International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 13 Issue: 05 | May 2026 www.irjet.net p-ISSN: 2395-0072

# Implementation of a System for Leftover Food from Events and Hotels to Needy Communities through NGOs (ZEROhunger)

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**ABSTRACT:** *Food wastage and hunger are major global challenges, with large amounts of edible food being discarded while many people lack access to proper nutrition. This study proposes a technology-based solution in the form of an Android application that connects food donors with NGOs and individuals in need. It also examines factors influencing users' willingness to adopt such applications, including perceived usefulness, ease of use, and perceived risks. The findings indicate that usefulness and ease of use positively impact adoption, while perceived risks have a negative effect. The system aims to reduce food wastage and support efficient food distribution.*

**Keywords: Food Donation, Donor, Receiver, Food Wastage, Food Distribution**

## 1 . INTRODUCTION:

Food wastage is one of the major issues faced by society today, especially in developing countries like India. Every day, a huge amount of edible food is wasted in hotels, restaurants, weddings, parties, and other large events due to overproduction or poor estimation of consumption. At the same time, a large section of the population continues to suffer from hunger and food insecurity. This contrast highlights the urgent need for an organized and efficient system that can connect those who have surplus food with those who need it the most.

The Leftover Food Management System aims to bridge this gap by creating a digital platform that links food donors such as hotels, restaurants, and event organizers with receivers like NGOs and charitable organizations. The main purpose of the project is to minimize food wastage and ensure that leftover food reaches people in need quickly and safely.

Through a simple and user-friendly mobile application, donors can easily upload information about available food, including its quantity, type, and pickup location, along with a photo and time window. On the other hand, NGOs can view nearby food donations in real-time, claim them, and coordinate pickups efficiently. This process ensures the timely collection and proper utilization of leftover food.

The Real-time database storage, image uploads, cloud notifications, and serverless backend functions. Integration with the Google Maps API enables automatic location detection and navigation for efficient pickup coordination.

By automating the process of food donation, the proposed system promotes social responsibility, sustainability, and transparency. It helps reduce food wastage, supports hunger relief efforts, and encourages individuals and organizations to contribute to a noble cause with minimal effort.

Food waste has become a serious issue in India. Every year, around 68.7 million tonnes of food are wasted in Indian homes alone. This means that, on average, each person wastes nearly 50 kilograms of food every year. It is also found that about one-third of all the food produced in India gets spoiled or wasted before it is even eaten. This large amount of food wastage not only affects the economy but also increases hunger and environmental pollution. By reducing food waste, we can save valuable resources, feed more people in need, and move closer to ending hunger in our society.

## 2. LITERATURE REVIEW :

Urban food redistribution systems have long struggled with delays, inconsistent donor–NGO coordination, and the lack of reliable information exchange. To address these challenges, a cloud-enabled redistribution system was introduced, digitizing previously manual donation workflows. By integrating the MERN stack with geolocation APIs, the solution ensures scalable management of surplus food along with accurate, real-time availability updates, significantly reducing coordination delays that existed earlier. [1]

Traditional food rescue networks also suffered from inefficient volunteer routing and unpredictable demand patterns. To overcome this, an AI-supported food rescue framework was developed using Python Flask, TensorFlow, and Firebase. The inclusion of machine learning techniques enabled demand prediction and optimized pickup routing, replacing slow, assumption-based scheduling with adaptive and data-driven operations. [2]

Communication gaps between donors and NGOs often led to missed donations and unorganized pickup schedules. A mobile-first system was therefore created

using Flutter for the interface and Node.js for backend processes. This automation of alerts and scheduling allowed near-instant synchronization of donation events, improving responsiveness in fast-changing environments. [3]

Maintaining food freshness during transport has historically been a major limitation. To solve this, an IoT-integrated safety monitoring system was implemented using Arduino, MQTT, and Django. With temperature and spoilage sensors, this system ensured high-quality redistribution and improved traceability, replacing unreliable manual checks. [4]

Supermarkets and community shelters often faced difficulties due to inconsistent communication methods and unstructured logistics. To fix this, a digitally connected logistics model was created using React, Express.js, and PostgreSQL. This improvement brought accurate, real-time stock listings and streamlined request handling, addressing earlier fragmentation. [5]

Lack of trust, data manipulation, and unverifiable donation records have long affected food donation chains. A blockchain-based verification tool was introduced to create tamper-proof, transparent transaction logs. Using Hyperledger Fabric and JavaSpring, the system established secure, traceable donation lifecycles that solved transparency issues of conventional methods. [6]

Donation availability is often unpredictable, causing volunteer overload or under-utilization. To overcome this, an automated pickup assignment system was developed with AWS Lambda for serverless computing and Vue.js for the front-end. Its low-latency and scalable operation replaced inefficient manual task allocation.[7]

Commercial kitchens often generate surplus without accurate forecasting, resulting in wastage. An AI-powered inventory analysis tool was therefore created using Python, scikit-learn, and MongoDB. By predicting surplus levels, the model enabled optimized donation timing, replacing guess-based decisions. [8]

NGOs working manually often face fragmented coordination and inconsistent documentation. To standardize workflows, an end-to-end redistribution platform was introduced using ASP.NET Core and MS SQL Server. The automated donor–NGO matching significantly improved reliability under high workload conditions. [9]

Urban donation pickups frequently experience route inefficiencies and delays due to dense traffic and poor planning. A GPS-enabled redistribution app was developed using Kotlin, Firebase Realtime Database, and Google Maps API. This solution optimized routes in real time, replacing outdated manual scheduling methods. [10]

Donation chains involving multiple stakeholders typically suffer from communication gaps and message delays. A middleware-based communication framework using Java EE, RabbitMQ, and MySQL was created to unify donors, volunteers, and shelters. This ensured high-throughput, reliable message delivery that overcame failures of earlier uncoordinated systems. [11]

The lack of authority and reliability in traditional donation workflows prompted the development of a decentralized platform using Ethereum Solidity and a React interface. By implementing smart contracts, the system ensured immutable, trustworthy donor-recipient mapping and reduced the risk of fraudulent updates. [12]

Rural food redistribution often fails due to unstable connectivity. To address this, a lightweight mobile donation system was designed using PWA architecture, service workers, and a Node.js backend. Its offline-first capability ensured continuous usage, solving network-dependent failures common in rural areas. [13]

Volunteer-based distribution chains frequently face delays due to a lack of structured task assignment. A coordinated food transportation system using Django REST Framework, Redis caching, and Angular was introduced. It automated dispatch processes and maintained stable multi-user interactions, improving upon earlier unorganized volunteer networks. [14]

Shelters commonly receive food at mismatched times due to an inaccurate understanding of consumption patterns. To fix this, a data-driven redistribution management system was created using R for analytics, Laravel for backend processing, and MySQL. By optimizing donation timing based on actual needs, the system replaced inefficient traditional practices. [15]

## 3. PROBLEM STATEMENT

Every day, a huge amount of leftover food from hotels, restaurants, and events goes to waste, while many poor and needy people struggle to get even one proper meal. There is no proper digital platform to connect food donors, like hotels, with NGOs or people who need food the most. Donations still depend on phone calls or social media, which are slow and unorganized. Because of no real-time updates or verification system, food often gets wasted due to delays, confusion, and a lack of coordination between donors and receivers.

## 4. OBJECTIVE

1. To minimize food wastage by connecting food donors (hotels/events) and receivers (NGOs).
2. To build a real-time web application for posting and claiming leftover food.
3. To ensure food safety, transparency, and verification during donations.
4. To promote social responsibility through technology.

## 5. SYSTEM ARCHITECTURE :

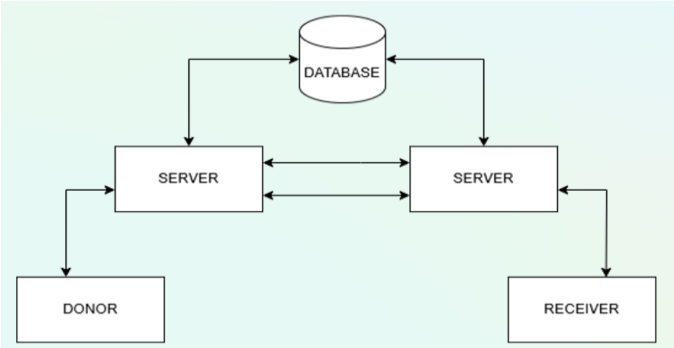


**Fig. System Architecture of Application**

## 6. SOFTWARE REQUIREMENTS :

Technologies Used
Frontend → HTML,CSS, JavaScript
Backend → Node.js + Express
Database → MongoDB
IDE → Visual Studio Code, MongoDB

**Modules**
1. Restaurant Module
   Register/Login
   Add food details

2.NGO Module
   Register/Login
   View food donations
   Accept food
3. Database Module
   Store user and donation data

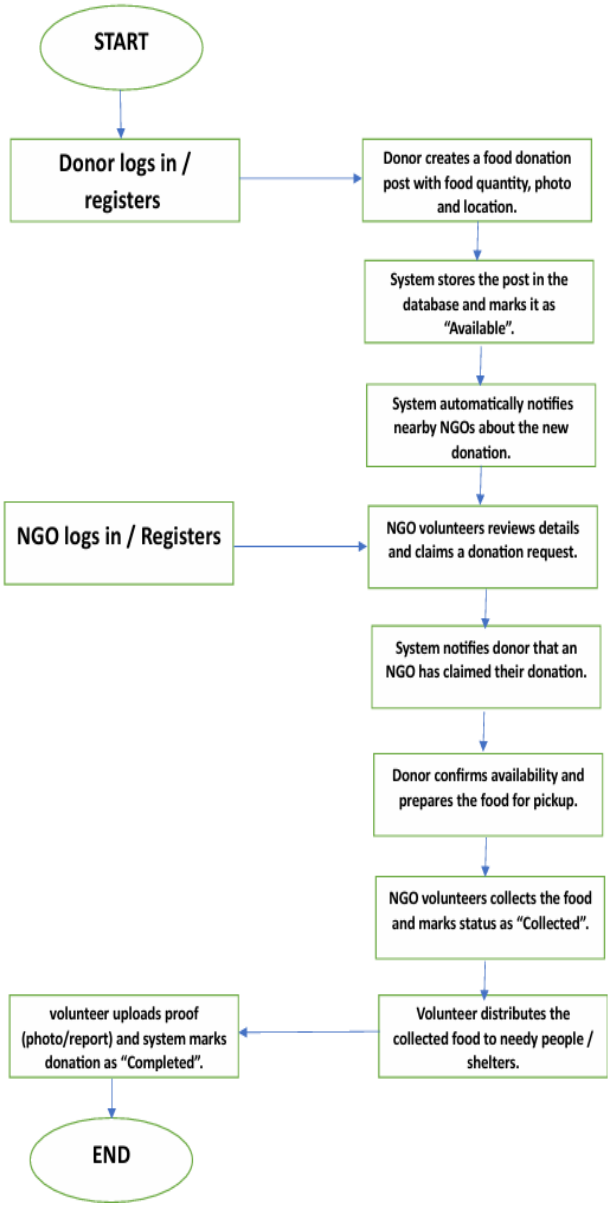


**Fig. Block Diagram**

## 7. METHODOLOGY:

1. Data Collection & User Registration

• Donors and NGOs register on the web platform
• Donors provide details such as organization name, location, and food availability schedule.
• NGOs provide information about their operational area and pickup capacity.

2. Food Donation Listing
• Donors upload food details (type, quantity, and freshness) along with photos.
• The data is stored in a centralized database.

• Each food listing is automatically timestamped to ensure timely pickup.

3. Matching & Notification System
• The system uses location-based matching to find nearby NGOs.
• NGOs receive real-time notifications or alerts when new donations are available.
• Priority is given to NGOs within the shortest distance to minimize delivery delays.

4. Food Collection
• Once an NGO accepts the request, the donor is notified instantly.
• The NGO visits the donor's location to collect the food.
• The status of each donation (Pending → Accepted → Collected → Delivered) is updated in the system.

5. Quality & Safety Check
• Before pickup, NGOs verify that the food meets hygiene and safety standards.
• Temperature, packaging, and expiry checks are carried out as per guidelines.

6. Reporting & Appreciation
• After successful delivery, both donor and NGO receive confirmation.
• Donors are awarded digital appreciation badges to encourage participation.
• The admin panel maintains logs for transparency and performance tracking.

## 8. RESULT & DISCUSSION

The home page is the main interface of the Food Donation Platform. Provides information about food donation and helping needy people.

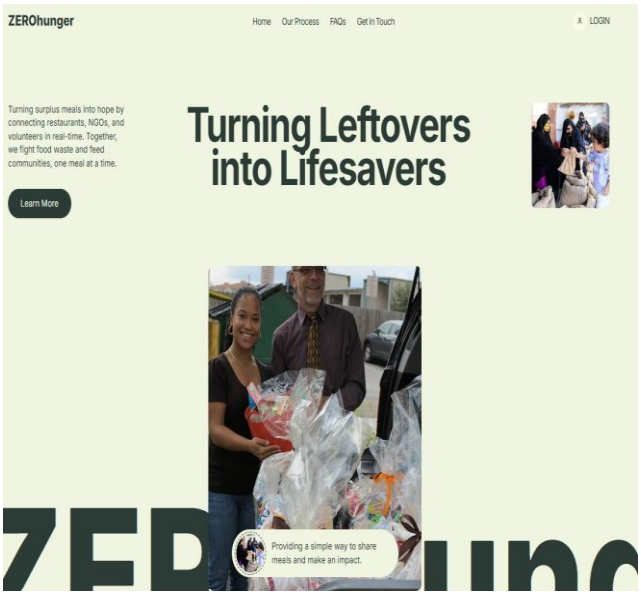


**Fig.1.Home Page**

The Login page helps restaurants and volunteers enter the Food Donation Platform using their email and password. It also provides signup options for new users.

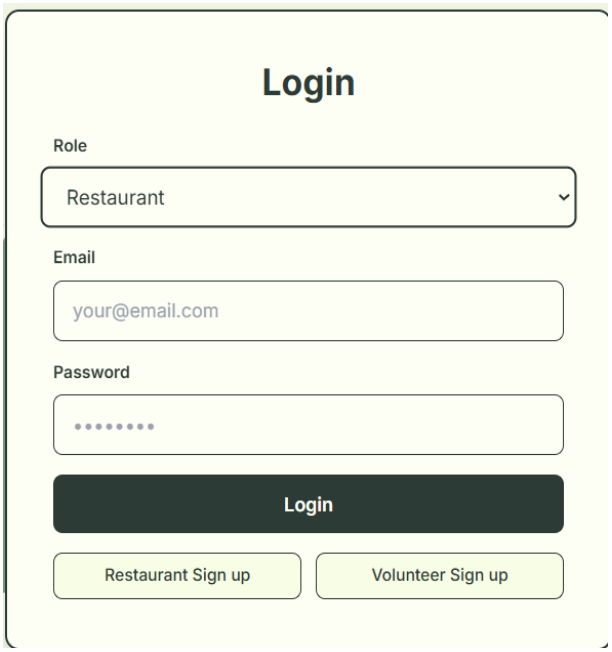


**Fig.2 .Login Page Restaurant/Volunteer**

The Food Details page allows restaurants to upload food information, including the food name, quantity, description, and location, for donation.

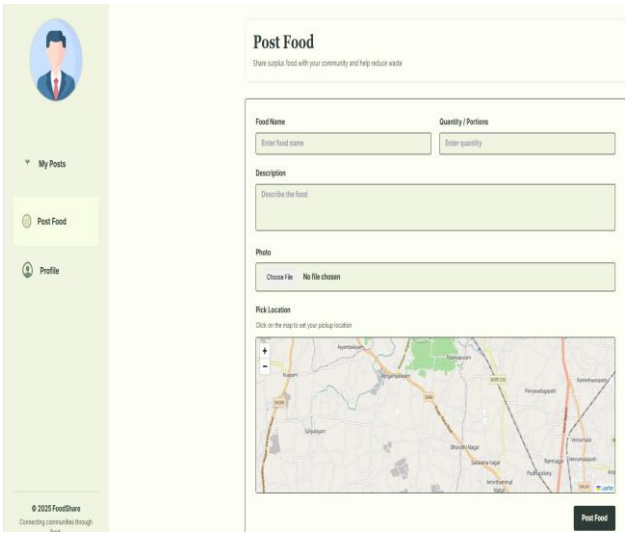


**Fig.3.Uploads Details of food**

The volunteer page allows volunteers to view available food donations and accept food for collection and distribution.

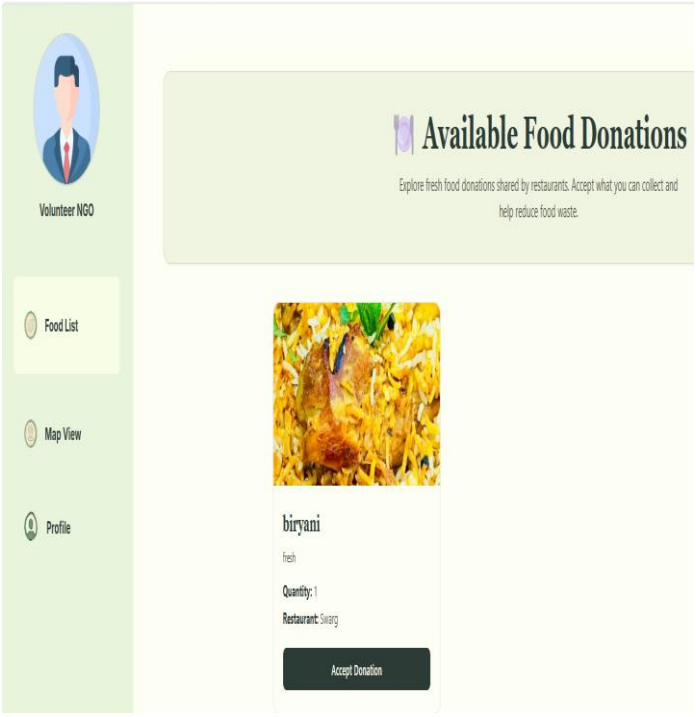


**Fig.4.Accept food as a volunteer**

The Food Donation Platform stores all user and food donation details securely in MongoDB. It helps manage and retrieve data easily. MongoDB provides fast and reliable data storage for the system.

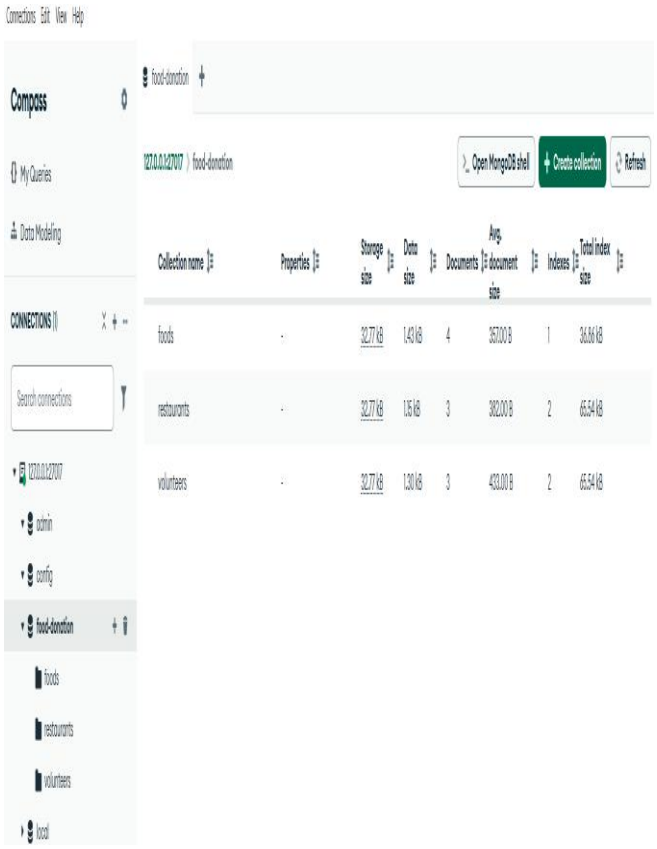


**Fig.5. DataStore in MongoDB**

The Admin page allows the administrator to securely log in using email and password credentials. After logging in, the admin can access the dashboard to monitor restaurants, volunteers, and food donations. It helps in managing and controlling the food donation system efficiently.

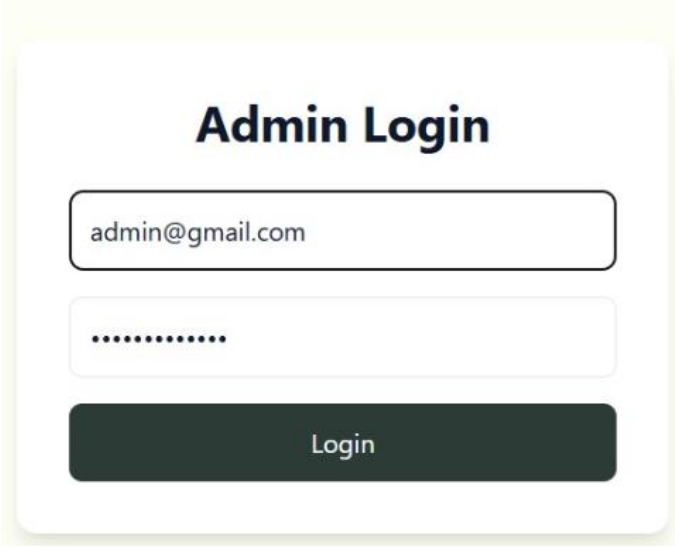


**Fig.6.Admin Login Page**

The Admin Dashboard displays the total number of restaurants, volunteers, and donations in the system. It allows the admin to monitor all food donation activities and view donation details with their current status. This helps in the efficient management and control of the food donation process.

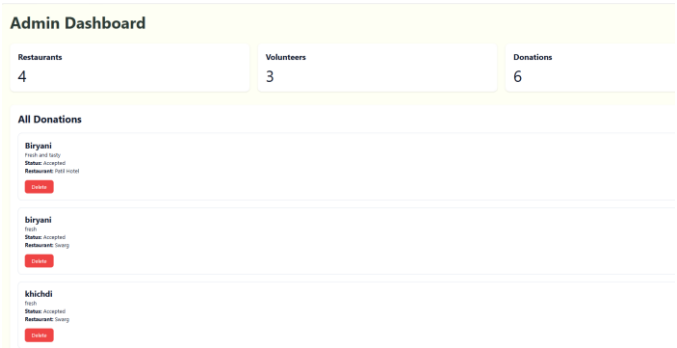


**Fig.7.Admin Dashboard**

## 8. CONCLUSION:

This paper presents a Food Donation Platform.It is developed to reduce food wastage and help needy people by connecting restaurants with NGOs and volunteers. The system provides an easy and efficient way to donate excess food through an online platform. Restaurants can add food details, and NGOs can view and collect the available food donations.

This project improves communication between donors and receivers, saves time, and supports social welfare.

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