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.