERATURE SURVEY

Paper Name: FoodX, a System to Reduce Food Waste

Author: J Shinta Oktaviana R, Diana Ambarwati Febriani, Intan Yohan, LR Payanta [2].

This study addresses the serious global issue of food waste, focusing on the FoodX system, a straightforward mobile app. This app brings together various communities in Indonesia that are

concerned with food waste and hunger. These communities collect surplus food from eligible donors and distribute it to those in need.

Paper Name: A Food Wastage Reduction Mobile Application

Author: Hajjdiab H, Anzer A, Tabaza HA, Ahmed W [3].

This study demonstrates the design and implementation of the application, emphasizing its features aimed at reducing food waste. These features likely include functionalities, such as inventory management, donation matching, and real-time notifications. The authors discuss the significance of their solution in addressing the global issue of food waste and may provide insights into its potential impact on sustainability and community welfare.

Paper Name: Sustainable Development: Drivers of Consumer Food Wasting

Author: Hsiu-Hua Chang [4].

This study describes the methodology used to investigate the drivers of consumer food waste. This could involve surveys, interviews, focus groups, or observational studies aimed at understanding consumer behavior and attitudes related to food waste. The paper concludes by summarizing the key findings and highlighting the critical role of tackling consumer food waste in achieving development goals. It also highlights avenues for future research to further understand and mitigate the drivers of food waste.

Paper Name: Zero Food Waste: Food Wastage Sustaining Mobile Application

Author: MDCJ Gunawardane, HAN Pushpakumara, ENMRL Navarathne, Shashika Lokuliyana, KTI Kelaniyage, Narmadha Gamage [5].

They emphasized that a significant amount of food is wasted because of issues such as inadequate planning, buying more food than needed, and overpreparation in restaurants. To address this issue, the authors developed a mobile app capable of capturing images of food, identifying them, and measuring their weight. The application utilizes an intelligent agent that suggests recipes using leftover food, thus reducing food waste. Additionally, the app features an interactive chatbot to guide users in preparing meals and making healthier choices based on previous meal plans and statistical analyses.

Paper Name: Smart Resource Management: Civic Engagement and Food Recovery

Author: Irini Spyridakis, Madison Holbrook, Brent Gruenke, Srinithi Sellakumaran Latha [6].

This study explores how smart technologies such as the Internet of Things (IoT), data analytics, and mobile applications can be utilized to optimize food recovery processes. This may include methods for the real-time monitoring of food surplus, efficient routing of food donations, and coordination of volunteers or community organizations involved in food recovery efforts. This emphasizes the potential of smart resource management techniques coupled with civic engagement strategies to address food waste challenges, promote sustainability, and create positive social impacts within communities.

Paper Name: DOVIR: Virtualizing Food Donation Distribution through Mobile Application and Cloud-Based Supply Chain Management

Author: Divy Chhibber, Aditi Tripathi, and Sandip Ray [7]

This paper discusses how the DOVIR system utilizes features such as real-time tracking of food donations, automated inventory management, and route optimization to ensure the timely and effective distribution of surplus food to those in need. It also explores the role of cloud-based infrastructure in storing and processing data related to food donations, thereby enabling scalability, flexibility, and accessibility for users. This study highlights the potential of the DOVIR system to revolutionize food

donation distribution processes through the integration of mobile applications and cloud-based supply chain management, ultimately contributing to more efficient and sustainable food recovery.

PROPOSED SYSTEM

The “NGO Flow System” streamlines the process for non-governmental organizations, enhancing efficiency in project management, funding, and communication. It provides a centralized platform for tracking activities, donor relations, and impact reporting, as shown in Figure 1.

User Registration and Login

- On the home screen, there is an overview of options to donate or request food items.
- Users download the app and register using their email or social media accounts.
- Firebase Authentication handles the login and registration processes.

Posting Donations (Donors)

- Donors (e.g., hotels and individuals) log into the app and post details about available food donations, including descriptions, quantities, and images.
- This information is stored in the Firebase Realtime Database, and images are uploaded to the Firebase Cloud Storage.

Browsing Donations (Receivers)

- Receivers (e.g., NGOs, and individuals) log in and browse the available food donations through the app.
- The app fetches and displays donation listings from the Firebase database.

Claiming Donations

- When a receiver finds a suitable donation, they claim it through the app.
- The app updates the donation status in the Firebase database to indicate that it has been claimed.
- The receiver can find the location of the donor through this application and obtain food from them.

Notifications

- Users receive push notifications about new donations, claims, and updates.
- Notifications are managed through Firebase Cloud Messaging.

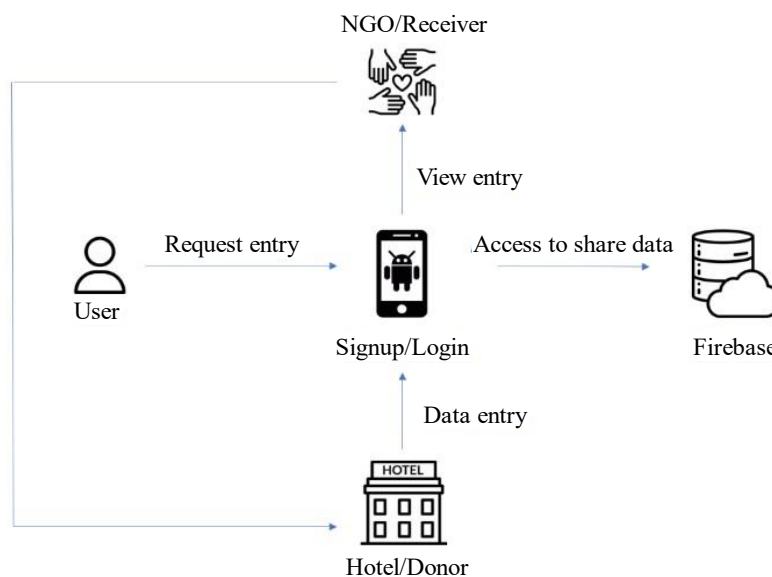


Figure 1. NGO flow system.

Tracking and History

- Users can track their donation history and points earned within the app.
- This information is retrieved from the Firebase database.

Google Maps

- Users can find the nearest NGO's or Hotel's location with some application.

Key Feature

- Enables users to engage with the app, allowing them to donate or request food.
- It ensures secure access, safeguards user data, and manages privacy settings to maintain security and confidentiality.
- *User authentication*: Provides secure login and registration through Firebase Authentication.
- *Food posting and browsing*: Easy interface for donors to post and receivers to browse donations.
- *Real-time updates*: Live updates on available and claimed donations using the Firebase real-time database.

Interaction Sections

Below the login paths, there are two interaction sections:

1. *NGO interaction*: This section includes the functionalities available to NGOs, such as viewing and tracking food and locations. They can use this to log into the app and access all functions of the app.
2. *Hotel_User Interaction*: This section describes the functionality for updating the database, which is accessible to both hotels and users. If anyone wants to donate something, then they use this here and they can add details about their food items and their location; if they want to donate some money to the NGO, this can also be done through this app.

Advantages

1. Using API like Google Maps and GPS, will help with the same app.
2. The backend database will provide a 24/7 service.
3. Operates on a zero-commission model.

Disadvantages

1. Requires internet access to use the application.
2. It cannot fully prevent fraudulent users from submitting false food entries.

SOFTWARE INFORMATION

Android Studio is an official integrated development environment (IDE) for developing Android applications [8]. It is a Java-based IDE that includes code-editing features and developer tools. Android Studio utilizes a grade-based build system, an emulator, and code templates, and integrates it with GitHub. Applications developed in Android Studio were compiled into the APK format for submission to the Google Play Store.

Kotlin is an open-source, statically typed programming language that supports both object-oriented and functional programming paradigms. It is well-suited for large development teams and is officially supported by Google for Android development. This means that Android documentation and tools were optimized for Kotlin [9]. Although some Android APIs, such as Android KTX, are specifically designed for Kotlin, the majority are written in Java and can be accessed using either Java or Kotlin.

Kotlin's popularity has resulted in a nicer development experience on Android, but the development of the Android framework continues with both Kotlin and Java [10].

Firebase, a Google Product, assists developers in easily building, managing, and growing their apps. It enables faster and more secure app development without requiring any programming on the Firebase side, making its features highly efficient and user-friendly. Firebase supports Android, iOS, Web, and Unity applications and offers cloud storage services. It uses a NoSQL database for data storage, allowing data to be fetched and manipulated as needed. In addition, the Firebase platform analyzes the data to facilitate tracking and insights.

CONCLUSION

The sustenance approach aims to bridge the gap between NGOs and donors by ensuring that surplus food is directed toward those in need. This method provides large quantities of food to NGOs that must be consumed within 2–3 hours. By connecting these organizations, this approach helps reduce food waste and allows hotels, restaurants, and event venues to easily find recipients of surplus food. This system provides a greater cause and significant benefits to humanity.

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