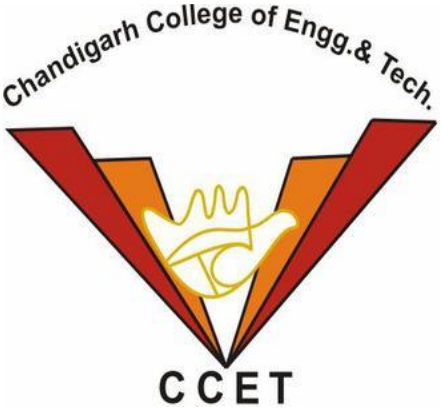
MAJOR PROJECT SRS



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PREFACE

Food wastage is a critical issue affecting communities worldwide, while millions of people struggle with hunger daily. *Annasamrakshna* was conceived as a technological solution to bridge the gap between surplus food and those in need. This initiative aims to create a **seamless, efficient, and transparent** platform where donors, receivers, and volunteers can work together to **reduce food waste and promote food security**.

This document serves as a comprehensive **Software Requirements Specification (SRS)** for *Annasamrakshna*, outlining its objectives, scope, functionalities, and future growth potential. The application integrates **modern technology, user-friendly interfaces, and secure data management** to facilitate food donations and ensure optimal distribution.

By leveraging **real-time notifications, volunteer coordination, and analytics**, *Annasamrakshna* fosters a **collaborative ecosystem** where food waste is minimized, and communities benefit from structured food distribution.

This document is intended for **developers, stakeholders, and organizations** interested in contributing to or utilizing *Annasamrakshna*. It provides insights into the system's architecture, functionalities, and long-term vision to make food donation **accessible, scalable, and impactful**.

With the collective effort of donors, volunteers, and communities, *Annasamrakshna* strives to build a **hunger-free world** where food is a shared resource, not a wasted one.

1. INTRODUCTION

The Food Waste Management System is a web-based application designed to reduce food wastage by bridging the gap between food donors and those in need. It allows individuals, restaurants, or organizations with surplus food to donate it conveniently. Donors can provide details such as the type of food, quantity, location, and expiration date through a user-friendly interface. Simultaneously, NGOs or charitable organizations can register on the platform to access donation details and coordinate food collection. The system promotes efficient distribution by providing visibility into available food resources, helping to combat hunger while reducing environmental harm caused by food waste.

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to outline the functionalities, features, and constraints of the *Annasamrakshna* food donation app. This app is designed to minimize food waste by efficiently connecting donors, receivers, and volunteers. By facilitating food donations from individuals, restaurants, and organizations to NGOs and people in need, the application aims to address both food wastage and hunger issues.

1.2 Scope

The *Annasamrakshna* app serves as a platform for managing food donations, ensuring seamless interaction between donors, receivers, and volunteers. The key features of the app include:

- User registration and authentication
- Posting and requesting food donations
- Real-time notifications and alerts
- Scheduling and tracking of food pickups
- Reporting and analytics to track food saved and waste reduced
- Secure data management and encryption
- A user-friendly UI with accessible design for all users

1.3 Definitions, Acronyms and The Abbreviations

- **SRS**: Software Requirements Specification
- **NGO**: Non-Governmental Organization
- **UI/UX**: User Interface/User Experience
- **OAuth**: Open Authorization (for secure authentication)
- **GDPR**: General Data Protection Regulation

1.4 Objective

The objective of the *Annasamrakshna* app is to create an efficient and user-friendly platform that facilitates food donations, minimizes food waste, and ensures that surplus food reaches those in need. By connecting donors, receivers, and volunteers, the app aims to bridge the gap between excess food and hunger relief efforts, enhancing food security and promoting social responsibility.

1.5 Target Audience

The intended users of the *Annasamrakshna* app include:

- **Donors**: Individuals, restaurants, and businesses willing to donate surplus food.
- **Receivers**: NGOs, shelters, and individuals in need of food donations.
- **Volunteers**: Individuals who assist in transporting food donations.
- **Admins**: Authorities responsible for managing the platform, monitoring donations, and generating reports

2. DESCRIPTION

2.1 Product Perspective

The *Annasamrakshna* app is a standalone system that facilitates food donations by bridging the gap between donors, receivers, and volunteers. It serves as a digital marketplace for surplus food distribution, ensuring that excess food is effectively allocated to those in need. The app operates independently but can integrate with:

- **Google Maps API** for location tracking and mapping pickup points.
- **Firebase or SQL-based database** for secure and efficient data storage.
- **Notification services** for real-time alerts and communication.
- **Payment gateways** for optional donations to support logistics.

The app follows a **mobile-first approach**, prioritizing accessibility through smartphones, while also offering a web-based dashboard for administrative and reporting functions.

2.2 User Needs

The app is designed to address the following challenges:

- **Food waste**: Large quantities of edible food go to waste due to lack of efficient donation mechanisms.
- **Hunger and food insecurity**: Many individuals and families lack consistent access to nutritious food.
- **Inefficient food distribution**: The absence of proper coordination between donors and receivers leads to logistical challenges.
- **Lack of volunteer engagement**: Existing donation efforts often struggle to mobilize volunteers effectively for pickups and deliveries.

2.3 Assumptions and Dependencies

The successful operation of the *Annasamrakshna* app is based on the following assumptions and dependencies:

- Users should have an **active internet connection** to access the app's features.
- **Location services** should be enabled for accurate tracking of donations and pickups.
- The app will rely on **third-party APIs** (e.g., Google Maps, Firebase) for functionalities like geolocation, authentication, and notifications.
- Donors will provide **accurate and truthful information** about food quality and expiration dates to ensure safety.
- Volunteers will be **available and willing** to transport food from donors to receivers in a timely manner.
- The app's **database and servers** should be maintained for high availability and security.

2.4 Constraints

- **Internet Dependency**: The app requires an active internet connection for real-time updates and data synchronization.
- **Device Compatibility**: The app will be developed primarily for mobile devices, with a web-based dashboard for administrators.
- **Data Storage Limitations**: Limited storage capacity may apply, depending on the hosting provider and budget constraints.
- **User Verification**: Manual or automated verification may be required to prevent fraudulent activity and ensure data accuracy.

2.5 Features

1 User Registration and Authentication

- Users can sign up as **donors, receivers, volunteers, or admins**.
- Secure authentication using **email/password, OTP verification.**
- Role-based access to functionalities based on user type.

2 Food Donation Management

- Donors can post food donations by specifying:
- Food type (e.g., cooked, packaged, fresh produce)
- Quantity and estimated servings
- Expiry date or best-before date
- Pickup/drop-off location
- Any additional notes (e.g., dietary information)
- Ability to edit or cancel a donation before pickup.
- Donors can track past and ongoing donations.

3 Food Request Mangement

- NGOs, shelters, and individuals in need can request food donations.
- Filtering options to search for donations based on:
- Food type, location, and availability
- Requests can be approved or declined by donors based on feasibility.

4 Real-Time Notification and Alerts

A) Instant alerts for:

- New donation postings
- Food requests and approvals
- Volunteer task assignments
- Pickup and delivery status updates

B) Push notifications, SMS, or email alerts based on user preferences.

5 Data Security and Privacy

- End-to-end encryption for secure data storage and transactions.
- Compliance with **GDPR, data privacy laws, and security standards**.
- User verification to prevent fake donations and spam.

6 Use-Friendly UI/UX

- Simple and intuitive interface for all users.
- Multi-language support for wider accessibility.
- Accessibility features (voice input, text-to-speech for visually impaired users).

2.6 Technology Used

Programming Language: Python Python is a versatile, high-level programming language known for its simplicity, readability, and efficiency. It is widely used in application development due to its vast ecosystem of libraries and frameworks, making it an ideal choice for the Food Waste Management System.

Frameworks:

- **Kivy:** A Python framework used for building multi-platform applications with touch-friendly interfaces. Enables responsive layouts, smooth event handling, and seamless deployment across devices like Android, iOS, and desktops.
- **KivyMD:** An extension of Kivy that incorporates Google's Material Design components. Enhances the app's visual appeal with pre-designed UI elements like buttons, text fields, and navigation drawers, ensuring a modern and user-friendly interface. The combination of Kivy and KivyMD allows the Food Waste Management System to deliver both functionality and aesthetics. While Kivy ensures cross-platform compatibility and core app functionality, KivyMD adds a modern and professional design that improves user engagement.

Database Management:

• **MySQL**: A reliable and secure relational database management system used to store and manage data. Handles user details, donation records, NGO registrations, and transaction history efficiently. Ensures data integrity and enables seamless retrieval and updates through SQL queries.

Python Libraries:

• **Kivy & KivyMD:** For building the app's core functionality and implementing a modern Material Design-inspired user interface.

• **MySQL Connector:** To connect the application with the MySQL database for secure data storage and management.

• **Pillow:** For handling and processing images, such as food donation photos.

Development Tools:

- **VS Code:** For writing and debugging Python code efficiently.

Version Control:

- Git & GitHub: For version control, collaboration, and maintaining the project's code repository.

3. SYSTEM OVERVIEW

The *Annasamrakshna* system is designed as a multi-user platform that enables food donation and distribution. The key components of the system include:

3.1 System Components

- **User Management Module**: Handles user registration, authentication, and role-based access.
- **Donation Management Module**: Allows donors to post food donations, including details such as type, quantity, expiry date, and location.
- **Request Management Module**: Enables receivers to browse and request available food donations.
- **Volunteer Coordination Module**: Facilitates assignment and tracking of food pickups and deliveries.
- **Notification System**: Sends real-time alerts for donation updates, pickup schedules, and other critical events.
- **Analytics and Reporting Module**: Generates insights on food donations, waste reduction, and overall impact.

3.2 System Workflow

1. A **donor** posts a food donation with relevant details.
2. A **receiver** browses available donations and submits a request.
3. A **volunteer** is assigned to facilitate the pickup and delivery.
4. The system sends **notifications** to all relevant users about the status of donations.
5. The **admin** monitors system activity and generates reports on food donation trends.

3.3 System functional Requirements

- **User Registration and Authentication**: Secure login and role-based access for donors, receivers, volunteers, and admins.

- **Food Donation Posting**: Donors can post food donations, including type, quantity, location, and expiry date.

- **Food Request Posting**: NGOs or individuals can request food, specifying their requirements.

- **Real-Time Notifications**: Users receive alerts about new donations, requests, pickups, and updates.

- **Food Pickup Scheduling and Tracking**: Volunteers can schedule pickups, track deliveries, and update status.

- **Volunteer Management**: Coordination of volunteer assignments and task tracking.

- **Reporting and Analytics**: Generate reports on food saved, waste reduced, and donation trends.

4.FUNCTIONALITY

4.1 Authentication

Authentication is a crucial part of the *Annasamrakshna* app, ensuring security and access control.

A) User Registration

- New users can sign up as **Donors, Receivers, Volunteers, or Admins**.
- Users must provide basic details such as **name, email, phone number, and password**.

B) Login and Verification

- Secure login using **email and password**.
- Forgot password? Users can reset via email verification.

C) Role-Based Access Control (RBAC)

- **Donors**: Can post donations, view requests, and track donations.
- **Receivers**: Can browse and request available food donations.
- **Volunteers**: Can accept pickup tasks and update delivery status.
- **Admins**: Can manage users, monitor donations, and generate reports.

D) Security Measures

- **Data encryption** for storing user credentials securely.
- Prevention of **fake accounts and spam** through verification.

4.2 Advantages

A) Social and Environmental Impact

- Reduces **food waste** by ensuring surplus food is utilized.
- Helps combat **hunger and malnutrition** by distributing food to those in need.

B) Efficiency and Convenience

- **Seamless coordination** between donors, receivers, and volunteers.
- **Real-time notifications** keep all parties updated instantly.
- **Automated tracking** of food pickups and deliveries.

C) Security and Trust

- **Verified users and donations** to prevent misuse.
- **Transparency in food distribution** through analytics and reports.
- **Data encryption** ensures user privacy and protection.

D) Scalability and Accessibility

- Can **support a growing number of users** without performance issues.
- Works on **both mobile and web platforms**.
- **Multi-language support** makes the app accessible to diverse users.

4.3 Flow Diagrams

The graphical representations provide a clear depiction of the system's operations and codebase. These visual aids are particularly useful for software developers as they offer a comprehensive understanding of the various modules involved.

5. Use Cases

A use case is an essential component in the development process of websites or applications. It describes how users will interact with the system when completing specific tasks. A use case outlines the behaviour of the system as it responds to user requests, focusing on the user's perspective. These cases typically consist of a series of simple, step-by-step instructions, starting with the user's objective and concluding when the desired outcome is accomplished. Consequently, a well-written use case is critical for ensuring that the system meets user needs and expectations

5.1 User Roles and Permissions

The *Annasamrakshna* app consists of four main user roles: **Donors, Receivers, Volunteers, and Admins**. Each role has specific permissions to ensure a secure and efficient food donation system.

A) Donors

Users who donate surplus food (individuals, restaurants, grocery stores, etc.).

- ✅ **Post food donations** – Add food details, including type, quantity, location, and expiry date.
- ✅ **Edit or cancel donations** – Modify donation details before pickup.
- ✅ **View request history** – Track past and current donations.
- ✅ **Receive notifications** – Get alerts when a receiver requests food or a volunteer is assigned.
- ✅ **Chat with volunteers** – Coordinate pickup arrangements.

B) Receivers

Users who request food donations (NGOs, shelters, individuals in need).

- ✅ **Browse available food donations** – Search by food type, location, and availability.
- ✅ **Request food donations** – Specify quantity and pickup details.
- ✅ **View request status** – Track pending, approved, or declined requests.
- ✅ **Receive notifications** – Get alerts when a donor approves or rejects a request.
- ✅ **Communicate with donors and volunteers** – Coordinate pickup logistics.

C) Volunteers

Users who assist in picking up and delivering food donations.

- ✅ **View available pickup tasks** – Browse unassigned food deliveries.
- ✅ **Accept or decline pickup requests** – Choose based on location and availability.
- ✅ **Update delivery status** – Change task status (Pending → In Progress → Completed).
- ✅ **Receive notifications** – Get alerts for new pickup assignments.
- ✅ **Access navigation tools** – Use GPS tracking for optimized routes.
- ✅ **Chat with donors and receivers** – Coordinate pickup and drop-off details.

D) Admins

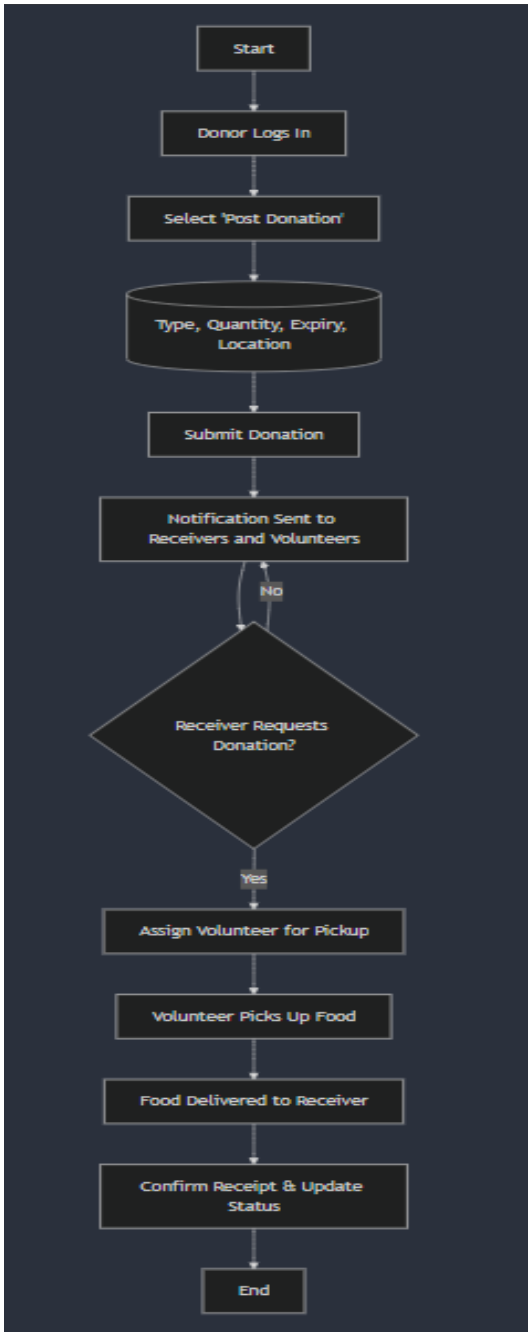
Users who manage the platform, monitor activities, and generate reports.

- ✅ **Manage user accounts** – Approve, verify, or disable users (donors, receivers, volunteers).
- ✅ **Monitor donations and requests** – Ensure fair and ethical use of the platform.
- ✅ **Generate reports and analytics** – Track total food donations, pickups, and impact metrics.
- ✅ **Handle disputes and issues** – Investigate and resolve reported problems.
- ✅ **Ensure security and compliance** – Enforce policies to prevent misuse and fraud.

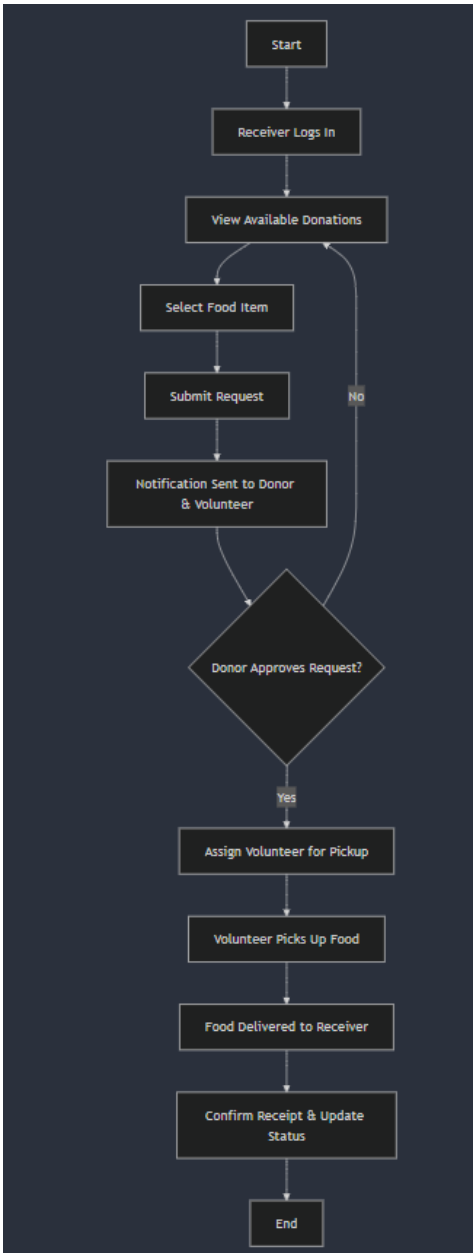
5.2 Activity Diagram

- **User Registration and Login**

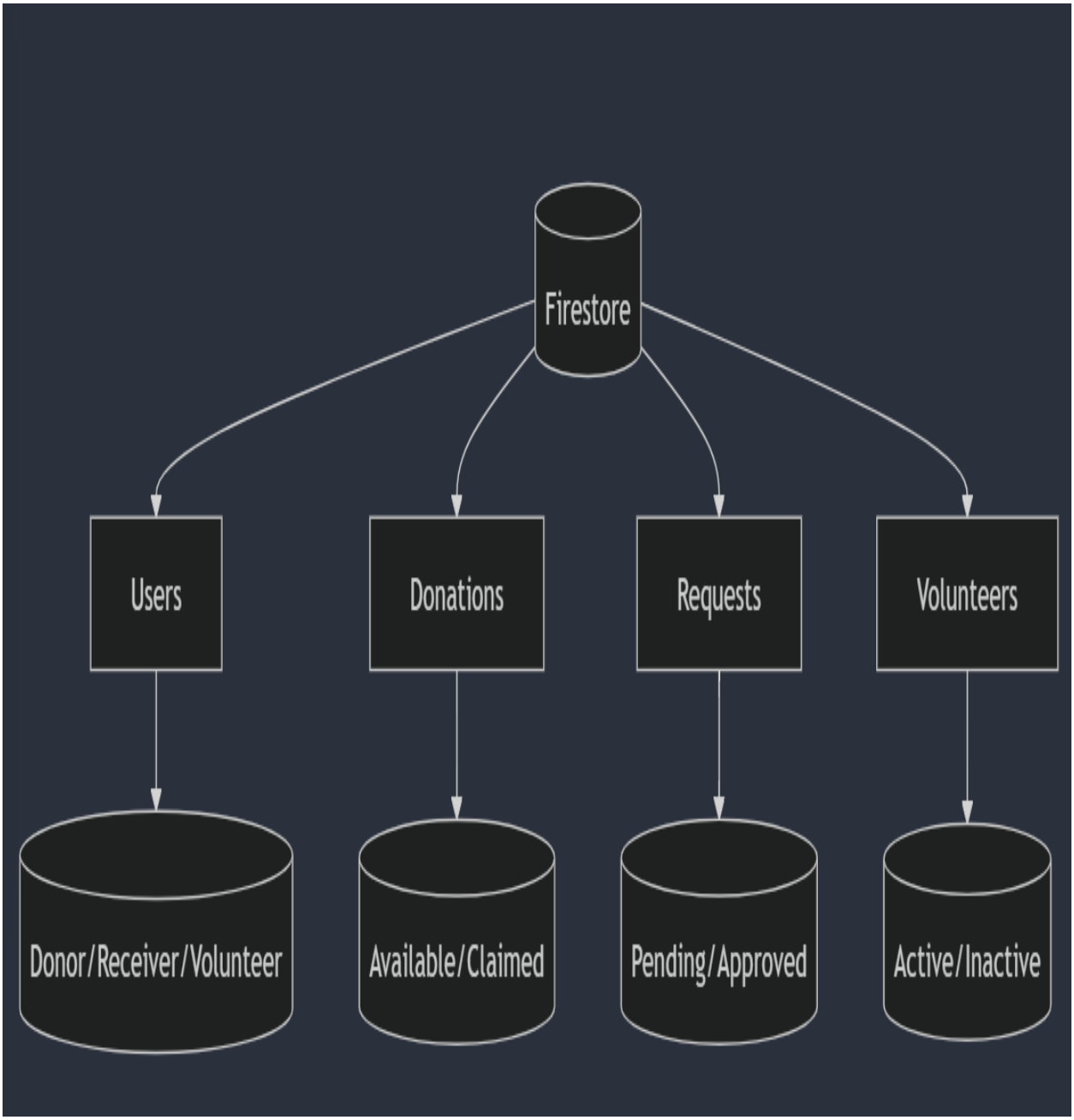
➢ Food Donation Process



➢ Food Request Process



- **Database Diagram**



5.3 Future Scope of Annasamrakshna

The *Annasamrakshna* app has the potential to evolve and expand its impact in several ways. Below are some key future enhancements and developments:

1. AI-Powered Food Matching System

- Implement AI-based algorithms to **match food donations with the nearest receivers** based on demand, location, and food type.
- Use **machine learning models** to predict donation patterns and optimize food distribution.

2. Blockchain for Transparency and Security

- Integrate **blockchain technology** to ensure transparency in food donations, tracking, and distribution.
- Maintain **immutable records** of donations to prevent fraud and ensure accountability.

3. Expansion to Rural and Underserved Areas

- Develop **offline functionality** for areas with low internet connectivity.
- Partner with **government organizations and NGOs** to extend reach into rural communities.

4. Food Quality Assurance and Safety Measures

- Implement **AI-driven image recognition** to check food quality before donation approval.
- Collaborate with **food safety authorities** to establish guidelines and certification for donated food.

5. Gamification and Reward System

- Introduce a **reward system** for frequent donors and active volunteers (e.g., badges, rankings, certificates).
- Offer **partnership incentives** with restaurants and grocery stores that consistently contribute food.

6. Corporate and Institutional Partnerships

- Partner with **supermarkets, restaurants, and corporate cafeterias** for large-scale food donations.
- Work with **educational institutions** to include students in volunteer activities.

7. Integration with Government and Relief Programs

- Collaborate with **local governments** to integrate the app with existing hunger relief initiatives.
- Establish **emergency response features** for disaster relief food distribution.

8. Smart Logistics and Automated Dispatching

- Develop a **smart routing system** for volunteers to optimize food pickup and delivery.
- Use **drone technology** in metropolitan areas for quick food transport.

9. Multi-Language and Accessibility Support

- Add **multi-language support** to make the app accessible to diverse communities.
- Enhance **voice command and screen reader support** for visually impaired users.

10. International Expansion

- Scale the platform to other **countries and regions** facing food insecurity.
- Partner with **global NGOs and humanitarian organizations** to expand outreach.