

ZEROBIN: FROM EXTRA TO ESSENTIAL

Project Reference No.: 49S_BE_2209

College : Maratha Mandal's Engineering College, Belagavi
Branch : Department of Computer Science and Engineering
Guide : Prof. Sushant Patil
Student(s) : Mr. Shrishail Patil
Mr. Sudarshan Ainapur
Mr. Swaroop Bokadekar
Mr. Samrat Mugali

Keywords:

Food Waste Management, Multi-Donation Platform, Mobile Application, Sustainability, Resource Sharing

Introduction:

Food wastage and improper utilization of essential resources such as clothes and groceries are major societal challenges across urban and rural areas. A significant amount of edible food is discarded daily by households, restaurants, and events, while many individuals struggle to access basic necessities. This imbalance reflects inefficiencies in resource distribution and highlights the need for a structured and technology-driven solution.

At the same time, clothing and grocery items that are still usable often remain underutilized or are disposed of due to the absence of a proper redistribution mechanism. Existing systems primarily focus on single-category donations and lack integration, real-time coordination, and accessibility.

The proposed project **ZeroBin: From Extra to Essential** aims to address these challenges by developing a multi-donation platform that enables users to donate surplus food, clothes, and groceries through a single mobile application. The system connects donors with nearby recipients, NGOs, or volunteers, ensuring efficient and timely redistribution.

The platform leverages mobile technology, cloud-based backend systems, and database management to streamline the donation process. It also incorporates location-based services to improve accessibility and response time.

By integrating multiple donation categories into a unified system, ZeroBin promotes sustainability, reduces wastage, and enhances community engagement. The project contributes to social welfare by ensuring that surplus resources are effectively utilized rather than discarded.

ZeroBin System Architecture Diagram

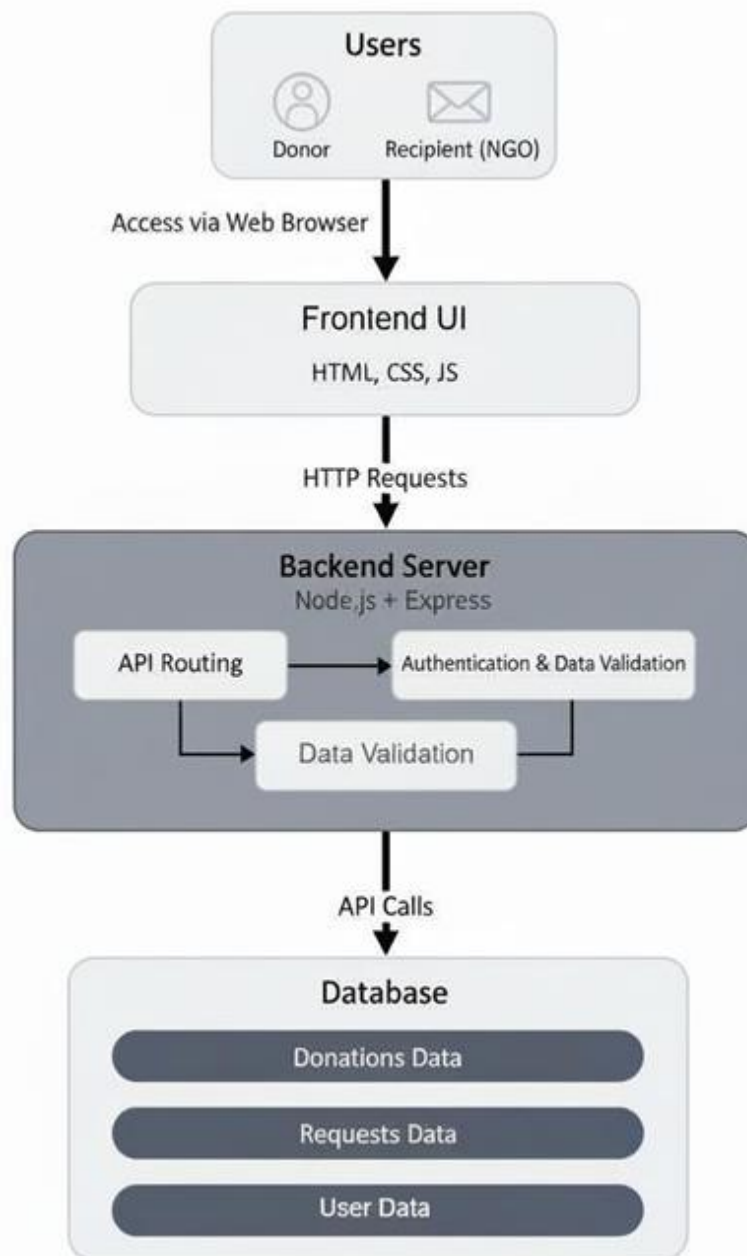


Figure 1: System Architecture Diagram

Objectives:

1. To design and develop a multi-donation mobile application
2. To reduce food wastage and improve resource utilization
3. To enable donation of food, clothes, and groceries in a unified platform
4. To connect donors with nearby recipients efficiently using location-based services
5. To promote sustainable and socially responsible practices
6. To ensure ease of use through a user-friendly interface
7. To create a scalable system for real-world deployment.

Methodology:

The ZeroBin system is developed as a cross-platform mobile application supported by a robust backend infrastructure.

The frontend of the application is developed using modern frameworks such as Flutter or React Native, ensuring compatibility across Android and iOS devices. The user interface is designed to be intuitive, enabling users to easily register, log in, and navigate through donation options.

The backend is implemented using Node.js with Express.js, which handles API requests, authentication, and communication between the client and the database. MongoDB is used as the database to store user profiles, donation details, request statuses, and transaction history.

The system supports three primary donation categories: food, clothes, and groceries. Users can select the type of donation, upload relevant details, and specify their location. The system then processes this information and matches it with nearby recipients or NGOs using location-based filtering.

The workflow begins with user registration, followed by donation listing. The system notifies potential recipients, who can accept or request the donation. Once confirmed, the donation is completed through pickup or delivery.

Additional features include user authentication, notification services, and optional offline data handling. The system architecture ensures scalability, security, and efficient data management.

Result and Conclusion:

1. The ZeroBin platform was successfully developed and tested to facilitate the redistribution of surplus resources including food, clothes, and groceries. The system demonstrated efficient handling of user registration, donation listing, and matching between donors and recipients.
2. The implementation showed that a unified platform significantly improves accessibility and reduces delays in donation processes. Users were able to easily upload donation details and connect with recipients in nearby locations, ensuring timely utilization of resources.
3. The project also highlighted the effectiveness of integrating multiple donation categories into a single application, reducing the need for separate systems. The use of a scalable backend and database ensured smooth performance and data handling.
4. Graphs and testing results indicate improved response time and successful transaction completion rates. The platform can be further enhanced with real-time logistics and tracking features.

In conclusion, ZeroBin provides a practical and impactful solution to reduce wastage and support underprivileged communities. It demonstrates how technology can be leveraged to address real-world social challenges effectively.

References:

1. [1] D.Manoj Kumar, R Arthi, M.Gokulakrishnan, T.Praveen Kumar, S. Vejaysuriyaa - "A Food Wastage Reduction App based on Django Python Application", 2024 3rd International Conference on Applied Artificial Intelligence and Computing (ICAAIC),IEEE.
2. [2] Hélder Pereira; Pedro Oliveira; Paulo Matos- "Architecture for Efficient Food Management and Waste Reduction",2024 International Conference on Engineering and Emerging Technologies (ICEET)IEEE.
3. [3] Anthony Callo, Mo Mansouri – "Food Security in Global Food Distribution Networks: A Systems Thinking Approach", 2024 IEEE International Systems Conference (SysCon)IEEE.
4. [4] Katakam Sudheepa, Padmashetti Rashmitha,P. Sardar Maran "Food Wastage Management Application using Android Studio", 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC)IEEE.
5. [5] Bharani S , E. Mohanraj;Sujith M, Vinothkumar P– "Optimizing Surplus Food Management: A User Centric Application Approach", 2024 Second International Conference on Emerging Trends in Information Technology and Engineering (ICETITE)IEEE.
6. [6] Devadharshini K;Sandra Johnson;Devisri Mahalakshmi S;Srijayanthi;Pooja Sri L;Nagendiran- "ResQFeed: EMPOWERING COMMUNITIES THROUGH OPTIMIZED FOOD RESCUE", 2023 International Conference on Research Methodologies in Knowledge Management, Artificial Intelligence and Telecommunication Engineering (RMKMATE)IEEE.

Future Scope:

The future scope of this project includes:

1. Integration with NGOs and government organizations
2. AI-based demand prediction for better distribution
3. Real-time tracking and logistics support
4. Expansion to web platform and larger geographic areas
5. Multilingual support for wider accessibility.
6. Integration with corporate social responsibility (CSR) initiatives of companies
7. Development of a volunteer management system for handling donations
8. Implementation of user rating and feedback system for reliability
9. Collaboration with restaurants and supermarkets for bulk donations
10. Implementation of automated scheduling for pickups and deliveries