

# **CHAPTER 1**

## **INTRODUCTION**

A food donation management platform is a digital system designed to efficiently connect food donors such as restaurants, hotels, supermarkets, and individuals with organizations and communities in need, including food banks, NGOs, and shelters. The platform streamlines the process of collecting, managing, and distributing surplus food by providing real-time tracking, scheduling, and communication features. Through a central online portal or mobile app, donors can quickly list available food before it goes to waste, and recipient organizations can request or claim items based on their needs and location. By leveraging technology, the platform helps reduce food wastage, promotes social responsibility, enhances transparency, and ensures that surplus food reaches the underprivileged efficiently and safely.

### **1.1 Background of the Project**

The increasing problem of food wastage alongside the persistent issue of hunger has created a pressing need for effective food redistribution systems. Many restaurants, supermarkets, and households discard large quantities of edible food daily, while numerous individuals and communities continue to face food insecurity. A Food Donation Management Platform aims to bridge this gap by providing a centralized system that connects food donors, such as restaurants, grocery stores, and individuals, with organizations or volunteers that distribute food to those in need.

By streamlining the process of collecting, tracking, and distributing surplus food, the platform not only helps reduce food wastage but also ensures that resources reach underprivileged populations efficiently and safely. This project leverages technology to enhance transparency, improve logistics, and foster community participation in addressing hunger, ultimately contributing to both social welfare and environmental sustainability.

### **1.2 Problem Definition**

Food wastage and hunger are two critical issues occurring simultaneously across the globe. Despite the availability of surplus food from restaurants, supermarkets, and households, there is no efficient, organized system to ensure that this food reaches those who need it most. Existing food donation processes are often manual, fragmented, and time-

consuming, leading to delays, mismanagement, and sometimes the spoilage of donated food. This lack of coordination not only contributes to food wastage but also leaves vulnerable communities without timely access to essential resources. The Food Donation Management Platform addresses this problem by providing a digital solution that connects donors with volunteers and organizations, tracks donations, and facilitates the timely distribution of food. By improving communication, logistics, and transparency, the platform aims to minimize wastage, streamline donation processes, and ensure that surplus food benefits those facing hunger.

### **1.3 Objectives**

The primary objective of the Food Donation Management Platform is to create an efficient and streamlined system for managing the donation and distribution of surplus food. The platform aims to connect food donors, such as restaurants, supermarkets, and individuals, with charitable organizations, volunteers, and communities in need, ensuring that edible food reaches its intended recipients in a timely and organized manner. Additionally, the project seeks to reduce food wastage, improve transparency and accountability in the donation process, and simplify logistics through real-time tracking and notifications. By leveraging technology, the platform aspires to promote social responsibility, foster community participation, and contribute to addressing both hunger and environmental sustainability.

### **1.4 Scope of the Project**

The Food Donation Management Platform encompasses the development of a comprehensive digital system that facilitates the collection, tracking, and distribution of surplus food from donors to beneficiaries. The platform will cater to restaurants, grocery stores, households, charitable organizations, and volunteers, providing features such as donor registration, donation scheduling, real-time tracking of food availability, and notifications for both donors and recipients. It will also include basic reporting and analytics to monitor food donation patterns and ensure transparency. While the platform primarily focuses on food donation management, it can be expanded in the future to include partnerships with logistics providers, integration with social welfare programs, and awareness campaigns to encourage community participation. The system aims to reduce

food wastage, improve operational efficiency, and ensure that donated food reaches those in need quickly and safely.

### **1.5 Methodology Adopted**

The methodology adopted for the development of the Food Donation Management Platform follows a systematic approach to ensure efficiency, usability, and reliability. Initially, a thorough requirement analysis is conducted to understand the needs of donors, volunteers, and beneficiary organizations, along with studying existing manual or fragmented systems. This is followed by system design, which includes creating a database structure for storing donation details, user information, and tracking data, as well as designing an intuitive user interface for easy navigation. The platform is then developed using appropriate technologies for front-end, back-end, and database management, ensuring scalability and security. After development, rigorous testing is carried out to identify and resolve any functional or performance issues.

### **1.6 Expected Outcomes**

The expected outcomes of the Food Donation Management Platform include a significant reduction in food wastage and improved efficiency in the distribution of surplus food to those in need. The platform is anticipated to provide a seamless connection between donors, volunteers, and charitable organizations, ensuring that donated food reaches beneficiaries in a timely and organized manner. Additionally, it will enhance transparency and accountability by tracking donations and providing reports on donation patterns and usage.

## **CHAPTER 2**

### **REQUIREMENT ANALYSIS**

A Donation Management System involves understanding and defining the functional and non-functional needs of all stakeholders, including donors, receivers, delivery volunteers, and administrators. The analysis identifies essential system requirements such as secure user authentication, donor registration, food donation listing, request submission and approval, delivery or pickup scheduling, and real-time status tracking. It also includes requirements for database management, notification services, and role-based access control to ensure each user accesses only authorized functions. Non-functional requirements such as performance, security, reliability, usability, and scalability are also evaluated to ensure the system can handle large numbers of donations and users efficiently. Additionally, requirements analysis involves gathering feedback from potential users, examining existing donation processes, and aligning system features with real-world.

#### **2.1 Functional Requirements**

The functional requirements of a Food Donation Management System define the key operations that the system must support to ensure effective food distribution. The system must allow users to register, log in, and access features based on their roles as donors, receivers, or administrators. Donors should be able to add details of available food, update listings, and track donation status, while receivers must be able to browse donations, submit requests, and monitor approval and delivery progress. The administrator should manage users, verify donation activities, and oversee system operations. The system must support request approval workflows, scheduling of delivery or pickup, and send real-time notifications about status changes. Additional functional requirements include maintaining a secure centralized database of all users and donation transactions, providing search and filtering of food items, displaying donation history, and generating reports to ensure transparent and efficient management.

The System include enabling donors to register and submit food donation details, allowing volunteers and organizations to view, accept, and schedule pickups or deliveries, and maintaining a database of donors, recipients, and donation records. The system should

provide real-time notifications, generate reports on donations and distributions, and support search and filter options for tracking available food items. Additionally, it must manage user authentication and roles, ensuring that administrators, donors, and volunteers can access features relevant to their responsibilities.

## **2.2 Non-Functional Requirements**

A Food Donation Management System define the quality attributes and performance standards that ensure the system operates efficiently and reliably. The system should be highly available and responsive, handling multiple users and donation requests simultaneously without significant delays. It must ensure data security and privacy, protecting sensitive information of donors, receivers, and administrators through secure authentication, authorization, and encrypted data storage. The system should be scalable, capable of accommodating growth in user base and donation volume, and maintainable, allowing easy updates and bug fixes. It should also be user-friendly and accessible, with a responsive interface that works on both web and mobile devices. Additionally, the system should ensure reliability and consistency, providing accurate real-time updates on donation status, requests, and deliveries, while minimizing system downtime or errors.

Usability is essential the interface should be intuitive and user-friendly for donors, volunteers, and administrators, minimizing training requirements. Reliability is necessary to guarantee that donation records, inventory data, and notifications are accurate and consistently available.

Additionally, the system should comply with relevant legal and regulatory standards concerning food safety and data privacy. Maintainability is also a key requirement, allowing easy updates, bug fixes, and feature enhancements without disrupting ongoing operations. Lastly, the system should be interoperable, capable of integrating with external platforms such as logistics, payment gateways, and notification services.

## **2.3 User Requirements**

A Food Donation Management System describe the needs and expectations of the end users, including donors, receivers, and administrators. Donors require an easy-to-use interface to register, log in, add food donation details, and track the status of their donations. Receivers need the ability to browse available food items, submit requests, and

monitor the approval and delivery progress. Administrators require tools to manage users, verify donation requests, oversee delivery scheduling, and generate reports to ensure transparency and smooth operations. All users expect real-time notifications, clear dashboards, and seamless interaction across devices. The system should also be secure, reliable, and responsive, providing a convenient and efficient platform for donating, receiving, and managing food.

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## **2.4 Hardware and Software Requirements**

It is designed to operate efficiently on standard hardware, including desktops, laptops, or smartphones with at least 4GB RAM, a dual-core processor, and sufficient storage to handle user profiles, donation records, and transaction history. A stable internet connection is required for real-time updates, notifications, and remote access. On the software side, the system uses Node.js as the backend environment to manage server-side logic, API handling, and database communication, providing scalability and fast processing for multiple users. The frontend is built using HTML, CSS, and JavaScript, ensuring a responsive, intuitive, and interactive interface accessible on both desktop and mobile devices. The system integrates with a database such as PostgreSQL to securely store and manage user data, donation details, and request histories. Additional software tools like Node Package Manager (npm) handle package dependencies, while Vercel Application other IDEs support development, and Git enables version control and collaborative work. Optional technologies may include Node.js for routing, RESTful APIs for communication between frontend and backend, and Bootstrap or Tailwind CSS for enhanced UI styling. This combination of hardware and software ensures the system is scalable, reliable, secure,

and user-friendly, capable of managing donations, requests, scheduling, and notifications efficiently across multiple users and devices.

## **2.5 Feasibility Study**

Technical feasibility indicates that the system can be developed using existing technologies such as web and mobile platforms, cloud databases, and notification services, making it technically achievable. Economic feasibility suggests that the system can reduce food wastage and optimize donation logistics, providing social and financial benefits that justify the development and maintenance costs. Operational feasibility reflects that the system aligns well with the goals of food banks, NGOs, and donors, simplifying donation tracking, volunteer coordination, and distribution management, thereby enhancing efficiency and user satisfaction. Legal feasibility ensures that the system can operate within regulations related to food safety, hygiene, and data privacy, minimizing the risk of legal complications. Overall, the project is highly feasible, as it leverages existing technologies, addresses a significant social need, and has manageable costs and risks while offering considerable benefits to both donors and recipients.

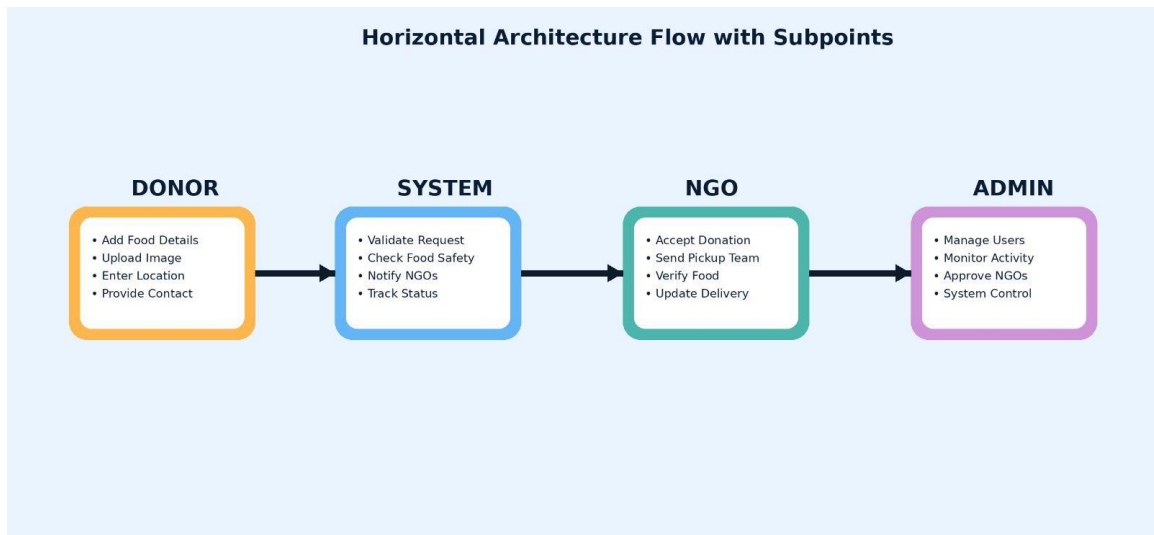
Operationally, it aligns with the workflows of donors, volunteers, and recipient organizations, providing an intuitive interface, real-time tracking, and reporting to streamline processes. Legally, the system can comply with food safety and data privacy regulations by implementing secure data handling, authentication, and proper record-keeping. Additionally, the system is socially viable, encouraging community participation and supporting underprivileged populations efficiently. Overall, the project is practical, cost-effective, and capable of delivering significant social and operational benefits.

## CHAPTER 3

### SYSTEM DESIGN

The Food Donation Management System is designed to provide a unified digital platform for donors, receivers, and administrators to manage food sharing efficiently. It supports donation posting, request handling, delivery scheduling, and real-time status updates through a simple and responsive web interface. The system uses a role-based structure with separate panels for donors, receivers, and admins. A centralized database securely stores user information and donation records, ensuring transparency and smooth coordination.

#### 3.1 Architectural Design



**Fig 3. 1 Architectural Design**

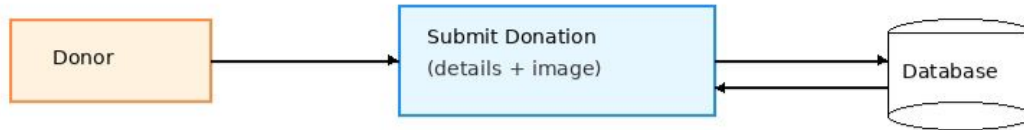
This architecture illustrates the workflow between the Donor, System, NGO, and Admin. Donors submit food details, which the system verifies for accuracy and safety before notifying relevant NGOs. NGOs then accept the request, arrange pickup, verify the food, and update the delivery status. Meanwhile, Admins oversee user management, NGO approval, and overall system activity. The process ensures a safe, efficient, and well-organized food donation flow.



## 3.2 Data Flow Diagrams (DFD)

### 3.2.1 Level 1 DFD

#### Simple Level-1 DFD — Donor

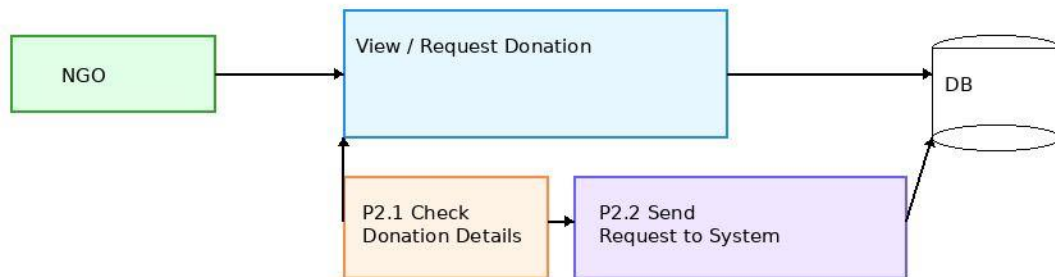


**Fig 3.2.1 Level 1 DFD**

The Level-1 DFD shows how a Donor submits food donation details and images to the system. The Submit Donation process receives this information and stores it in the Database. The process also retrieves needed data from the database when required. Overall, it represents the basic data flow between the donor, the system process, and the storage.

### 3.2.2 Level 2 DFD

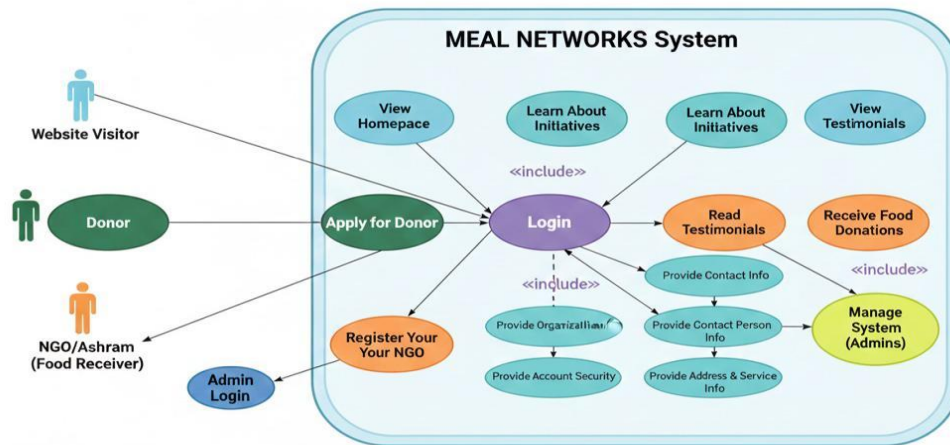
#### Simple Level-2 DFD — NGO Process



**Fig 3.2.2 Level 2 DFD**

The Level-2 DFD shows how an NGO views or requests available donations from the system. The View/Request Donation process fetches donation data from the Database. The NGO then checks the donation details (P2.1) and sends a request back to the system (P2.2). Overall, it illustrates the detailed data flow between the NGO, internal processes, and the database.

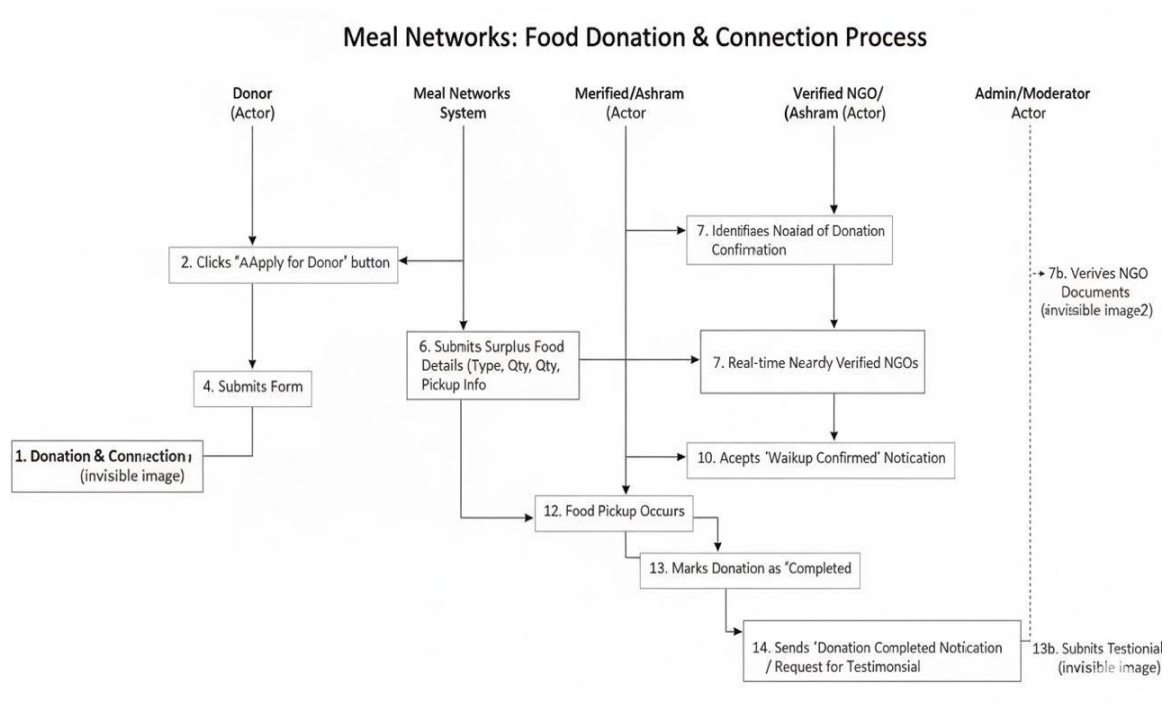
### 3.3 Use Case Diagram



**Fig 3.3 Use Case Diagram**

The diagram illustrates the MEAL NETWORKS System and highlights how different users interact with it, including website visitors, donors, NGOs/ashrams (food receivers), and administrators. Website visitors can explore information such as the homepage, initiatives, and testimonials, while donors can apply and NGOs can register to receive food donations.

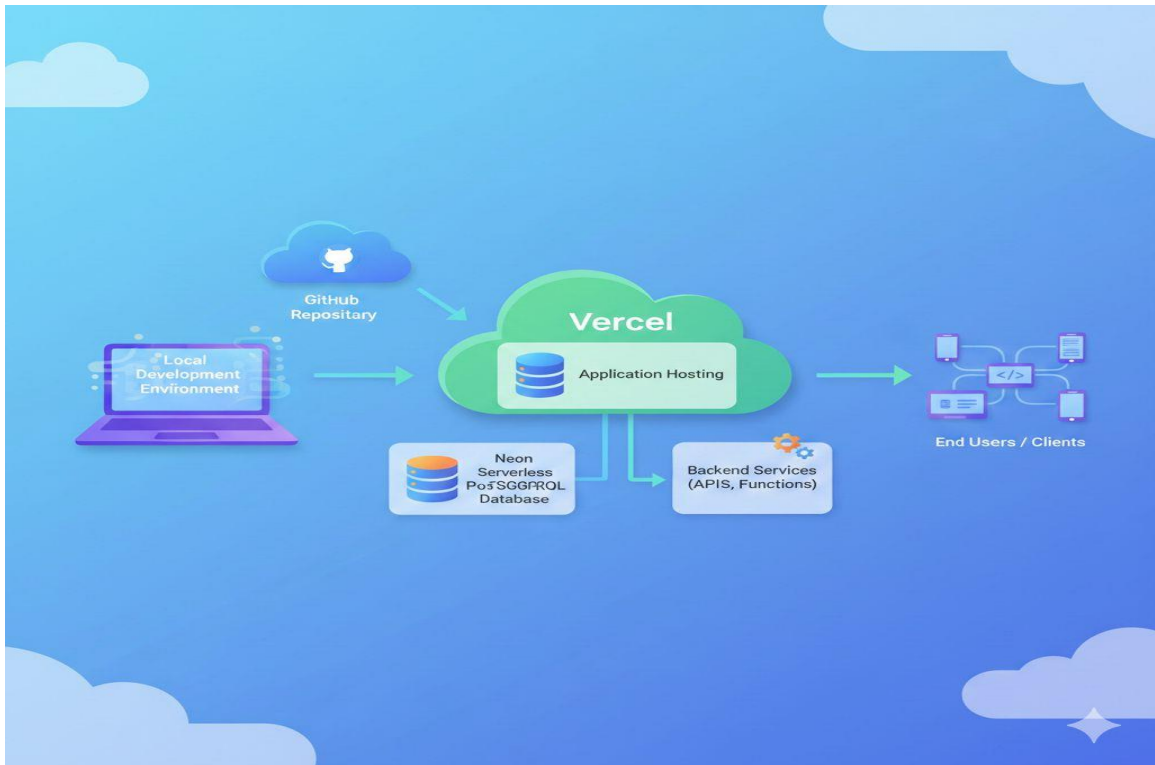
### 3.4 Sequence Diagram



**Fig 3. 4 Sequence Diagram**

The donor submits details about their extra food through the Meal Networks system, which then alerts nearby verified NGOs. A suitable NGO accepts the donation and picks up the food from the donor. After the pickup, the NGO marks the donation as completed, and the system sends a confirmation and request for a testimonial.

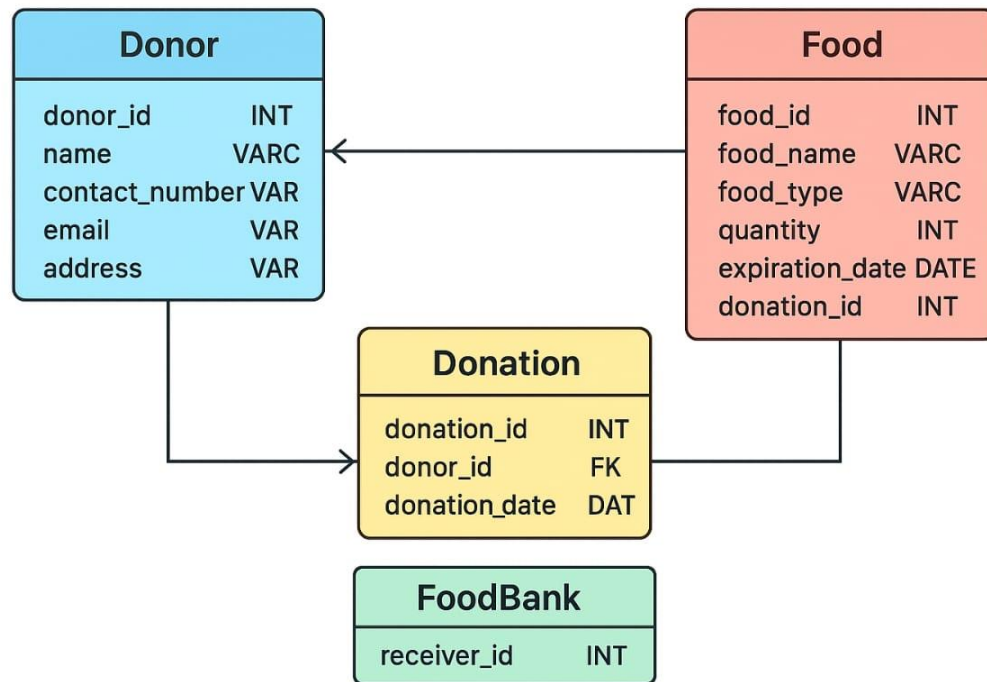
### 3.5 Deployment Diagram



**Fig 3. 5 Deployment Diagram**

The deployment diagram illustrates how system components run across different nodes. Users access the application through browser clients connected to the Django server, which handles all CMS operations. The Django server communicates with the Flask sentiment microservice and stores academic and analytical data in the SQLite backend.

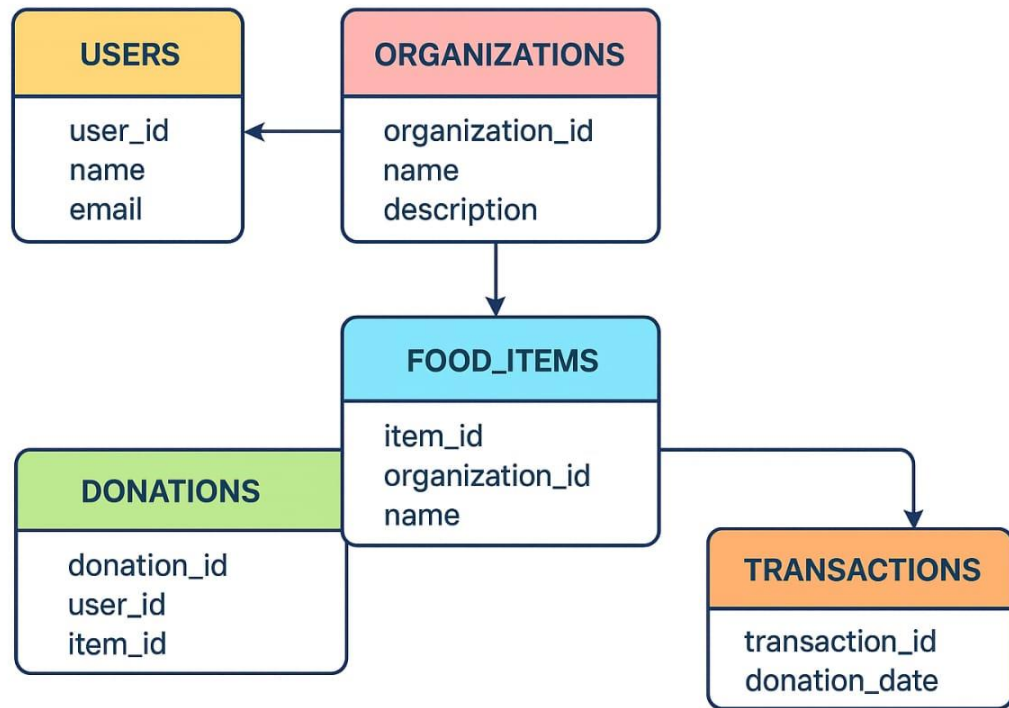
### 3.6 Entity Relationship (ER) Diagram



**Fig 3. 6 E-R Diagram**

This image shows how donors, their donations, and donated food items are connected in the system. Each donor can make multiple donations, and each donation can include several food items. Food records store details like type, quantity, and expiration date, linked to a specific donation. A Food Bank entity receives donations, represented by its receiver ID. system.

### 3.7 Database Schema



**Fig 3.7 Database Schema**

This database schema represents a structured system connecting users, organizations, food items, donations, and transactions. Organizations provide various food items, which are stored in the FOOD\_ITEMS table. Users can donate these items, and each donation is recorded in the DONATIONS table. Finally, every donation is linked to a transaction, capturing the date and completion of the donation process.

## **CHAPTER 4**

### **SYSTEM IMPLEMENTATION**

A food donation management platform can be implemented as a cloud-based, modular system designed to connect food donors with recipient organizations through a secure, scalable architecture. The platform is typically built using a three-tier structure consisting of a responsive front-end interface, a robust back-end service layer, and a cloud-hosted database. The front end, developed with frameworks such as HTML, CSS, And JavaScript provides tailored dashboards for donors, recipients, volunteers, and administrators, enabling users to create donation listings, claim donations, schedule pickups, and track statuses in real time. The back end, implemented using Node.js, exposes RESTful APIs to manage core processes such as user authentication, donation creation, matching algorithms, notifications, and logistics coordination.

Integration with external services such as map APIs for geolocation, SMS/email gateways for alerts, and identity verification tools enhances usability and trust. Continuous integration and deployment pipelines automate testing and updates, ensuring smooth feature releases and high platform availability. The result is a reliable, user-friendly solution that reduces food waste by efficiently matching surplus food with people in need.

#### **4.1 Module Description**

##### **1. Donor & NGO Registration Module**

Handles onboarding of donors and NGOs/ashrams, capturing necessary details such as contact info, address, role (donor or receiver), and verification to ensure reliable participants on the platform.

##### **2. Donation Listing & Matching Module**

Enables donors to list surplus food items (type, quantity, location, expiry) and matches them with registered NGOs/ashrams based on location and need. The platform tagline Connecting food donors with NGOs and Ashrams to ensure no plate goes empty.

### **3. Pickup & Delivery Coordination Module**

Coordinates logistics between donor sites and receiving NGOs/ashrams schedules pickup times, assigns volunteers or delivery partners, updates status from “available” to “in-transit” to “delivered”.

### **4. Inventory & Expiry Management Module**

For NGOs/ashrams, this module tracks received food items, their storage conditions, remaining shelf-life, and ensures timely distribution before spoilage — part of minimizing waste and maximising impact.

### **5. Communication & Feedback Module**

Manages notifications and alerts (to donors when donation is accepted, to NGOs when pickup is scheduled, etc.), plus enables feedback (what people say/testimonials) and analytics to monitor impact (“What People Say” section hints at gathering feedback).

## **4.2 Algorithm Used**

The Food Donation Management System uses an algorithm to efficiently match food donors with nearby receivers based on location and requirements. It prioritizes minimizing food wastage by allocating donations to receivers with the highest need and available capacity.

**1. Distance Calculation:** The system utilizes the Haversine formula to accurately calculate the great-circle distance (shortest distance over the Earth's surface) between a Donor's location and potential Recipient (NGO/Ashram) locations.

**2. Geospatial Indexing:** The database (Neon PostgreSQL) employs spatial indexing (e.g., using PostGIS) to quickly retrieve all registered NGOs/Ashrams that fall within a defined radius (e.g., 5-10 km) of the donation point.

**3. Proximity Scoring:** The raw distance is converted into a Proximity Score, which is a weighted factor in the overall recipient selection process; shorter distances yield higher scores.



**4. Multi-Criteria Weighting:** A scoring algorithm is used to rank potential recipients by assigning weights to various factors: distance, current capacity, food type compatibility, and response time history.

**5. Capacity Constraint Check:** Before notifying an NGO, the system checks the recipient's registered daily capacity and their current receiving status to ensure they are available and able to handle the size and type of the incoming donation.

**6. Real-Time Notification Queue:** When a donation is submitted, the system places the resulting list of ranked recipients into a notification queue (often FIFO or Priority Queue), ensuring immediate alerts are dispatched for rapid pickup coordination.

**7. Secure Password Hashing:** For user security, all Donor and NGO passwords are processed using a strong, one-way cryptographic hashing function (like bcrypt or Argon2) before being stored in the database.

**8. Data Retrieval Optimization:** Standard B-tree indexing (a core database algorithm) is implemented on critical fields (like city, registration number, and status) to ensure fast and efficient searching and filtering of both Donor and Recipient records by system administrators.

#### **4.3 Coding Standards**

The implementation follows structured coding standards to ensure clean development practices, maintainability, and secure module interaction across the Node.js and JavaScript.

##### **1. Consistent Project Structure & Naming**

Use a predictable folder structure (e.g., controllers/, services/) and apply consistent naming conventions—camelCase for JS variables/functions, PascalCase for components, and snake case for PostgreSQL tables and columns.

##### **2. Input Validation & Sanitization**

All data coming from users (donors, volunteers, NGOs) must be validated on both frontend and backend. Sanitize text fields to prevent SQL injection, XSS, and invalid food-related data (expiry date, quantity, category).

### **3. Secure API & Database Interactions**

Use prepared statements or parameterized queries for PostgreSQL. Never expose database credentials in frontend code use environment variables.

### **4. Modular & Reusable Components**

Frontend UI components (forms, dashboards) should be reusable and isolated. Backend logic (authentication, food item operations, notifications) should be separated into services to avoid duplicate logic.

### **5. Error Handling & Logging Standards**

Implement global error handlers on the backend and user-friendly messages on the frontend. Log critical events (failed donation updates, expired food items, permission issues) using structured logging, without exposing sensitive information.

## **4.4 Integration of Modules**

**1. Registration Module:** Registration Module (for both Donors and NGOs/Ashrams) sends user input and verification documents to the Database Layer (Neon PostgreSQL). purpose is securely store user credentials, contact information, geographical coordinates, and official verification statuses (e.g., NGO registered number).

**2. Donation Module:** When a Donor submits a donation, the Donation Module passes the food details and pickup location (Lat/Long) to the Geospatial Module (part of the backend/database). purpose is initiate the crucial step of finding all potentially suitable NGOs within the immediate vicinity of the donation.

**3. Geospatial Module:** The Geospatial Module returns the list of nearby NGOs to the Matching/Scoring Module. This module then queries the database for each NGO's current capacity and food preference history. purpose is to apply the multi-criteria algorithm and generate a prioritized rank-ordered list of the best-suited recipients.

**4. Matching Module Integration:** The top-ranked NGOs from the Matching Module are fed into the Notification Module (using a queuing system). purpose is immediately send real-time alerts (SMS/email/in-app) to the most eligible recipients, triggering the next step of pickup coordination

## **CHAPTER 5**

### **SYSTEM TESTING**

#### **5.1 Testing Objectives**

The testing objectives of a Food Donation Management System are to ensure the functional correctness of all modules, including donor registration, food listing, receiver requests, delivery scheduling, and notification handling. The system is tested to verify secure authentication, proper role-based access control, and accurate tracking of food availability and status updates. Another objective is to validate integration between interconnected modules, such as donation approval workflows and delivery tracking, as well as to confirm data integrity through reliable CRUD operations and database consistency. Additionally, testing aims to check UI responsiveness across devices, evaluate system performance under heavy load, ensure the security and confidentiality of stored data, and confirm overall system stability, usability, and real-time reliability during multiple user interactions.

#### **5.2 Testing Methods**

Testing methods in a Food Donation Management System include unit testing to verify individual functions, integration testing to ensure modules work together, and system testing to check the complete workflow. User acceptance testing confirms real-user needs, while performance testing checks speed and load handling. Security testing protects data and access, usability testing ensures an easy and responsive interface, and regression testing confirms that new updates do not break existing features.

##### **5.2.1 Unit Testing**

A Food Donation Management System focuses on verifying the correctness of individual components and functions to ensure they work properly in isolation. It involves testing features such as donor and receiver registration forms, login authentication, food donation entry, request submission, and notification triggers. Each unit of code, including backend functions, database operations, and validation logic, is tested independently to identify errors early before modules are integrated. For example, unit tests confirm whether a new donation record is saved correctly, whether request status updates behave as expected, and

whether input validation prevents invalid data. This method helps improve reliability, simplifies debugging, and ensures a strong foundation for subsequent testing stages like integration and system testing.

### **5.2.2 Integration Testing**

A Food Donation Management System focuses on verifying that different modules and components work together seamlessly after being individually tested. It ensures that the interactions between modules such as donor registration, food listing, request approval, delivery scheduling, and notification services function correctly as a combined workflow. For example, integration tests check whether a food donation listed by a donor appears correctly in the receiver's available items section, whether request approval properly triggers pickup scheduling and notifications, and whether delivery status updates synchronize with the donation history. It also validates the correct flow of data between the application and the database, APIs, and user interfaces. By identifying communication issues, mismatched data flow, or incorrect module interactions, integration testing helps ensure smooth operation of the complete system before final deployment.

### **5.2.3 System Testing**

A Food Donation Management System is performed to evaluate the complete, fully integrated application and ensure that it meets all functional and non-functional requirements. It tests the entire end-to-end workflow, including registering users, listing food items, submitting and approving donation requests, scheduling deliveries, tracking donation status, and updating records. This testing method verifies that all modules work together correctly and that the system behaves as expected under real operating conditions. It also checks the accuracy of data processing, user interface consistency, notification handling, usability, performance, and overall stability of the platform.

#### **5.2.4 User Acceptance Testing (UAT)**

A Food Donation Management System is conducted to ensure that the system meets the expectations and practical needs of real end users, such as donors, receivers, delivery volunteers, and administrators. During UAT, users interact with the system in real-life scenarios, such as registering, listing food donations, submitting requests, scheduling pickups, tracking delivery status, and viewing donation history. The goal is to confirm that the system is easy to use, produces accurate results, presents clear and intuitive interfaces, and supports smooth workflow execution without confusion or errors. UAT also checks whether notifications, role-based access, and data display function correctly under actual usage conditions. Feedback from users is collected to identify improvements or changes needed before final deployment, ensuring the system is ready for real-world operation and satisfies user requirements.

<b>Use Case Description</b>	<b>Module</b>	<b>Actor</b>	<b>Input</b>	<b>Output</b>	<b>Status (example)</b>
<b>Register as a Donor</b>	Registration/Donation	Donor (Individual, Restaurant, Event Organizer)	Contact Info (Phone, Aadhaar), Address (City, State, PIN).	Donor account created, ready to submit donation details.	Success/Fail (Validation error)
<b>Register as a Food Receiver</b>	Register/NGO	NGO/Ashram	Organization Info (Name, Reg. Number, Type), Contact Person, Service Areas, Daily Capacity, Preferred Donation Types, Verification Documents (PDF/Image).	Receiver account created, ready to receive donation notifications.	Success / Fail (Pending document verification)
<b>Submit Surplus Food Donation</b>	Donation	Donor	Details of surplus food (type, quantity, pickup location, time).	Real-time notification sent to nearby verified NGOs/Ashrams.	Success / Fail (Incomplete details)
<b>Connect NGO/Ashram to Donor</b>	Connection / Notification	Verified NGO / Ashram	Real-time notification of nearby food donation.	NGO coordinates with donor for pickup, donation status updated.	Success (Pickup Coordinated) / Fail (No response from NGO)
<b>Facilitate Pickup &amp; Distribution</b>	Logistics / Distribution	Verified NGO / Ashram	Coordinated pickup time and location.	Food successfully picked up and distributed to needy communities.	Success / Fail (Donor/NGO no-show)
<b>View Testimonials</b>	Information	Any Website Visitor	N/A (Click on "What People Say").	Display of testimonials and ratings from Donors, NGOs, and Beneficiaries.	Success
<b>Learn About Mission &amp; Initiative</b>	Information	Any Website Visitor	N/A (Click on "About" or "Initiative").	Display of the organization's mission, "What We Do," and "Why It Matters."	Success

**Table 5.1 Test Cases**

## **5.4 Test Results**

The user test results for the Food Donation Management System demonstrated that the platform successfully met the expectations of most users, including donors, receivers, and administrators. Test participants reported that the registration, login, and food donation processes were easy to understand and complete, with clear instructions and a smooth workflow. Users were able to browse available food items, send and approve requests, and track delivery status without encountering major issues. Notification features, such as request approvals and pickup scheduling alerts, were found to function accurately and on time. The interface received positive feedback for being clean, responsive, and well-organized across desktop and mobile devices. Minor suggestions were noted regarding faster page loading when displaying large donation lists and adding more filter options for food categories. Overall, the UAT results indicate that the system is user-friendly, functional, and ready for real-world deployment with only minor improvements recommended. No critical bugs, crashes, or performance bottlenecks were observed during the testing cycle.

## CHAPTER 6

### RESULT AND DISCUSSION

#### 6.1 Output Screens

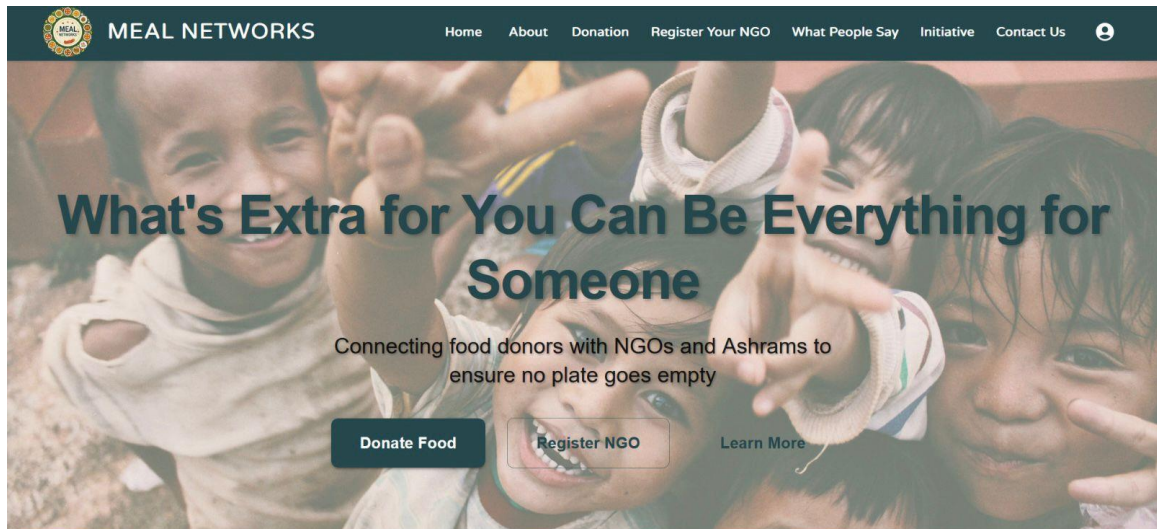


Fig 6. 1 Home Page

A welcome page of A Food Donation Management System where a user can login, register and contact to the system administrator.

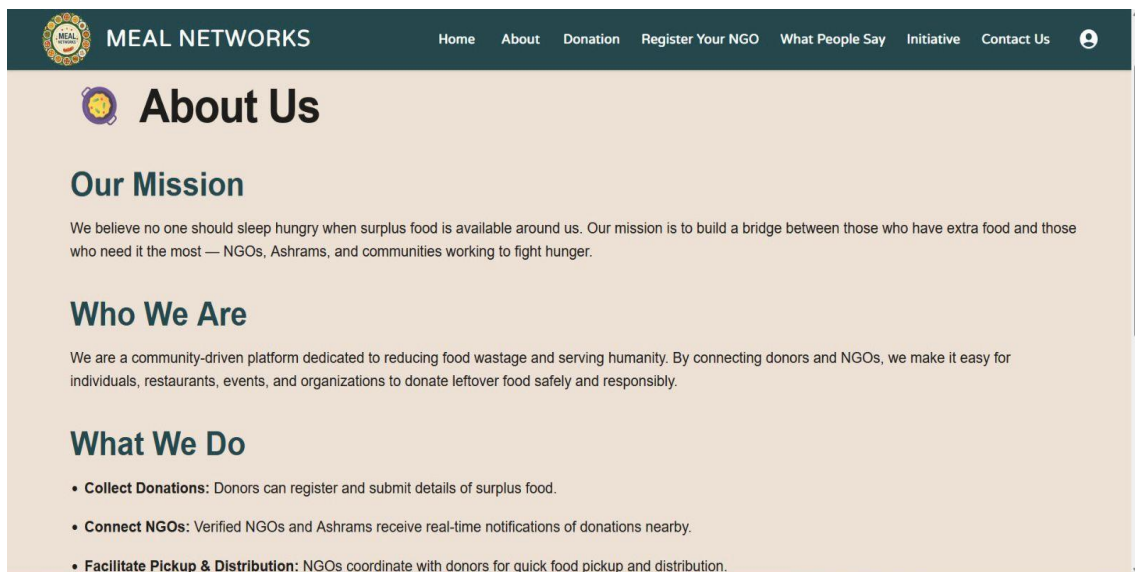
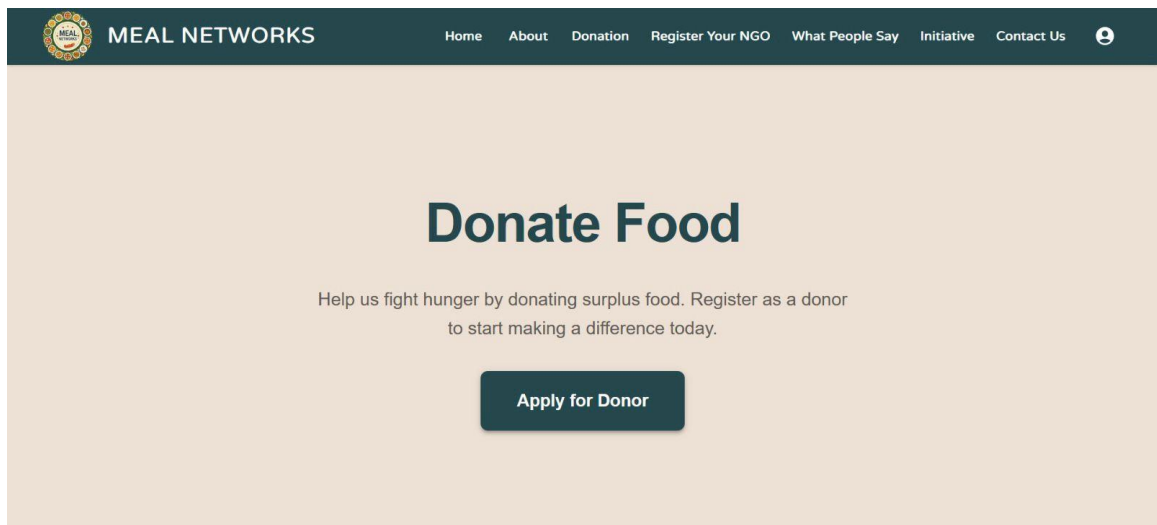


Fig 6. 2 About Us

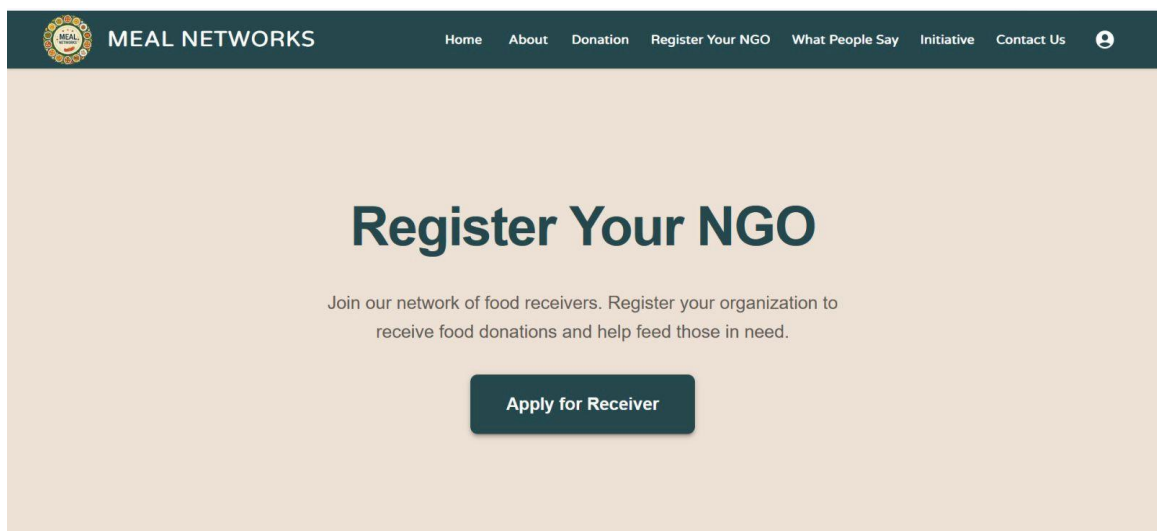


A Community Platform that connects surplus food donors with verified NGOs to reduce food waste and help feed people in need.



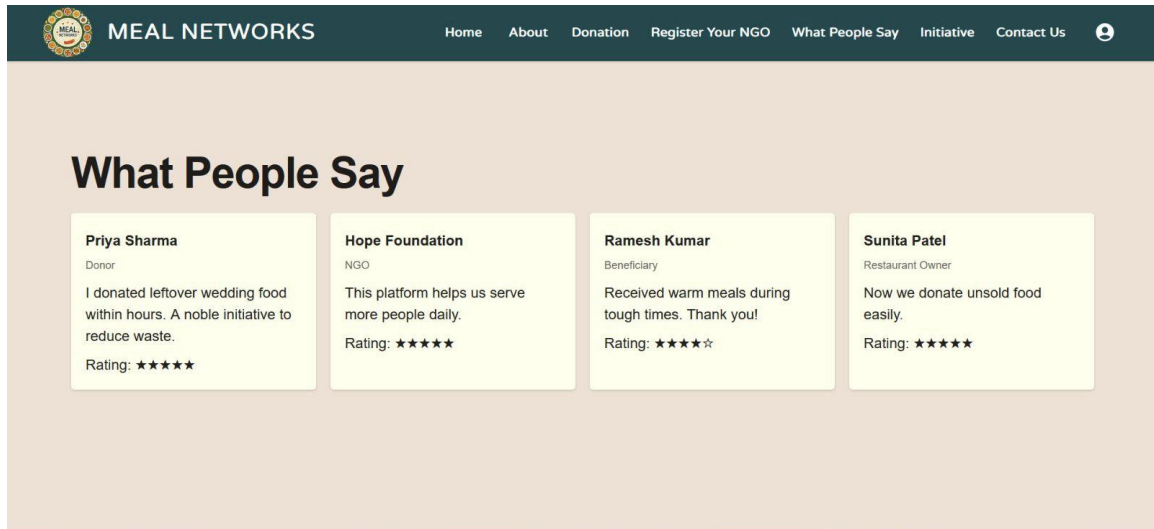
**Fig 6. 3 Apply for donor**

This image shows an Apply for Donor of a Food Donation Management System where people or organizations register and provide details about their surplus food so they can make a donation through the Meal Networks platform.



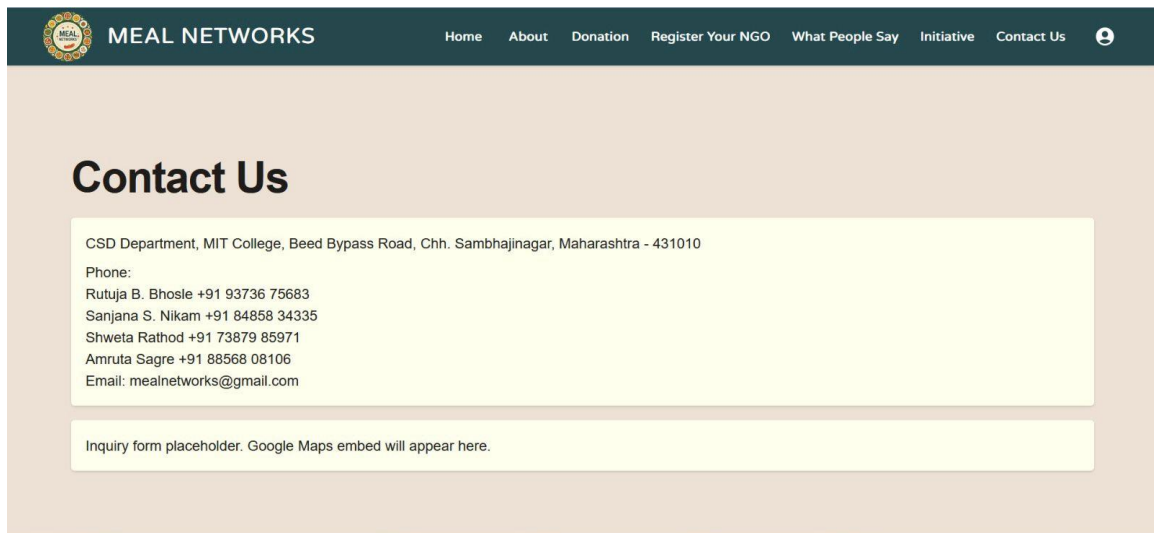
**Fig 6. 4 Apply for Receiver**

This image shows allows NGOs or ashrams to sign up on the Meal Networks platform so they can receive surplus food donations. Once registered and verified, they will get real time notifications whenever nearby donors submit available food.



**Fig 6. 5 Feedback**

This image shows a food donation management system helps donors and NGOs share their experience to improve the donation process. It also ensures transparency and helps the platform enhance service quality and trust.



**Fig 6. 6 Get in Touch**

This image provides donors and NGOs with a direct way to reach the food donation management team for support, questions, or assistance.

**Register as Food Donor**

**Contact Information**

Phone Number

Aadhaar Number Cannot be changed after approval

Confirm Aadhaar Number Re-enter Aadhaar for verification

**Address Information**

Address

City State PIN Code

**Register as Donor**

Already have an account? [Back to Login](#)

**Fig 6. 7 Register as Donar**

This image shows a person or organization signs up by providing essential details like contact information and identification. This creates a verified donor profile, enabling them to submit food donations through the system.

**Register as Food Receiver**

**Organization Information**

NGO / Ashram Name \*\*

Registration Number \*\* Trust/Society/BGG registration number

Year Established

Organization Type

**Contact Person Details**

Contact Person Name \*\*

Contact Number \*\*

Email Address \*\*

Website (Optional)

**Fig 6. 8 Register as Receiver**

This image shows NGOs to sign up by providing their organization details, including the year of establishment, to verify their authenticity.

**Register as Food Receiver**

**Account Security**

Password \*\*

Confirm Password \*\*

**Address Details**

Complete Address

City

State

PIN Code

**Service Information**

Service Areas

Daily Capacity

**Fig 6. 9 Receiver Account Security**

This image shows security details, address, and service information to verify the NGO's credibility. After approval, the organization becomes eligible to receive surplus donations.

**Register as Food Receiver**

Service Areas

Daily Capacity

Number of people you can serve daily

Preferred Donation Types

**Verification Documents**

Upload Documents

Choose File No file chosen

Registration certificate, 80G certificate, or other proof (PDF/Image)

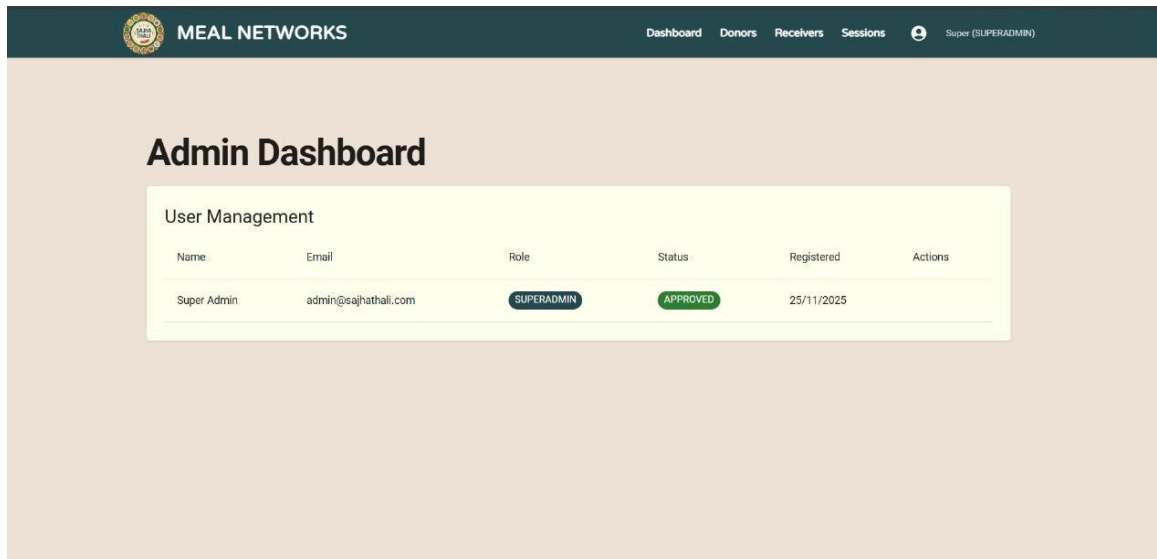
☐ I confirm that all the provided information is accurate and verifiable. \*

**Register as Receiver**

Already have an account? [Back to Login](#)

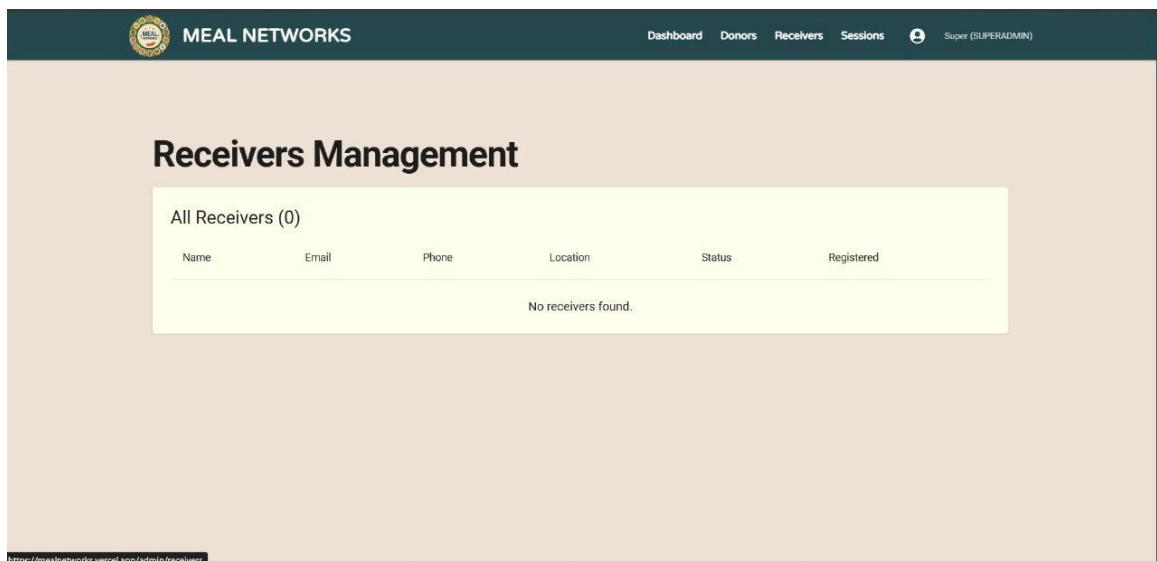
**Fig 6.10 Receiver Verification**

This image shows registering as a food receiver NGO, where users enter service details and upload verification documents to complete registration.



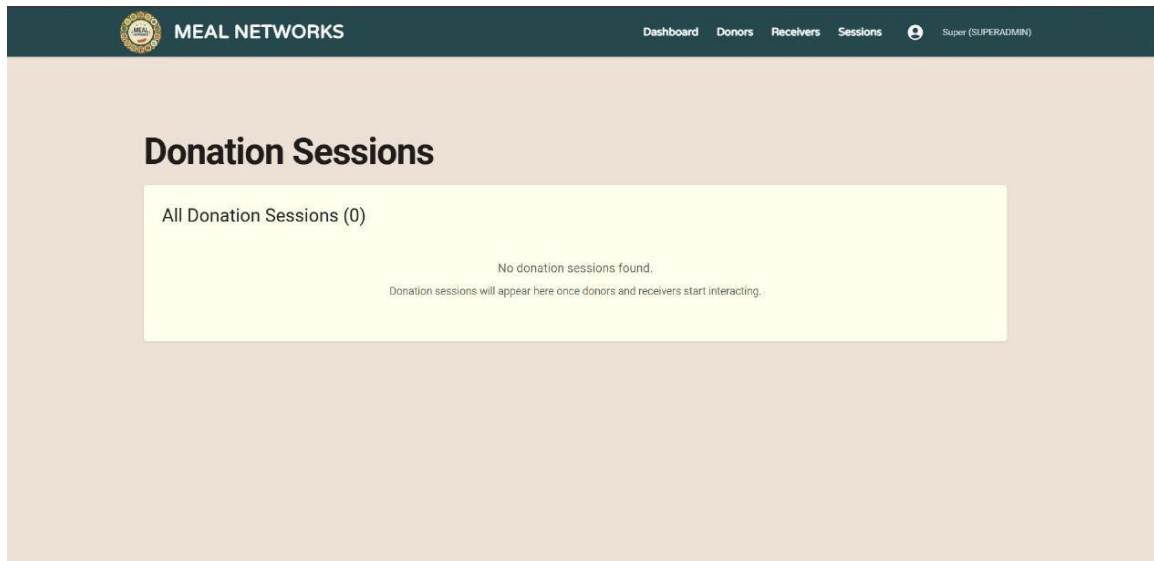
**Fig 6.11 Admin Dashboard**

An admin dashboard page displaying user management details, including name, email, role, status, registration date, and actions.



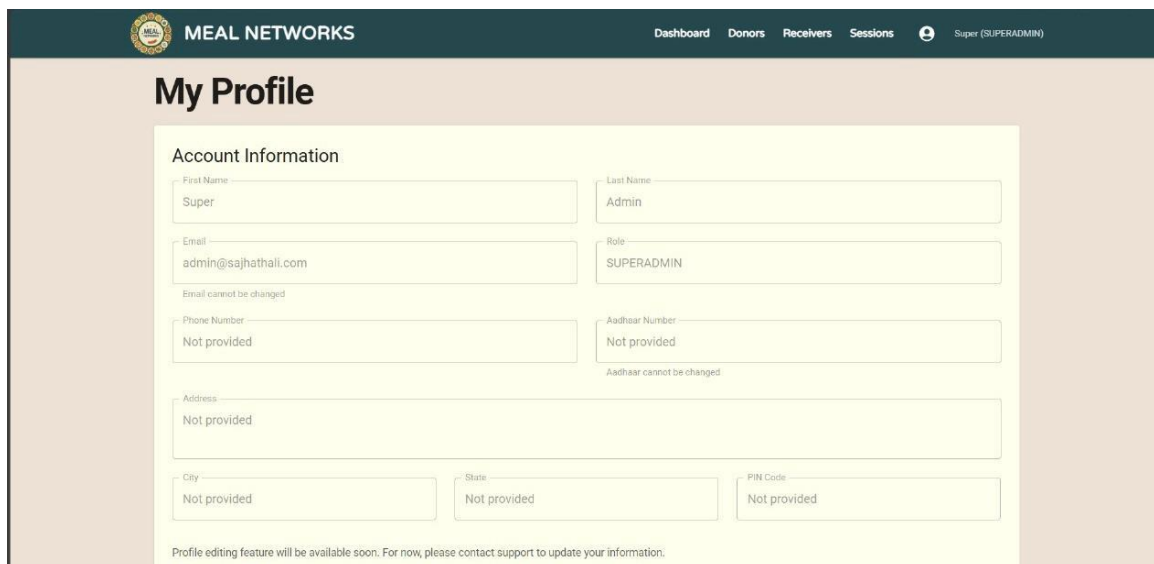
**Fig 6.12 Receiver Management**

This page displays the Receivers Management section, showing a table where receiver details would appear but currently none are registered.



**Fig 6.13 Donation Sessions**

This page shows the Donation Sessions section, indicating that no donation interactions have started yet.



**Fig 6.14 Super Admin Profile**

A user profile page showing account details like name, email, role, and contact information with editing currently disabled.

## **6.2 Performance Evaluation**

The performance of the platform involves several key dimensions. Firstly, operational efficiency can be measured by how quickly new food donations are listed, how fast they are matched to recipients, and how promptly pickup or delivery schedules are confirmed. The system's user engagement is also critical: tracking metrics such as donor registrations, volunteer sign-ups, and recipient log-ins gives insight into adoption and sustained usage. Another important metric is distribution effectiveness, which includes the percentage of donated food that is successfully delivered and the time taken from posting to delivery, ensuring minimal wastage especially for perishable items. On the technical side, system responsiveness and scalability are assessed by page load times, API response times, and the platform's ability to handle concurrent users during peak donation activity. Additionally, inventory accuracy and data integrity are key: the system must reliably track quantities, expiry dates, and allocation status, helping administrators generate accurate reports. Finally, user satisfaction is evaluated through feedback from donors, volunteers, and recipients, providing qualitative insight into usability, trust, and the perceived impact of the platform.

## **6.3 Result Analysis**

The System focuses on evaluating the effectiveness and impact of the system after implementation. It examines metrics such as the total number of donations received, the proportion of donations successfully allocated to recipients, and the reduction in food wastage, particularly for perishable items. Analysis also considers user engagement, including the number of active donors, volunteers, and registered recipients, as well as the timeliness of pickups and deliveries. Additionally, inventory accuracy and reporting effectiveness are assessed to ensure that data on available food, donation trends, and distribution efficiency is correctly captured and presented. Feedback from users provides qualitative insights into system usability, reliability, and satisfaction levels. Overall, result analysis helps identify strengths and weaknesses, measure social impact, optimize operational efficiency, and guide improvements for more effective food donation management.

## **CHAPTER 7**

### **CONCLUSION**

#### **7.1 Summary of Work**

The Food Donation Management Platform is designed to streamline the process of collecting, managing, and distributing surplus food to needy communities by connecting donors, NGOs, and volunteers on a single digital system. The platform allows donors to register food donations, while NGOs can view available donations and request items based on location, quantity, and urgency. Volunteers are assigned to collect and deliver food, ensuring timely and safe distribution. The system incorporates features such as real-time tracking, automated notifications, donation history management, and role-based access to ensure transparency and efficiency. By digitizing the donation process, the platform reduces food wastage, improves coordination between stakeholders, and supports social welfare efforts through an organized, user-friendly, and impactful solution.

#### **7.2 Limitations**

The Food Donation Management Platform improves coordination between donors, NGOs, and volunteers, it still faces several limitations. The system heavily depends on internet availability, which can restrict accessibility for users in remote or low-connectivity areas. Real-time tracking and timely pickup of donated food also rely on volunteer availability, making the process vulnerable to delays. Additionally, the quality and safety of donated food cannot be fully guaranteed by the platform and require manual verification by NGOs or volunteers. The system's effectiveness depends on active participation from all stakeholders, and low engagement can reduce overall impact. Technical challenges such as server downtime, data accuracy issues, and maintenance requirements may also affect smooth operation.

#### **7.3 Future Scope**

The Food Donation Management Platform has significant potential for future enhancements that can greatly increase its efficiency and impact. Advanced technologies such as AI and machine learning can be integrated to predict donation patterns, optimize delivery routes, and match surplus food with NGOs based on real-time demand. The



platform can expand to include automated food quality assessment using image recognition, ensuring safer distribution. Integration with government welfare schemes and local municipalities can help scale the platform to a wider population.

A mobile app with offline features could improve accessibility in regions with poor internet connectivity. Additionally, incorporating multi-language support, digital payment options for supporting transportation costs, and blockchain-based tracking for transparency can transform the system into a fully scalable and globally adaptable solution.

## REFERENCES :

1. J. Patil and C. A. “Zero Hunger: Smart Food Donation System using IoT,” *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, vol. 5, no. 1, May 2021. DOI: 10.48175/IJARSCT-1124. [Ijarsct](#)
2. K. Pazhanivel, G. NanthaKumar, K. Bala, S. Guhan, K. Jagadesh, and S. Praveen, “A Smart Food Donation System using Mobile Technology,” *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, [year], pp. [paper pages]. Available: (PDF) [Ijarsct](#)
3. V. P. G., S. R., V. Taanvi and R. B. Jiddagi, “FEEDIE: FOOD DONATION APPLICATION,” *International Journal of Creative Research Thoughts (IJCRT)*, vol. 12, Issue 5, May 2024. Available: <https://www.ijcrt.org/papers/IJCRT24A5301.pdf> [IJCRT](#)
4. Kruthika V., Lavanya H.R., Mahalakshmi E.H., Ranju P.S.R., H.L. Priyanka, and K.S. Sindhu, “Integrated Approach for Food Donation System, Restaurant Food Demanding Forecasting Using Machine Learning, and Global Food Waste Analysis,” *International Research Journal of Modernization in Engineering Technology and Science (IRJMETS)*, vol. 5, Issue 7, July 2023. DOI: 10.56726/IRJMETS42802. [IRJMETS](#)
5. “Waste Food Management System and Donation Application,” Prof. Swati S. Bharad, Nikita D. Gaikwad, Sonal S. Patki, Kiran P. Throat, *International Journal of Scientific Research in Science & Technology (IJSRST)*, vol. 10, Issue 10, May-June 2023, pp. 273-278. Available: <https://ijsrst.com/IJSRST231010138> [IJSRST](#)
6. P. Montoli et al., “Food donation as a strategy to reduce food waste in an urban context,” *Sustainability*.(2023)Available:  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10124677/> [PMC](#)
7. N. Sundin, “Surplus food donation: Effectiveness, carbon footprint, and rebound effect of a food donation system run by a charity in Sweden,” *Resources, Conservation & Recycling*, vol. 180, 2022.