

Food Rescue and Waste Reduction System

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Abstract: The global competition for food waste has environmental, economic and social consequences. This article shows how to work together to solve food waste by saving food and reducing waste. The planning system is a digital platform that connects donors including restaurants, families and grocery stores, with recipients, such as those in need. The system uses Android app technology to facilitate rapid food distribution and ensure that excess food is returned to those in need. Key features include a user-friendly interface, geolocation for nearby donations, two-step verification for proper authentication and analytics to track project impact. The process is more transparent, easy to access and inclusive, making it applicable to both urban and rural areas. Through the use of technology, it can reduce waste, conserve resources, and reduce hunger. This study highlights the design, implementation, and challenges of the system, while also addressing its social benefits. Through collaboration, the system has the potential to create a shared, balanced food supply that will contribute to global food security and environmental sustainability.

Keywords—*Android App, Food Security, Geolocation, Environmental Sustainability.*

I. INTRODUCTION

Food waste is a major global problem with environmental, economic and social consequences. Despite increasing food availability in homes, restaurants and grocery stores, millions of people around the world still face hunger and malnutrition. In addition to harming people, food waste also harms the environment by producing carbon monoxide emissions and destroying valuable resources such as water, energy and performance. Solving this problem requires innovative, technological solutions that can bridge the gap between food waste and hunger. Communicate these issues to donors and those in need. The Android based app allow such as individuals and businesses, to collect food items that can be quickly collected by beneficiaries, such as home food banks. The system integrates important functions such as proximity based geolocation, security to ensure food security, and analysis of its impact on people and the environment. By promoting accessibility, transparency, and community engagement, the initiative not only reduces food waste but also reduces hunger and helps share a healthy and balanced diet.

II. OBJECTIVES AND METHODOLOGY

The main objective of food saving and waste reduction is to reduce food waste by distributing food from donors such as restaurants, homes and stores that sell food to the needy such as food banks and vulnerable groups, thus reducing food scarcity. The aim is to create a transparent and efficient food platform using technology, promote community participation and support the environment. To achieve these goals, the project uses a user-friendly Android application with geolocation features that provides proximity, connectivity and check donations in real time. Donors can enter information such as the amount, type and pick-up location of leftover food, while beneficiaries can request and collect donations. Good security measures and verification ensure the safety and availability of free food. Analytics and reporting tools track measures such as food redistribution, waste reduction, and environmental impacts. Awareness and support programs are also included to encourage participation and foster community engagement. Through rigorous testing, feedback collection, and continuous improvement, the system provides reliable, efficient, and cost effective solutions to address food waste and hunger worldwide.

III. LITERATURE SURVEY

Existing food rescue and distribution programs usually provide simple functions such as login and registration, as well as interaction for donors and recipients, allowing people to collect leftovers or request donations. However, these systems have several limitations that hinder their effectiveness. Limited interaction between donors and recipients limits effective communication and reduces opportunities for timely collaboration. Without immediate notification when food arrives, the recipient will have to manually check the platform, resulting in no benefit and time loss. Further more, the lack of connectivity between donors and beneficiaries makes the entire process cumbersome, to navigate between donors and business recipients. Additionally, the lack of geolocation or donor location tracking makes it difficult for recipients to identify nearby donors and plan for the best outcomes. While some platforms, such as OLIO and Good To Go, address some aspects of the problem through features such as geolocation and push notifications, these solutions are largely localized and do not meet all the needs, especially in disadvantaged communities. Closing these gaps by developing platforms with advanced capabilities is critical to creating a more sustainable and profitable food supply chain.

IV. PROPOSED SYSTEM

The plan to save food and rescue waste aims to address the limitations of the current platform by integrating several key elements designed to make community engagement, energy and security effective. A key development is the introduction of push notifications that immediately notify recipients when new food donations are available, reducing the need for manual tracking and ensuring timely distribution of perishable food items. The system also improves connectivity between donors and recipients, enabling seamless communication and faster coordination of food donations and collections. Sharing donation locations via geolocation technology allows recipients to easily identify nearby donations, optimizing transportation and reducing shipping challenges. The system also promotes sustainability by reducing food waste and reducing the environmental impact of food waste. The platform helps save important resources like water, energy, and their contributions and monitor the impact of their actions, thus helping to shift the purse strings of transparency and accountability. Overall, the system aims to create a more efficient, effective, and productive way to manage food waste while promoting community awareness and responsibility.

A. Donor Location Sharing:

This system uses geolocation technology to provide donors with precise location details, allowing recipients to better plan and complete deliveries. Beneficiaries can view nearby vacancies on a map, reducing freight competition and optimizing transportation. This feature is particularly useful in urban areas where there are a lot of freebies, as it helps prioritize and improve the pickup process.

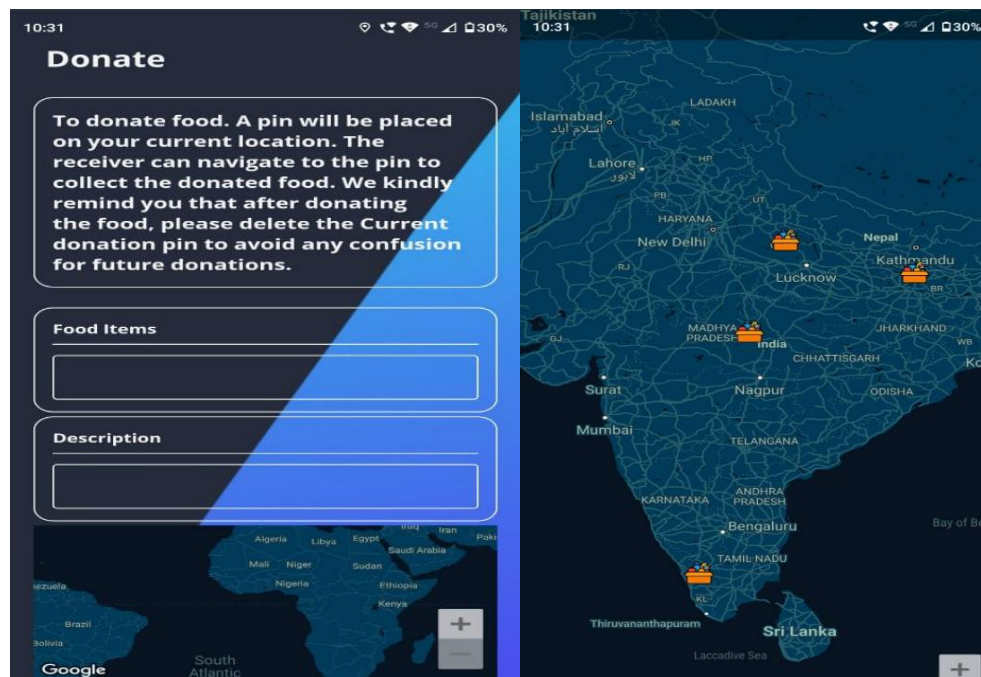


Fig 1: Donate Screen

B. Get Instant Project Access:

The platform is designed to provide users with instant access to information such as free listings and regular events. This transparency builds trust among users and ensures accountability throughout the donation process. Access to up-to-date information also allows donors and beneficiaries to track their donations, encourage ongoing contributions, and promote social responsibility.

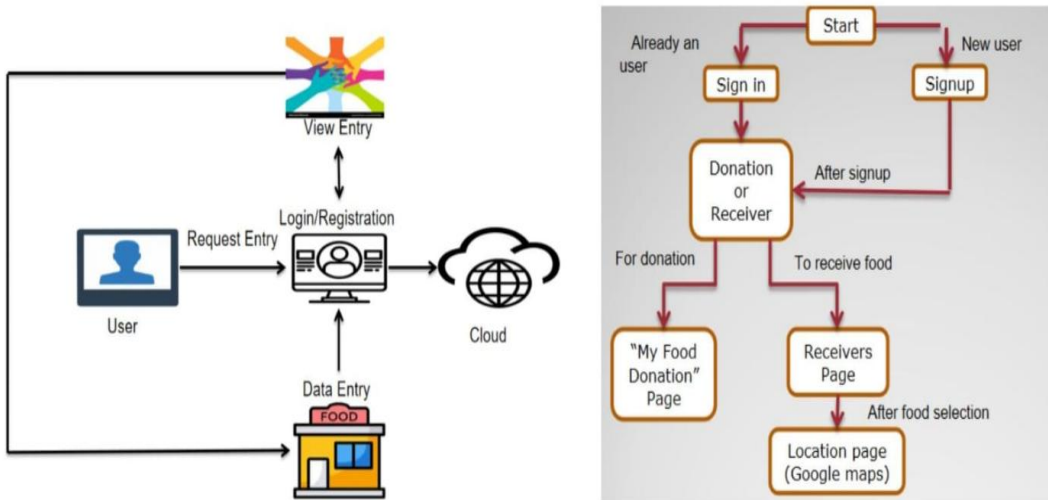
C. Reduce food waste:

The system solves one of today's biggest food problems by returning quality food. It delivers usable food to those who need it most, prevents it from being thrown away, and ensures that valuable produce is not wasted. This directly impacts international efforts to reduce food loss and increase food security for vulnerable people.

V. IMPLEMENTATION

The use of food rescue and waste reduction involves creating an Android app experience whose key features include push notifications for recipients, geolocation for donor sharing, and user interactions for interactions between donors and recipients. The system will allow donors to list their food donations, including details such as type and quantity, while recipients can request items remotely, reducing waste and making food more accessible. The secure backend uses cloud-based services such as firebase to manage user authentication and push notifications. The platform will also integrate analytics to track relevant measures such as reducing waste and collecting donations. The system will be rigorously tested to ensure proper functionality before being submitted to the google play store. Continuous monitoring and user feedback will help drive further improvements to ensure the system meets its goals of reducing food waste, positively improving food distribution, and encouraging engagement.

A. Architecture Diagram:



The schematic diagram of the food waste management system shows the flow of information and interaction between the various parts of the system. Users first log in or register to ensure they are logged in, and can then make requests, such as giving away too much food. Once approved, users will have access to the contents of the free food that will be stored and processes in the air, representing the storage and operation of the system. The system then allows users to view the food received from donors such as restaurants, allowing recipients to easily identify and request donations. The interaction between users and the cloud ensures that all information related to food supply and demand is managed appropriately, supporting the overall goal of reducing food waste through effective collaboration and instant access to information.

B. TestCases:

Test Case ID	Scenario	Input	Expected Output	Status
TC001	User Registration	Enter valid details and click "Register"	User Created	Pass
TC002	User Login	Enter correct email and password	Logged in Successfully and redirected to dashboard page	Pass
TC003	Invalid Login	Enter incorrect email or password	Error! The password is invalid	Pass
TC004	Donor Details	Fill Food items, quantity and submit	Success	Pass
TC005	Receiver	Request food items	Success	Pass
TC006	Logout	Tap logout button	Redirected to main page	Pass

VI. DISCUSSION

A. Comparative Analysis:

Food Waste Management Systems differentiate themselves from existing platforms by addressing the major limitations of the food saving process. While many systems only provide basic functionality such as free registration and allowing users to browse available products, this platform enhances the user experience by integrating real-time alerts to immediately notify buyers when food is available. In addition, the system includes geolocation capabilities that allow customers to efficiently plan shipments based on distance, a significant improvement over platforms that do not offer location based services. Additionally, the cloud-based architecture provides scalability, data security, and the ability to handle large amounts of user interaction without compromising performance. These advancements make the food waste management process more efficient and easier to solve than other platforms that still rely on manual controls and are less discreet.

B. Positive Aspects:

Managing food waste has many pros that make it very useful for reducing food waste. Instant alerts let users know immediately when food is available, increasing the chances of returning damaged items intact. The system's user-friendly interface simplifies the food donation and collection process, ensuring full participation. Integration of geolocation not only facilitates coordination, but also improves access by providing accurate location information. Cloud-based storage and operations also ensure information management and customer service. The platform focuses on sustainability, making an impact on the environment and society by reducing food waste and encouraging responsible redistribution. Additionally, by encouraging community engagement and providing a feedback process, the system builds trust and encourages long-term user engagement, making it a powerful tool to address food insecurity and waste.

VII. CONCLUSION AND FUTURE SCOPE

The food Waste Management System app represents a significant initiative in combating food waste and hunger by connecting donors with recipients and promoting a layer of shared capital in society. Its user-friendly interface and key features such as free feeding and app management make it accessible and relevant. However, the app currently faces limitations, including a lack of management modules and offline functionality, which present significant opportunities for improvement. Future improvements such as the introduction of management modules, offline mode, role-based operation, multi-language support, reward, user feedback, and event donations could increase the value and reach of the app. Through continuous efforts and innovations, the app is able to contribute to global development goals by reducing hunger and promoting responsible consumption.

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