MEALMITRA: Food Donation Platform

A Project Based Learning Report Submitted in partial fulfilment of the requirements for the award of the degree

of

Bachelor of Technology

in The Department of CSE

Full Stack Application Development: 23SDCS12E

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Abstract

MEALMITRA: The Food Donation Platform is an online solution crafted to combat food waste and alleviate hunger by linking those with excess food to those in need. It acts as a vital connection between restaurants, companies, and individuals with surplus provisions and those experiencing food scarcity. Utilizing advanced technology, this platform enhances the efficiency, clarity, and reach of food distribution efforts.

Individuals can sign up as either Donors or Requesters depending on their purpose. Donors are able to post details about extra food, including amount, category, and shelf life. Requesters can browse for food offerings nearby and submit requests. The system provides live updates on food availability, allowing users to track donations as they are added or taken, which speeds up distribution and greatly cuts down on waste.

Built with MongoDB, the platform ensures robust protection of user data. It features tailored dashboards for donors and requesters through role-based access, simplifying the process of giving and receiving. A convenient popup login enhances user authentication, while a retractable sidebar improves navigation, delivering a seamless experience.

The platform also offers location-specific search options, making it simple for requesters to locate nearby donations. Automatic email alerts notify users of fresh listings, boosting accessibility.

Our goal is to foster a society without hunger by harnessing technology to build a streamlined, open, and expandable food-sharing network. By reducing waste and enabling access to surplus food, this initiative drives significant societal benefits.

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INTRODUCTION

Hunger continues to be a major global challenge, even with advances in technology and greater food production. The Global Hunger Index (GHI) reports that approximately 828 million people worldwide face hunger, including 45 million at risk of starvation. India struggles significantly, ranking 111th out of 125 nations in the 2023 GHI, with over 194 million of its people—about 15% of its population—lacking proper nourishment. Meanwhile, enormous amounts of food are discarded every day.

According to the United Nations Environment Programme (UNEP), India wastes around 68 million tons of food yearly. This loss spans farming, shipping, and daily use, with edible leftovers thrown out by events, hotels, eateries, and homes. Paradoxically, as waste increases, countless individuals remain uncertain of their next bite.

In cities, hunger stands out in slums, shelters, and disadvantaged areas, where families and individuals find it hard to get enough to eat. Though NGOs and aid groups strive to help, the divide between abundance and need lingers due to flawed distribution and low awareness.

This sharp divide emphasizes the critical need for tech-savvy food donation systems to simplify sharing. By effectively uniting donors with those in need, these platforms can reduce waste and offer hope to the hungry.

The Community Food Donation Platform rises to this task, cultivating kindness and duty. It motivates people, companies, and groups to give away extra food, ensuring nothing usable is lost. With teamwork and intelligent tools, we can advance toward a hunger-free world, redirecting surplus food to those who need it.

OBJECTIVES:

1. Reduce Food Waste: The primary objective of the platform is to minimize food wastage by redistributing surplus edible food from individuals, restaurants, and events to people in need.
2. Help People Facing Hunger:
   The platform aims to provide food to poor and hungry people, making it easier for them to get meals.
3. Involve More People in Food Donation:
   It encourages individuals, restaurants, and businesses to donate extra food, promoting kindness and care in society.
4. Ensure Fair and Quick Food Distribution:
   The platform uses location-based search and real-time tracking to make sure donated food quickly reaches the right people.
5. Build a Strong Food Sharing Network:
   The platform's goal is to create a system where people regularly share extra food, helping reduce hunger in the long run.

LITERATURE REVIEW

[1] Save Food, Share Food (IFSA - SAVE FOOD, SHARE FOOD, SHARE JOY)

Overview:

This initiative focuses on minimizing food wastage by redistributing excess food to individuals in need. It collaborates with restaurants, food businesses, and individuals to ensure that edible surplus food is not discarded but instead reaches hungry people.

Strengths:

- **Food Waste Reduction:** Prevents large amounts of edible food from being wasted.
- **Community Participation:** Encourages donations from individuals and organizations.
- **Awareness Programs:** Educates the public on responsible food consumption and distribution.

Challenges:

- **Logistics Management:** Collecting, storing, and delivering food efficiently requires a strong operational framework.
- **Food Safety Compliance:** Ensuring the quality of donated food is crucial to prevent health risks.

Impact:

By redistributing excess food, the platform helps reduce waste and provides meals to those struggling with food insecurity.

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[2] Akshaya Patra (Akshaya Patra-NGO in India Supporting Food & Education of Children)

Overview:

Akshaya Patra is a well-known nonprofit organization in India that provides meals to schoolchildren. Through the Mid-Day Meal Scheme, it ensures that children receive nutritious food, promoting both health and education.

Strengths:

- **Massive Reach:** Serves millions of students across multiple states.
- **Government Collaboration:** Works in partnership with authorities to maximize its impact.
- **Hygienic Food Preparation:** Uses advanced kitchen facilities to maintain food safety standards.

Challenges:

- **Funding Reliance:** Heavily depends on donations and government funding to sustain operations.
- **Limited Food Collection from Donors:** Unlike surplus food distribution models, it primarily prepares meals rather than collecting excess food.

Impact:

By providing free meals, the initiative ensures better nutrition for children and encourages school attendance, thereby fostering education.

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[3] The Hunger Site (The Hunger Site | Help Fight Worldwide Hunger)

Overview:

The Hunger Site is an online platform that allows users to contribute to hunger relief through a simple click. Revenue from

advertisements and sponsors helps fund food distribution programs. Additionally, the site sells merchandise, with part of the proceeds supporting hunger relief efforts.

Strengths:

- **Easy Participation:** Allows people to contribute without spending money—just by clicking a button.
- **Global Reach:** Supports food aid programs in different countries.
- **Multiple Donation Methods:** Users can contribute by clicking, purchasing products, or making direct donations.

Challenges:

- **Ad Revenue Dependency:** Donations rely on advertising income, which can fluctuate.
- **No Direct Food Collection:** Unlike other platforms, it does not collect and distribute food physically.

Impact:

This platform makes charitable giving accessible to a broader audience by allowing people to support hunger relief through simple online actions.

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[4] Thaagam Foundation

Overview:

Thaagam Foundation is a nonprofit organization dedicated to feeding underprivileged communities. It provides both cooked meals and dry ration kits to support those facing extreme poverty, including homeless individuals and orphaned children.

Strengths:

- **Focused Assistance:** Prioritizes the most vulnerable groups in society.
- **Multiple Aid Methods:** Supplies both ready-to-eat meals and essential grocery kits.
- **Community-Based Approach:** Works closely with local communities to identify those in need.

Challenges:

- **Limited Geographic Reach:** Operates in specific regions, which may limit its impact.
- **Resource Dependency:** Requires continuous financial support and volunteer efforts to sustain its programs.

Impact:

Thaagam Foundation plays a crucial role in addressing food insecurity at a grassroots level, ensuring that vulnerable individuals receive timely support.

Each of these platforms contributes uniquely to addressing hunger and food insecurity:

- **Save Food, Share Food** focuses on reducing food waste through redistribution.
- **Akshaya Patra** provides school meals to promote education and nutrition.
- **The Hunger Site** enables easy online contributions to hunger relief.
- **Thaagam Foundation** directly delivers meals and essential food supplies to those in need.

Together, they highlight the importance of various approaches—waste reduction, school meal programs, digital donation platforms, and community-driven initiatives—in the fight against hunger.

EXISTING SYSTEM:

The current system to fight hunger and reduce food waste includes several approaches:

1. Food Redistribution Platforms:
    - Initiatives like Save Food, Share Food focus on collecting surplus food from restaurants, food businesses, and individuals. This food is then redistributed to people in need, preventing wastage and reducing hunger.
    - However, managing the logistics of food collection, storage, and delivery requires a strong operational network.
2. School Meal Programs:
    - Organizations such as Akshaya Patra prepare and distribute meals to schoolchildren. This not only ensures they receive nutritious food but also promotes education by encouraging regular attendance.
    - These programs heavily rely on government funding and donations, making them financially vulnerable.
3. Online Donation Platforms:
    - Websites like The Hunger Site allow users to contribute by simply clicking a button or purchasing products. The revenue generated from advertisements and sales supports hunger relief programs worldwide.
    - However, this platform does not directly collect or distribute food. It depends on ad revenue, which can be unstable.
4. Direct Meal Distribution:
    - The Thaagam Foundation provides both cooked meals and grocery kits to impoverished communities, including homeless individuals and orphaned children.
    - Despite its impact, the foundation has a limited geographical reach and relies on continuous financial support and volunteers.

DISADVANTAGES IN EXISTING SYSTEM:

1. **Lack of Real-Time Food Availability Tracking:**
    - Most existing platforms do not provide **real-time tracking** of available surplus food. This causes delays and inefficiencies in food distribution.

2. **Limited User Engagement and Interaction:**
    - Current platforms often have **one-way communication**, where donors contribute but cannot directly interact with requesters.

3. **No Location-Based Search for Food Availability:**
    - Existing systems do not offer **location-based search filters**, making it difficult for people in need to find nearby food donations.

4. **No Automated Notifications for Food Availability:**
    - Current platforms lack **automated alerts** to notify users when new food donations are available.

5. **Limited Verification of Donors and Requesters:**

- Some existing systems lack **proper verification processes**, making it difficult to ensure the authenticity of donors and requesters.

6. **Manual and Inefficient Food Matching:**
   - Food donation platforms often use **manual processes** to match donors with requesters, which can be slow and inefficient.

7. **No Food Quality Assurance:**
   - Many platforms struggle with **food safety compliance**, risking the distribution of low-quality or unsafe food.

PROPOSED IDEA:

Food waste and hunger persist as intertwined challenges, even with progress in production and delivery methods. Vast amounts of food go unused daily, while countless individuals grapple with food scarcity, unable to secure basic sustenance. The Community Food Donation Platform steps in to address this divide, offering a technology-powered system that links those with extra food to those who lack it.

At its heart, the platform provides a smooth, centralized, and easy-to-use online tool for food sharing. Donors—ranging from everyday people to restaurants, caterers, and event planners—can post details of consumable surplus food. On the other side, requesters like struggling individuals, shelters, and aid groups can browse and claim what's available. This process ensures that perfectly good food, which might otherwise end up in the trash, finds its way to those in need.

To boost efficiency, the platform uses real-time tracking to keep tabs on food availability and its journey from donor to recipient. It also employs MongoDB for secure data handling, protecting user details and donation logs. Transparency is prioritized, as users can check donation statuses, fostering trust and reliability.

A standout element is its focus on community, inspiring everyday users to donate and nurturing a sense of duty. With location-based search tools, it ensures food stays local, cutting down on transport hurdles.

The platform's ultimate goal is to slash food waste while easing hunger. By blending technology with collective effort, it seeks to build a lasting, caring food-sharing movement, strengthening communities and driving real change against food insecurity.

KEY FEATURES:

1. **100% Free Platform with Direct User-to-User Connection:**

Unlike many existing platforms that rely on funding or third-party intermediaries, our platform will allow **users to connect directly** for food donations.

- Donors (restaurants, individuals, event organizers, etc.) can list surplus food available for pickup.
- Recipients (NGOs, homeless shelters, individuals in need) can browse available donations and request food directly.
- Zero platform fees – we won't charge users for connecting, making donations more accessible.

Benefit: Eliminates funding dependency and reduces delays in food distribution.

2. A User-Friendly Mobile & Web Platform:

To make food donations seamless, we will develop a simple yet advanced **mobile and web platform** with:

- Real-time donation listings for easy searching.
- Location-based matching to connect donors and recipients nearby.
- Instant notifications for quick food pickup coordination.

Benefit: Encourages more people to donate and request food with minimal effort.

3. Smart Waste Food Management for Revenue Generation

One of the biggest challenges in food donation is managing **inedible food waste**. Instead of letting it go to waste, we propose a sustainable food waste monetization system:

- Collection of unusable food waste from users, restaurants, and large food events.
- Selling waste food to government and private companies for processing.
- Utilization in Urea and Organic Fertilizer (Khadar Soil) Production, helping agriculture while reducing waste.

Benefit: Creates a self-sustaining financial model while promoting eco-friendly waste management.

4. Government and Private Partnerships for Large-Scale Impact:

- Partnering with government welfare programs to provide additional support for food donations.
- Collaborating with private companies interested in purchasing food waste for fertilizer or biofuel production.
- Securing logistics partnerships with local delivery services to ensure food reaches people efficiently.

Benefit: Expands the platform's reach and ensures long-term sustainability.

5. Ensuring Food Safety and Hygiene:

- Educating donors on safe food handling practices before donation.
- Verification badges for trusted donors to build user confidence.

Benefit: Reduces the risk of foodborne illness and ensures food is safe for consumption.

6. AI Chat-Bot Support:

- The AI chatbot enhances user experience by guiding donors and requesters through safe, efficient food sharing practices.
- It builds trust, ensures hygiene, and simplifies the donation process for everyone on the platform.

Benefit: Platform users can clarify their doubts quickly.

Our **Food Donation Platform** will not only **solve** hunger issues but also reduce food waste, generate revenue, and create an eco-friendly impact by supporting urea and Khadar soil production. Unlike traditional donation platforms, we will

provide a free, direct, and smart system where users can connect instantly and food waste can be managed effectively. This innovative model will support communities, businesses, and environmental sustainability at the same time.

SYSTEM ARCHITECTURE:

The Community Food Donation Platform is a web-based application created using Node.js for the backend and MongoDB for storing data. The frontend is built with HTML, CSS, and JavaScript to provide a user-friendly interface.

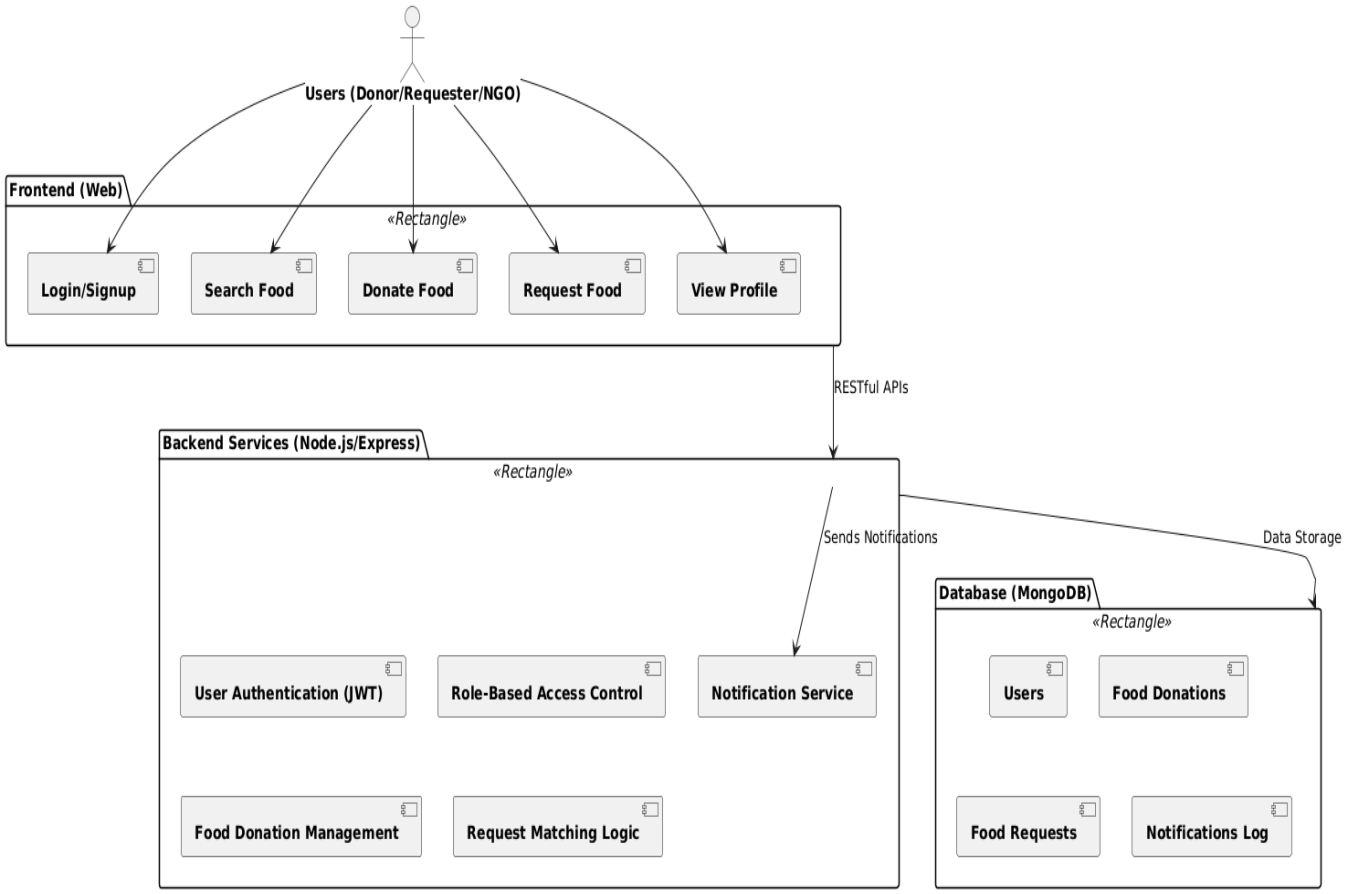


Fig 1: System Architecture

I. Technology Stack:

- **Frontend:** HTML, CSS, JavaScript (for building the user interface)
- **Backend:** Node.js (for handling server-side operations and APIs)
- **Database:** MongoDB (for storing user details, donations, and requests)

II. Tools and Technologies Used:

1. **MongoDB Atlas/Compass** – For managing the database.
2. **Node.js** – For building the server-side logic and APIs.
3. **VS Code** – Used as the development environment.
4. **Postman** – For testing APIs.

III. Features Based on User Roles:

- **Donor:**
  - Sign up and log in.
  - Post food donations.
  - Edit or remove existing donation posts.
  - View donation history.
- **Requester:**
  - Sign up and log in.
  - Search for food by location.
  - Request food donations.
  - Check the status of requests.
- **NGO:**
  - Sign up and log in.
  - Verify donors and requesters.
  - Manage and oversee food donations.
  - Help in coordinating delivery or pickup.

IV. Data Flow

1. Users interact with the **Frontend (Web App)**.
2. The frontend communicates with the **Backend (Node.js/Express)** via **RESTful APIs**.
3. The backend processes requests, manages authentication, and applies business logic.
4. The backend interacts with the **MongoDB Database** for storing/retrieving data.
5. The **Notification Service** sends updates to users about food donations and requests.

This architecture ensures modularity, scalability, and efficient data management for the **MealMitra Food Donation Platform**.

Donor Module:

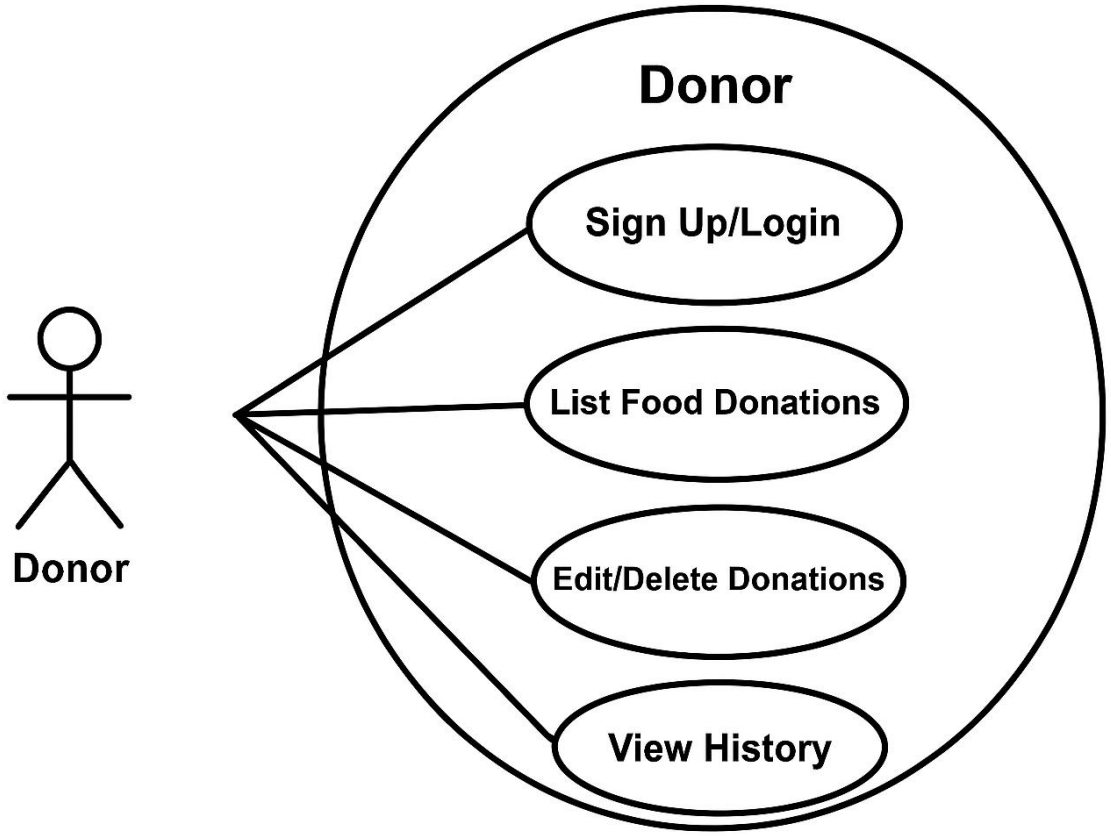


Fig 2: Donor use-case diagram

It consists of:

Sign Up/Login: Donor registers or logs in to access the platform.

List Food Donations**:** Adds details about food available for donation.

Edit/Delete Donations: Modifies or removes existing donation listings.

View History: Reviews past donation activities.

Requester Module:

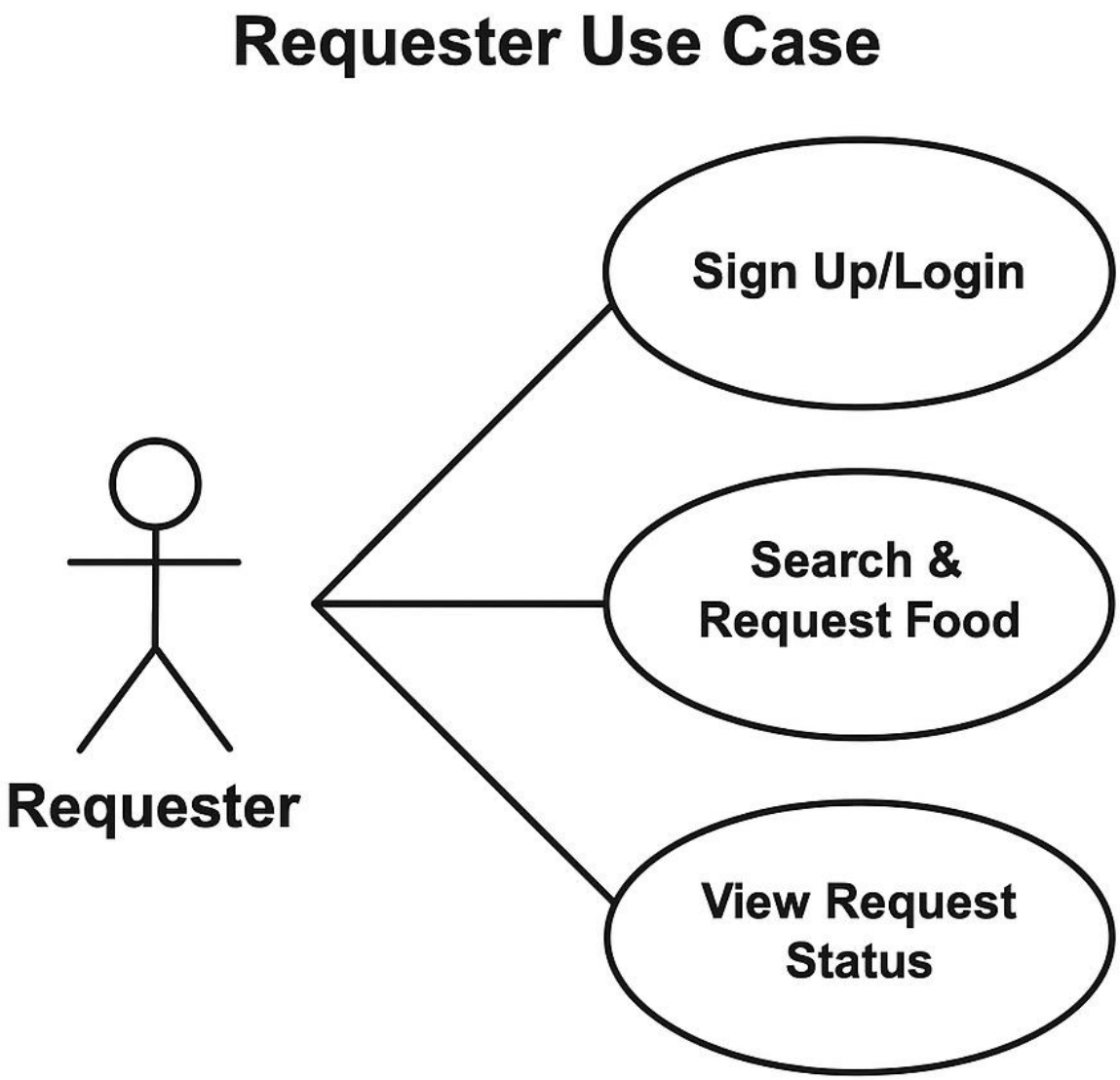


Fig 3: Requestor use-case diagram

It consists of:

Sign Up/Login: The requester creates an account or logs in to access the platform.

Search & Request Food: The requester finds available food and submits a request.

View Request Status: The requester checks the progress of their food requests.

NGO's Module:

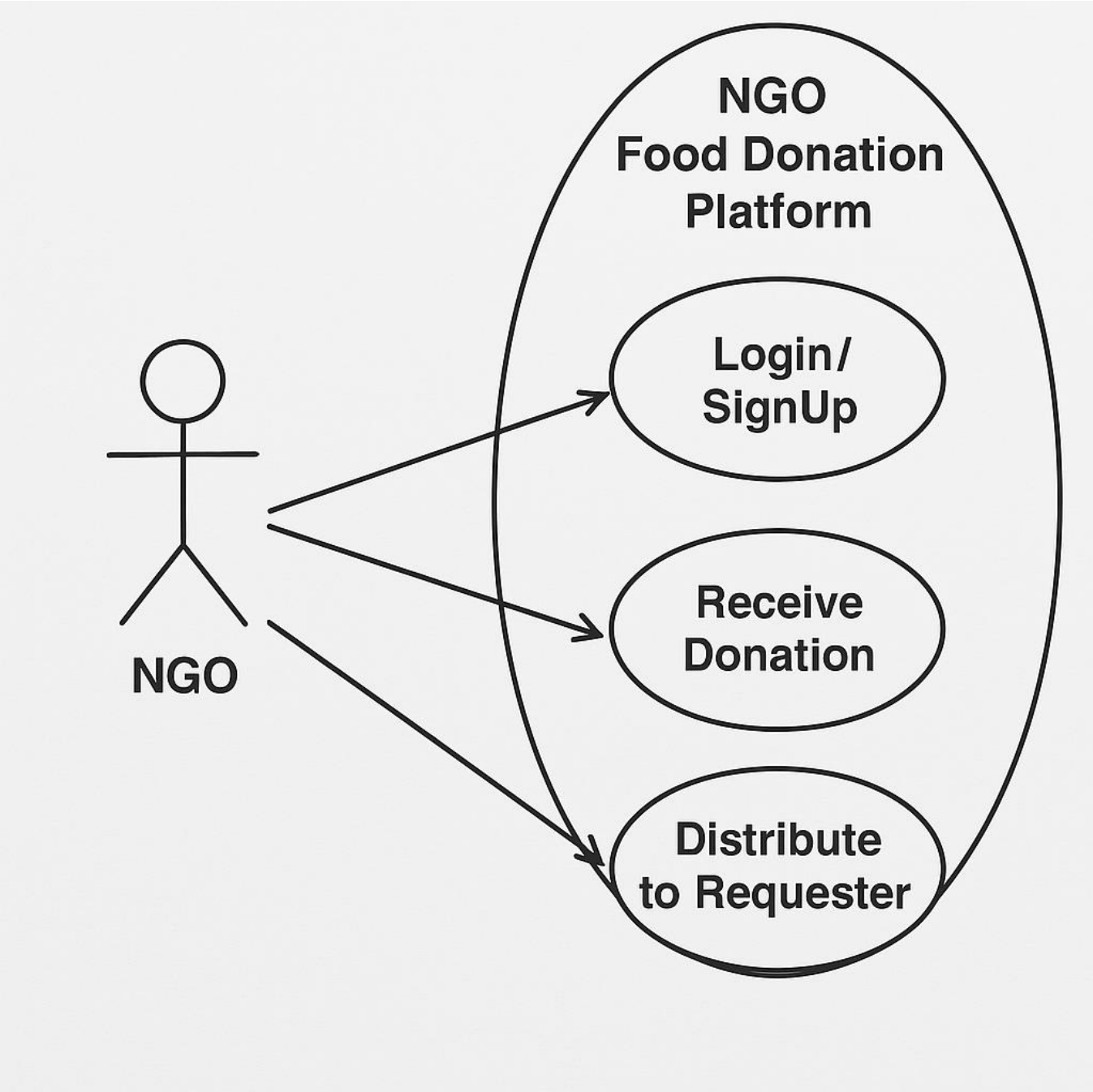


Fig 4: NGO use-case diagram

It consists of:

Login/SignUp: NGOs can create a new account or log in to access the platform.

Receive Donation: The NGO accepts food donations from donors through the platform.

Distribute to Requester: The NGO allocates the received food to the appropriate requester.

RESULTS AND DISCUSSIONS:

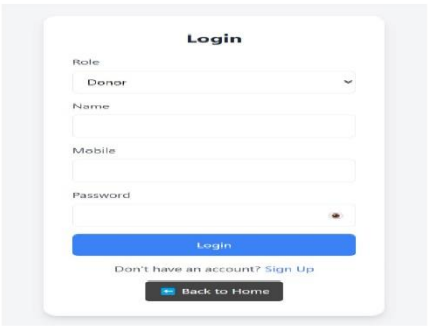
The MealMitra Food Donation Platform successfully streamlines the process of food donation by connecting donors with recipients in an efficient and transparent manner. The platform's **role-based authentication system** ensures that both donors and requesters can register and access relevant features. The integration of **MongoDB** for data storage allows seamless user management and tracking of food donations.

The **modern UI** with a collapsible sidebar and an intuitive login system enhances user experience, making navigation and interaction smooth. The **search functionality** enables requesters to find available food donations quickly, improving accessibility. Additionally, the **Contact Us feature**, integrated with MongoDB, ensures that user queries and concerns are stored and addressed effectively.

During testing, the platform demonstrated **fast response times**, **efficient data handling**, and **secure login management**. Users could sign up, donate food, and request meals without facing major technical issues. However, minor **UI improvements** and **real-time notification integration** could enhance the platform's functionality.

In discussions, potential future upgrades include **AI-based food demand prediction**, **partnerships with NGOs**, and **mobile app development** to expand accessibility. Additionally, implementing **automated alerts** for donors and requesters can further streamline communication.

Home Page

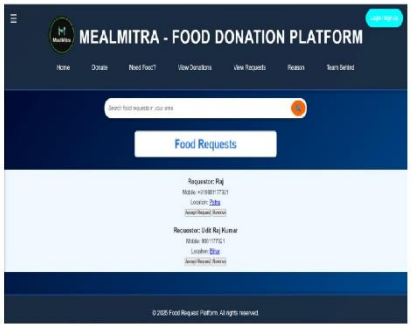


Login/SignUp Page

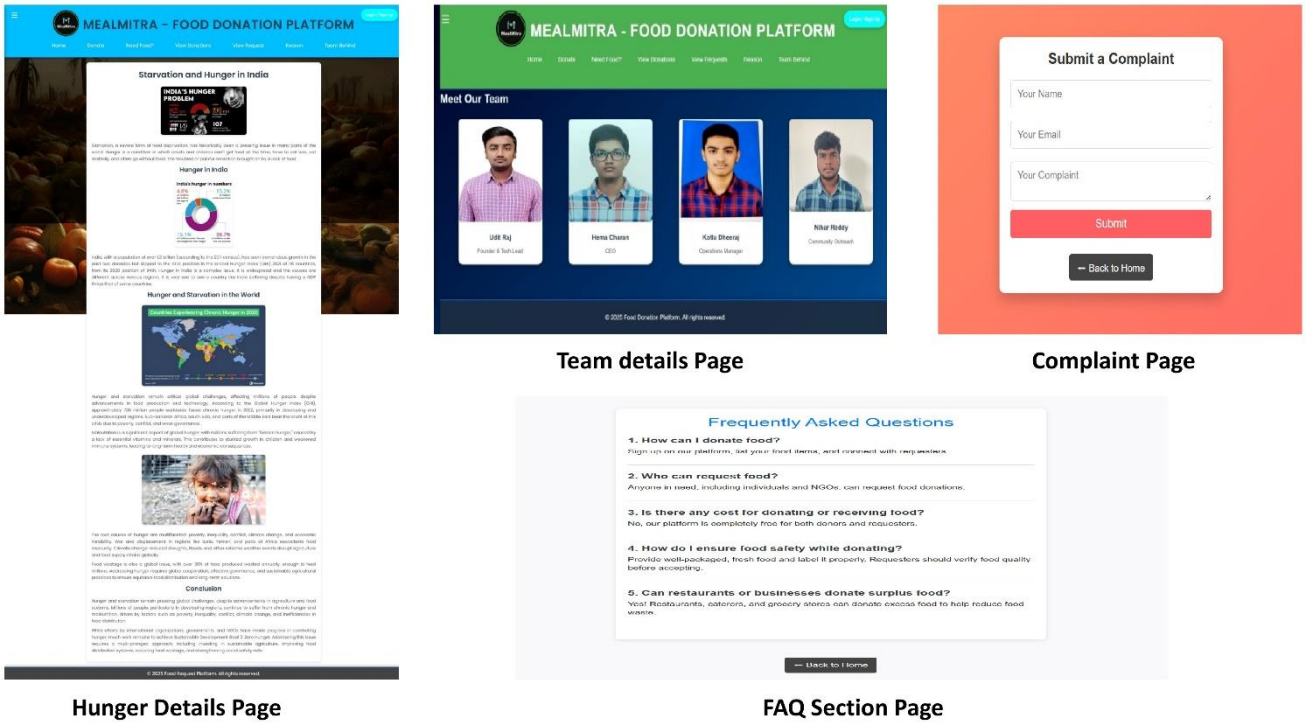
Donation form Page

Food Request form page

Donation List Page



Food Request List Page



Hunger Details Page **Team details Page** **Complaint Page**

FAQ Section Page

Fig 5: Results Snapshots

Overall, the project has successfully met its objectives by providing a **reliable and scalable food donation system**. With further improvements, it can grow into a **nationwide platform**, helping reduce food wastage and ensuring that surplus food reaches those in need more effectively.

CONCLUSION:

The **MealMitra Food Donation Platform** is a significant step toward bridging the gap between food donors and those in need. By leveraging modern web technologies like **Node.js** and **MongoDB**, this platform ensures a seamless, efficient, and user-friendly experience for both donors and recipients. The integration of features such as role-based authentication, real-time food availability search, and a structured database for storing user interactions enhances accessibility and reliability.

One of the core advantages of this platform is its ability to **minimize food wastage** while providing a transparent and effective way for donors to contribute to their communities. The inclusion of a **modern UI**, collapsible sidebars, and an intuitive login system with session management enhances usability. Additionally, the **"Contact Us"** feature, backed by MongoDB, enables effective communication, ensuring that concerns and queries are promptly addressed.

Future enhancements could involve integrating **real-time notifications**, an **AI-based food demand prediction system**, and **collaboration with NGOs** to scale operations further. By continuously refining and expanding its capabilities, the platform has the potential to evolve into a **nationwide initiative**, addressing food insecurity at a much larger scale.

In conclusion, the **Community Food Donation Platform** is more than just a technological innovation—it is a social impact-driven solution that fosters a culture of generosity and responsible food distribution. With further development, this platform can significantly contribute to reducing hunger and ensuring that surplus food reaches those who need it the most.

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