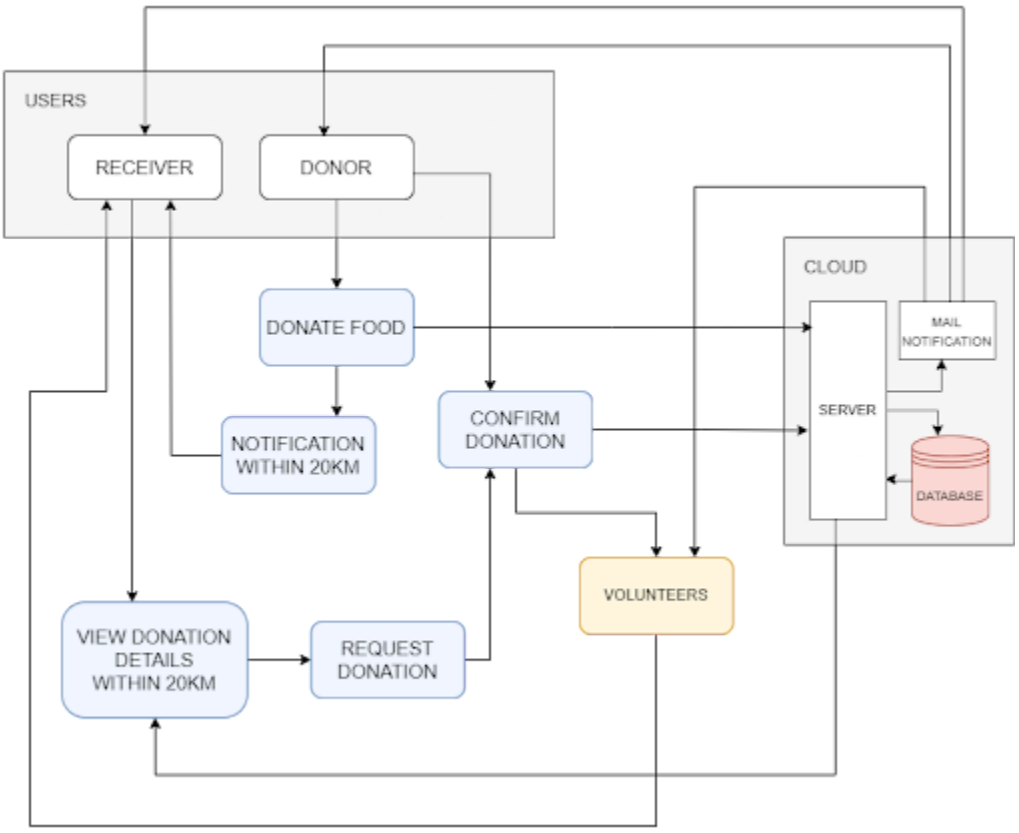
SERVE SURPLUS - FIGHTING HUNGER TOGETHER

SYSTEM ARCHITECTURE



Serve Surplus-System Architecture Diagram

This high-level architecture diagram in Fig 6.1 delves into the intricate workings of a food donation system designed to tackle the twin problems of food waste and hunger. It fosters a collaborative environment where donors with surplus food can connect with receivers in need. The system prioritizes a user-friendly experience. Donors can register and create detailed listings of their surplus food. These listings

can include information like type of food, quantity, expiry date, and dietary restrictions (if applicable). Additionally, donors can specify their preferred method of food transfer: self-delivery or volunteer-driven delivery. This flexibility caters to donors with varying schedules and capabilities.

On the receiver side, registration grants access to a searchable database of food donations. Users can filter and search for donations based on their needs, location, and dietary restrictions. This targeted search mechanism ensures efficient resource allocation, minimizing food waste and maximizing accessibility for those who need it most.

The system functions as a secure central hub, housing all user and donation information within a robust database. This data is meticulously protected using various security protocols, ensuring user privacy and safeguarding sensitive information.To streamline the donation process after a receiver identifies a suitable donation, a dedicated request module facilitates seamless communication between donors and receivers. This module allows donors to confirm their availability for pickup or volunteer delivery. Additionally, receivers can request pickups or schedule collections based on the donor's chosen timeframe.

The system goes beyond communication by incorporating a real-time chat function. This fosters open communication, enabling both donors and receivers to discuss logistical details such as pickup locations and specific dietary needs. The chat function also allows for real-time clarification of any donation-related queries, ensuring a smooth and efficient handover process.For situations where self-delivery might not be feasible, the system leverages a volunteer delivery network. This module assigns tasks to registered volunteers based on location and availability, optimizing delivery efficiency. Real-time tracking functionality within

the delivery module provides transparency throughout the process. Both donors and receivers can track the progress of the donation, ensuring peace of mind and reducing potential.

Donors receive notifications about requests for their donations, while receivers get notified about confirmations and updates on pickup or delivery schedules. The notification system also keeps users informed about any relevant system messages, fostering a sense of transparency and accountability.This comprehensive architecture fosters a collaborative environment that tackles food waste and hunger simultaneously. By connecting donors with receivers, the system promotes efficient resource allocation. Ultimately, this architecture aims to bridge the gap between food surplus and those in need, fostering a more equitable and sustainable food system.

Furthermore, a real-time chat function fosters communication, enabling donors and receivers to discuss logistical details or any other donation-related concerns. For volunteer deliveries, the system incorporates a delivery module that assigns tasks to registered volunteers and tracks the delivery progress in real-time.Finally, a notification module ensures everyone stays informed. Users receive updates on donation requests, delivery progress, and any other relevant system messages. This comprehensive architecture ensures a smooth and efficient food donation experience for both donors and receivers.

HIGHLIGHTING FEATURES

- **User-Friendly Interface**
    1. Intuitive Design: The app is developed on Flutter which is aimed to build a smooth and user-friendly interface for donors and recipients at the same time.
    2. Cross-Platform Compatibility: Can be found on both Android and iOS operating systems, meaning that a broad selection of users can gain access to it.
- **Secure User Registration and Login**
    1. Encrypted Passwords: Employs Bcrypt to encrypt passwords and make sure that password information is safe.
    2. JWT Authentication: Uses JSON Web Tokens for the purposes of user authentication and authorization that are both secure and performance.
- **Comprehensive Profile Management**
    1. Detailed Profiles: The application shall enable individual users to create their own profiles based on name, address, and contact details, which shall be encrypted and stored in the database.
    2. Role-Based Access: Participants may sign-up either to give or to receive, using the system features tailored to each option.
- **Efficient Donation Management**
    1. Easy Donation Process: The donors can be able to add the different types of food and quantities they wish to donate.

2. Donation History: Donors are able to access a history of their contributions, that cover delivered, process, and in-process donations, too.

- **Proximity-Based Matching**
    1. Geolocation Integration: Calculates distances between the donors and the recipients using the Haversine formula which is very accurate.
    2. Radius-Based Notifications: Alert the recipients or users within 20km proximity of a donor's location.
- **Order and Collection System**
    1. Order Placement: Customers can command the items they want and the amount they need by a receiver.
    2. OTP Verification: Institutes an OTP method to securely and properly gather the food donations.
- **Awareness and Education**
    1. Educational Content: Gives users insight into the importance of minimizing food waste and eco-friendly food management.
    2. Community Engagement: Empowers the users in engaging with food insecurity by facilitating information sharing and success stories.
- **Feedback Mechanism**
    1. User Feedback: It provides a platform for the users to give feedback as well as input on the app itself.
    2. Continuous Improvement: Eliminates bugs and maintains smooth functioning apps with feedbacks so that users can stay connected.

NOVELTY OF THE PROPOSED SYSTEM OVER EXISTING SYSTEM

1. Advanced Geolocation Feature

Accurate Distance Calculation: Uses the Haversine formula for the precise calculation of the distance between donors and recipients to ensure effective matching and timely notifications.

2. Enhanced Security Measures

Bcrypt Encryption: User passwords are guaranteed to be safely encrypted. This ensures robust protection against unauthorized access.

JWT Authentication: Adopts JSON Web Tokens for san individual user authentication and authorization, leading to data safety and integrity.

3. Role-Based Functionalities

Custom User Roles: Provides the functionalities that are personalized for donor and receiver, improves user experience by making relevant functions readily available.

Detailed Donation Tracking: Offers donors a through record of their donations which are marked as delivered, processed, and pending statuses.

4. OTP-Based Collection System

Secure Verification: An OTP system is introduced to verify the food collection, leading to the safe and correct deliveries of the intended recipients.

Email Notifications: Submits order details and OTPs via mail, making sure that the recipients will be provided with a safe and reliable means to collect their orders.

5. Social Impact and Education.

Awareness Campaigns: Provide awareness regarding food wastage and hunger by applying educational content.

Community Engagement: Enables community involvement in stories and impact reports, thus, encouraging a shared responsibility.

6. Continuous Feedback Integration

User Feedback Mechanism: Allows users to give real-time feedback, through which the app adapts to users' requirements and preferences.

Iterative Improvement: Feedback is used for improving, and it helps to make sure the app always puts the needs of its users first.

Through integrating these cutting-edge features as well as the emphasis on the security, user experience, and community impact, the "Serve Surplus" app has positioned itself as a new and distinctive instrument in the world of food being donated and reducing the amount of waste.