

SERVE SURPLUS – Fighting Hunger Together

A MINI-PROJECT REPORT

Submitted by

SANTHOSH P **2116210701234**

SONIYA V **2116210701254**

SANGEETHA G **2116210701229**

SAKTHILAKSHMI M **2116210701223**

In partial fulfillment of the award of the degree

of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING



RAJALAKSHMI
ENGINEERING COLLEGE

**An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai**

RAJALAKSHMI ENGINEERING COLLEGE

AUTONOMOUS, CHENNAI

MAY 2024

BONAFIDE CERTIFICATE

Certified that this project “**SERVE-SURPLUS**” is the bonafide work of “**SANTHOSH P 210701234**” , “**SONIYA V 210701254**” , “**SANGEETHA G 210701229**” and “**SAKTHILAKSHMI M 210701223**” who carried out the project work under my supervision.

SIGNATURE

Mr. K. VIJAY, B.Tech., M.E.,

Assistant Professor(SG),

Computer Science & Engineering

Rajalakshmi Engineering College

(Autonomous)

Thandalam, Chennai-602105

INTERNAL EXAMINER

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

We express our sincere thanks to our beloved and honorable chairman **MR. S. MEGANATHAN** and the chairperson **DR. M. THANGAM MEGANATHAN** for their timely support and encouragement.

We are greatly indebted to our respected and honorable principal **Dr. S. N. MURUGESAN** for his able support and guidance

No words of gratitude will suffice for the unquestioning support extended to us by our Head of The Department **Dr. P. KUMAR M.E Ph.D.**, and our Academic Head **Dr. N . DURAIMURUGAN**, for being ever supporting force during our project work

We also extend our sincere and hearty thanks to our internal guide **Mr. K. VIJAY M.E.**, for her valuable guidance and motivation during the completion of this project.

Our sincere thanks to our family members, friends and other staff members of computer science engineering.

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ABSTRACT

The "Serve Surplus" project is a novel initiative that will be dealing with the issues of food waste and hunger in the urban areas. The main idea of this service is an advanced mobile application that serves as a link between food donors, NGOs, and the people who are in a food crisis in their local community. The main aspect of this project is a well-built donation platform which enables donors to quickly and easily upload the details of their surplus food stuff like the quantity and the expiration date. The data is then intelligently reshaped with the suitable recipients, depending on the range. Additionally, the application puts the spotlight on the open and direct communication through the integrated messaging and notification functions, thus, the donors, recipients and the delivery personnel can easily coordinate with each other throughout the donation cycle. This project emphasizes community participation and it provides NGO's with a platform to participate in order to increase its effect and its reach. With its smart way of functioning, "Serve Surplus" not only deals with the problems of food waste and hunger quickly but also encourages the people to use resources in a sustainable way and to be part of the same collective responsibility in the communities. Through the utilization of technology, community collaboration, and social impact, "Serve Surplus" will be able to make a significant contribution in the war on food insecurity and at the same time, will inspire a culture of compassion and resourcefulness.

1. INTRODUCTION

1.1. INTRODUCTION

In an era that is marked by technology supremacy and social awareness, the "Serve Surplus" endeavor is created to provide solutions for the twin problems that are food wastage and hunger. The fact that a significant amount of food is being discarded yearly when millions of people are starving still depicts a very urgent situation which we need to address immediately. "Serve Surplus" is more than just a platform; it is a manifestation of a determination to use the potential of technology to build a better world. By incorporating the principles of software engineering, data science, and social work in a comprehensive way the project is aimed at renovating the panorama of food donation and distribution.

The front end, "Serve Surplus" relies on Flutter which is an open source framework by Google for building beautiful, natively compiled, multi-platform applications from a single codebase. Hence, Flutter also enhances the experience of an interactive user that is made more responsive via simple navigation and engagement of donors, NGOs, and beneficiaries accessing the platform. Engaging with Flutter on the frontend and using Node.js on the backend, this project relies on a fast runtime environment that is called Normally JavaScript. Node.js helps us overcome the challenge of the concurrent connections and interpreting the real-time data, since these two are critical in food donation logistics.

Besides, "Serve Surplus" makes use of MongoDB as its data management system, giving a reliable, flexible, and scalable technology for storing and

controlling data about food donations, recipients and logistics. This flexibility is of great benefit in the world of an evolving and dynamic system like 'Serving Surplus' because the underlying data model can evolve with time to meet the new user's needs and requirements.

1.2. SCOPE OF THE WORK

- **Addressing Food Insecurity:** The project intends to eliminate food insecurity by providing a link between the surplus food providers and the hungry through a centralized platform. This strategy can arguably make hunger a thing of the past.
- **Promoting Sustainability:** Through the diversion of surplus food from landfills and the offsetting of food insecurity, the project supports sustainable food management that aims at limiting the environmental impact.
- **Empowering Communities:** "Serve Surplus" move communities toward autonomy by giving them an avenue to fight food insecurity within their communities. It facilitates teamwork among individuals, businesses, NGOs, and governmental departments to assist those who are in need.
- **Fostering Innovation:** In addition to being a technology-oriented solution, the project also improves the food redistribution process and social welfare programs. It always seeks to find new technologies and methods to improve efficiency and scalability.
- **Raising Awareness:** The project will raise awareness on food loss and hunger through educational initiatives that are integrated into the platform. Through its educational efforts and the establishment of community, it facilitates sustainability of the food and social accountability.

1.3. PROBLEM STATEMENT

To innovate an idea to address urban excess food waste, hunger-related deaths, and create a logistic network with innovative technology and cost-effective storage solutions. This aims to efficiently transfer surplus food from cities to areas in deficit. To create an application that facilitates the connection between surplus and deficient food resources within a community's network.

1.4. AIM AND OBJECTIVES OF THE PROJECT

The "Serve Surplus" project is designed to use technology and community involvement to address the two issues of food waste and hunger in the city by solving them. In order to achieve this, the project started the creation of a mobile application which is good and advanced at the same time, and the goal is to make the donation of the food stuff from the donors to NGOs and people in need the most efficient. The fundamental purpose is to cut down food wastage, tackle hunger, create sustainable consumption habits and promote community involvement in solving the food insecurity problems that are so rampant in our society.

The objectives are as follows,

1. **Streamline Donation Process:** Build a simple and user-friendly internet platform that eases the process of people to donate the surplus food items by giving them the easy interface to upload the data of the donors and the data of the recipients.
2. **Enhance Communication:** The most essential thing is to make use of the communication tools such as the messaging and the notifications to help the people to coordinate the donors, the recipients and the delivery personnel in order to make the donation process a success.
3. **Optimize Matching Algorithm:** Use advanced algorithms that can find a

match between new food donors and the right recipients based on their location, dietary needs and the urgency of the situation so that the donations are given out in a timely and efficient manner.

4. **Ensure Delivery Monitoring:** Study the feasibility of the delivery tracking features that allow the donors to monitor their donations from pickup to delivery and thus, to make the donation network transparent, trustable and accountable.
5. **Promote Community Engagement:** Joining the local people and businesses in the program will provide the means to deepen the connection with them, as well as the feeling of collective responsibility and the strengthening of the community bonds.
6. **Collaborate with Stakeholders:** Go for joint actions with local NGOs, government agencies, food providers, and other stakeholders to make the platform more accessible and effective and to be in agreement with the bigger initiatives addressing food insecurity and sustainability.

2. LITERATURE SURVEY

2.1. Food-for-All Web Application for Donation Management, paper published by Sri Lanka Institute of Information Technology (SLIIT) in Oct 2022

Everything people need in life, food is an essential one of them. Nevertheless, at this moment, a lot of people not only cannot afford but also are not able to obtain and cover their necessary daily food needs. A lot of people in Sri Lanka do have a heart to see that no one should be hungry, but sadly there's no trustworthy platform available where you can get more information and contact when you decide to help. The main aim of the app is addressing the issue of people who are left behind financially and have surplus assets. Also, the framework provides an avenue for those interested in such philanthropic endeavors to come together to help the less fortunate as well as those who are in need of food and other stuff should be able to post details about their predicaments for anyone looking forward to helping. The system always tries to establish credibility by ensuring that faking and fraudulent donations/requests min from public attention through the confirmation of admins. In addition to this, each fundraiser program created by the registered destination will be assessed and approved by the admin prior to publishing in the app.

2.2. Food Donation Application to Improve the Distribution and Verification Process Within Selangor: Feedback, paper published by Journal of Applied Technology and Innovation (e -ISSN: 2600-7304) vol. 7, no. 3, (2023)

The paper aims to review global problems of food waste and insecurity which should show how environmental, societal and economic factors are critical, being mostly affected during events like the Covid-19 pandemic. Through it, we

emphasize the essence of food donation in waste management and also the necessity of such a program for the poorly fed population and this explains the relevance of setting up a centralized platform for coordination of food donations in Selangor. On top of that, this review gives much attention to the cyber criminality which happens to be an escalating phenomenon, especially in the view of mobile devices, as it stresses the need for robust cyber security measures in the protection of user data and privacy. The introduction of smart solutions like IoT and AI is recognised as the technology factor with a great ability to deal with food waste and develop better agricultural practices. The review however, identifies potential threats attributed to technology use such as data leakage and unreliability issues. Through these discussions, the literature review molds the proposed solution in the framework of the debate on food security, innovation, and cybercrime prevention which are the goals that are designed to advance sustainable development.

2.3. Ensuring food safety in food donations: Case study of the Belgian donation/acceptation chain, paper published by Laboratory of Food Microbiology and Food Preservation (LFMFP), Department of Food Safety and Food Quality, Faculty of Bio-Science Engineering, Ghent University, Belgium

The research centered on the food donation/acceptance chain in Belgium and it looks at the system challenges on keeping it up to the legislative arrangements and food safety standards. The report points out a disorderly and quick donation process contrary to previously compacted food chains. This is due to the present lack of trained and food safety personnel, making it difficult for communities to trust and hence hampering the donation of perishable items. The absence of cool-chain transport or chilling/freezing capacity also acts as a drain on the distribution process. Microbiological examination of the same batches of perishable foods donated to organizations indicates a marginal quality of some

of the samples, with some of them found to be *Listeria monocytogenes*. Many of the donated foods are not perishable, but things are already taking shape in this area to achieve harmonized logistics with both donors and acceptors. This is also observable at the national level with regulators taking the role to clarify hygiene regulations. The literature review touches on the difficulties of food waste definition and categories and then further brings to light the solutions oriented principles of prevention and the role of food donations as a weapon to fight the war on waste and hunger. These components cover the assessment of food bank models from different countries and the finding on their effectiveness.

2.4. Economic benefits from food recovery at the retail stage: An application to Italian food chains, paper published by Department of Chemical, Management, Informatics, Mechanical Engineering, University of Study of Palermo, Viale delle Scienze 90128, Italy

This work is an investigation into the economic consequences of food rescuing in Italian food chains while trying to improve supply chain response in retail, as a sector, as well as recipient groups which practice food waste collection. It indicates a seriously pressing problem of the food losses which occur in supply chains, and gives the reasons for this impact on the economy, society, and the environment. Water scarcity is brought upon by the wasteful nature of the agriculture industry, especially in the developing countries where lack of resources and awareness greatly limit its contribution to the economy. The Literature reviews encompass the root causes of food wastage along the supply area and the monetary analysis of food recovery, alongside the benefits thereof. For instance, the paper compares managerial perspectives and academic concepts in food supply chain optimization involving fuzzy sets for transportation cost minimization and employment of both tactical and operational techniques of supply chain management in non-profitable

food-insecurity curbing. The literature survey analysis includes research on the causes of food losses, supply chain improvement, and the financial consequences of food waste recovery. The strategies to be analyzed cover reduction in food wastage, reallocation of the resources, and maximization of economic benefits in food supply chains.

2.5. Waste Food Management and Donation Application

An extreme rise in food waste has been seen nowadays. According to the data given by FAO (food and agriculture organization) 1/3rd amount of food has been wasted globally i.e., 1.3 billion tons of food has been wasted every year. In order to reduce the food wastage, we came up with a solution and this solution can manage the food in useful ways .so, we can reduce food wastage with the help of an android application. If anyone has a huge amount of waste food, they can raise the request or can post a message. And that message will give the information about available food, location information and also, they will also provide your registered number to the nearest food donators. As we know that this is an android application, we can easily collect the waste food from hotels and restaurants and we can distribute that food to the needy people. So, by implementing this application we can reduce the food wastage and we can help the needy people by providing the food.

2.6. ‘Aahar - Food Donation App’, paper published in June-2021,

It is an android mobile application which provides a platform for donating food through the Internet. And that in this application not only food, the other things like clothes, books, utensils and so on are being donated. It contains 3 different modules i.e User Module, NGO module and Admin Module. User Module is used for users after successful login for users they are allowed to donate food by providing the details like – food type, location, cooking date and time, and donor’s availability and then they submit the request and In NGO’s module

those particular Donation details will be highlighted and then the NGO's will collect that food by selecting the pickup time and date if they don't want food means they simply reject and logout. Other than food rest all items are packed as gift items and then they are donated. This application is developed using java and xml on Android Studio.

2.7. 'Zero Hunger: Smart Food Donation System using IoT ', paper published in May-2021

It is an android mobile application which uses the latest technology where use of IOT devices for quality assurance of food. Here it contains two Modules One is the User module and another is the NGO module. Here the user on successful login they donate the food with details like food description, quantity and address and then post the donation. From NGO side the NGO's can view the donation details and then assign one particular volunteer to receive the food via map connection and volunteer will check the food using their IOT devices and confirm that food is good and distribute it in slum areas.

2.8. 'Food Donation Application: Food Share', paper published in May-2021

It is an android mobile application which came up with a lateral ideology. That is in all other journals they all are focusing on different NGOs and for that NGO's the food is being donated. Whereas here the people in need are directly registered whether an NGO or a needy person so when a user wants to donate food he can select for whom he wants to donate so there by that particular organization or particular user will receive the food.

2.9. 'Food Donation Portal', paper published in 2015

It briefly outlines the food donation practices and provides a forum connecting donors to NGOs. A concept to eliminate food waste, minimize food waste and

improve the food donation network is introduced and an impact on society is made possible via this medium. The paper 'Beyond Food Sharing: Promoting the Elimination of Food Waste with ICTs', released in 2016, maintains that food security is essential to tracking citizens' quality of life at various levels of society.

2.10. ‘SeVa: A Food Donation App for Smart Living ‘, paper published in 2021 IEEE 11th Annual Computing and Communication Workshop and Conference (CCWC)

This paper focuses on creating an interesting mobile application (app) called SeVa that provides a ubiquitous platform wherein users can visualize available food resources in their local area and consequently gain access to food, thereby tackling two major issues, i.e. hunger and food waste. This app is pertinent to the UN SDGs (United Nations Sustainable Development Goals) and fits the general realm of AI for Smart Living in Smart Cities. In addition to entailing IoT (Internet of Things) and ubiquitous computing, this work makes positive impacts on both healthcare and environment by reducing hunger and food waste respectively. SeVa app development uses principles from AI, and especially HCI (Human Computer Interaction), along with its evaluation encompassing user surveys.

2.11. ‘Foodernity: A Mobile and Web Application for Food Sharing‘, paper published in 2021 IEEE 1st International Conference in Information and Computing Research (iCORE)

This paper focuses on creating a mobile and web application called Foodernity with the goal of easing the burden of needy people who require food to survive. The paper states that it is critical, especially in times of crisis like the COVID-19 pandemic, where most of the people in low-income areas don't have enough budget for their food every day. Furthermore, the application also wants

to help in reducing the problem of food waste. The whole process of developing both mobile and web applications, in particular, followed the Agile Model's formal and logical processes. This study recommends that the beneficiary should use this application to evaluate its functionality. Those who are hungry or needy people who relies mostly on food donation from the organization will benefit from this application by allowing the donors to give donation to the organization that helps needy people to have access to food

3. SYSTEM SPECIFICATIONS

3.1 HARDWARE SPECIFICATIONS

Processor	:	Intel i5
Memory Size	:	8GB (Minimum)
HDD	:	1 TB (Minimum)

3.2 SOFTWARE SPECIFICATIONS

Operating System	:	WINDOWS 10
Front – End	:	Flutter
Back - End	:	Node JS
Database	:	MongoDB

4. PROPOSED SYSTEM

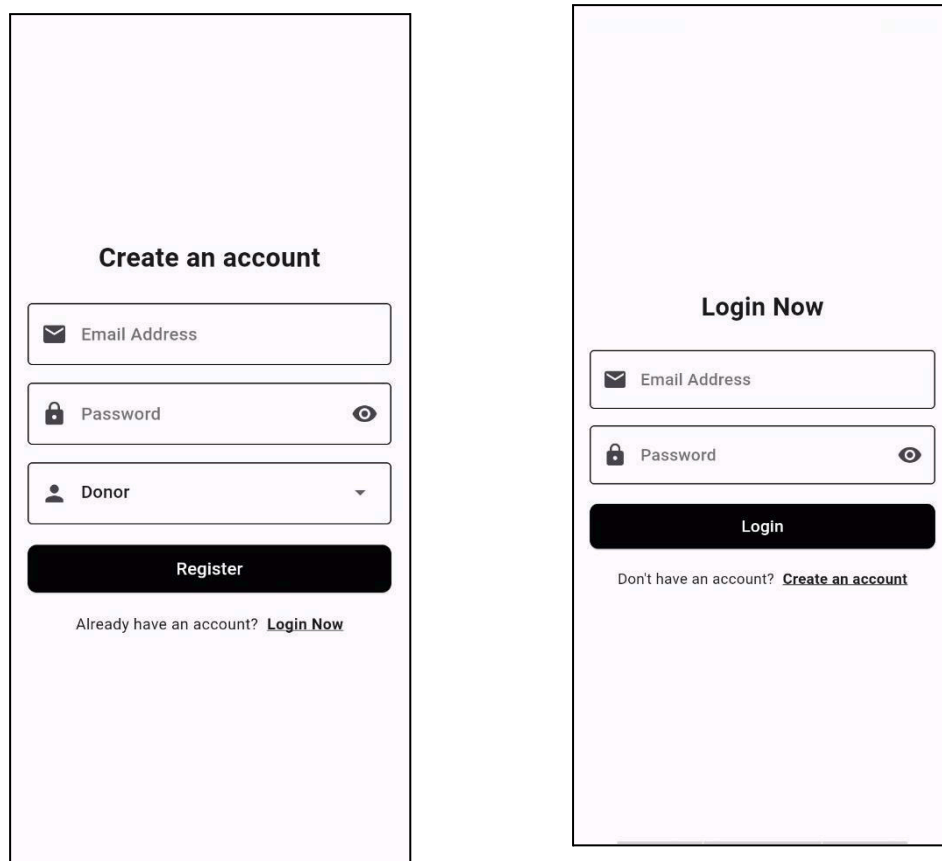
"Serve Surplus" Mobile App: Changing the Way Food Donation is Done, Through Technology.

- **Purpose and Mission:** The app is aimed at the reduction of food wastage and the solution of hunger problems by connecting the food donors with the NGOs and people in need who are within a 20km radius. The main goal of this mission is to establish a sustainable way of making the society benefit from the technology.
- **Technology Stack:** Flutter is used for the frontend, thus, a user-friendly and easy to operate interface is achieved. Node.js is used on the backend to secure the functionality and the data is processed without hassles.
- **Donor Interaction:** Donors of food that is in excess can easily upload the details through the app, which contain information about the food type and the quantity. This information is then transmitted to the neighboring NGOs and people in need, which results in the quick use of the surplus food.
- **Recipient Options:** The users can look for the available food lists and request the items they need through the app.
- **Geolocation Integration:** The application uses the haversine formula to calculate the distances accurately, thus, it is possible to send notifications to the recipients who are within the 20 km radius.
- **Awareness and Education:** The app is a tool for the increase of food wastage and hunger issues awareness, educating the users on the significance of responsible food management.

- **Community Impact:** The application is a link between the surplus food sources with the people who need it and this makes a community and a responsibility for everyone to be involved with the problem of food insecurity.
- **Feedback Mechanism:** Users can give their opinion and ideas within the app, thus, the features can be improved constantly and the user experience can be improved.

5. MODULE DESCRIPTION

5.1. USER REGISTRATION AND LOGIN MODULE



The image displays two mobile application screens side-by-side. The left screen is titled 'Create an account' and features three input fields: 'Email Address' with an envelope icon, 'Password' with a lock icon and a toggle eye icon, and a 'Donor' dropdown menu with a person icon. Below these is a black 'Register' button and a link 'Already have an account? Login Now'. The right screen is titled 'Login Now' and features two input fields: 'Email Address' with an envelope icon and 'Password' with a lock icon and a toggle eye icon. Below these is a black 'Login' button and a link 'Don't have an account? Create an account'.

Fig 5.1 User Registration and Login Page

The donors and receivers can create an account in this application by giving their email id, password and role (Donor or Receiver) as shown in Fig 5.1 . The password is encrypted using Bcrypt. After a user is registered, a Json Web token is generated and sent to the frontend. The JWT is used to authenticate users, authorize access to protected resources, it is used to safeguard sensitive information.

5.2. PROFILE CREATION MODULE

Fig 5.2 Profile Creation Page

The donors and receivers can create a profile in this application by giving their details like name, address and mobile number as shown in Fig 5.2. After entering, their details will be stored in the Users Collection.

5.3. DONOR MODULE

Fig 5.3 Donar Module

The donors can add the food items they want to donate and their quantity in this page as shown in Fig 8.3. The donation details will be stored in the donations array. After donation is made, a notification which shows the details of the donor will be sent to the receivers who are at a distance less than or equal to 20 kilometers. The donors can view their donation history. They can view their delivered, processed and pending donations.

5.4. RECEIVER MODULE

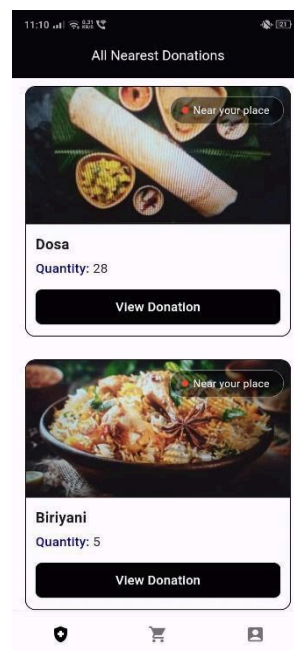


Fig 5.4 Nearest Donors Page

This module shows the donors who are at a distance less than or equal to 11 kilometers to the receiver as shown in Fig 5.4. The distance is calculated based on the latitude and donations' longitude of the donor and receiver using Haversine formula. If the donor is not in this particular distance, he/she will not be visible to that receiver.

5.5. ORDER MODULE

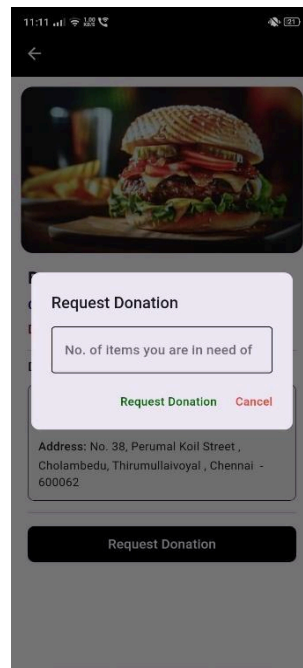


Fig 5.5 Order Page

The receiver can order the food in this module. They can specify the items and quantity they need and place the order as shown in Fig 5.5. After ordering, a mail will be sent to the receiver which contains their order details and OTP. The OTP will be stored in the database. While collecting the food, the user has to share the OTP with the donor. If the OTP matches, the food will be given to the receiver.

6. SYSTEM ARCHITECTURE

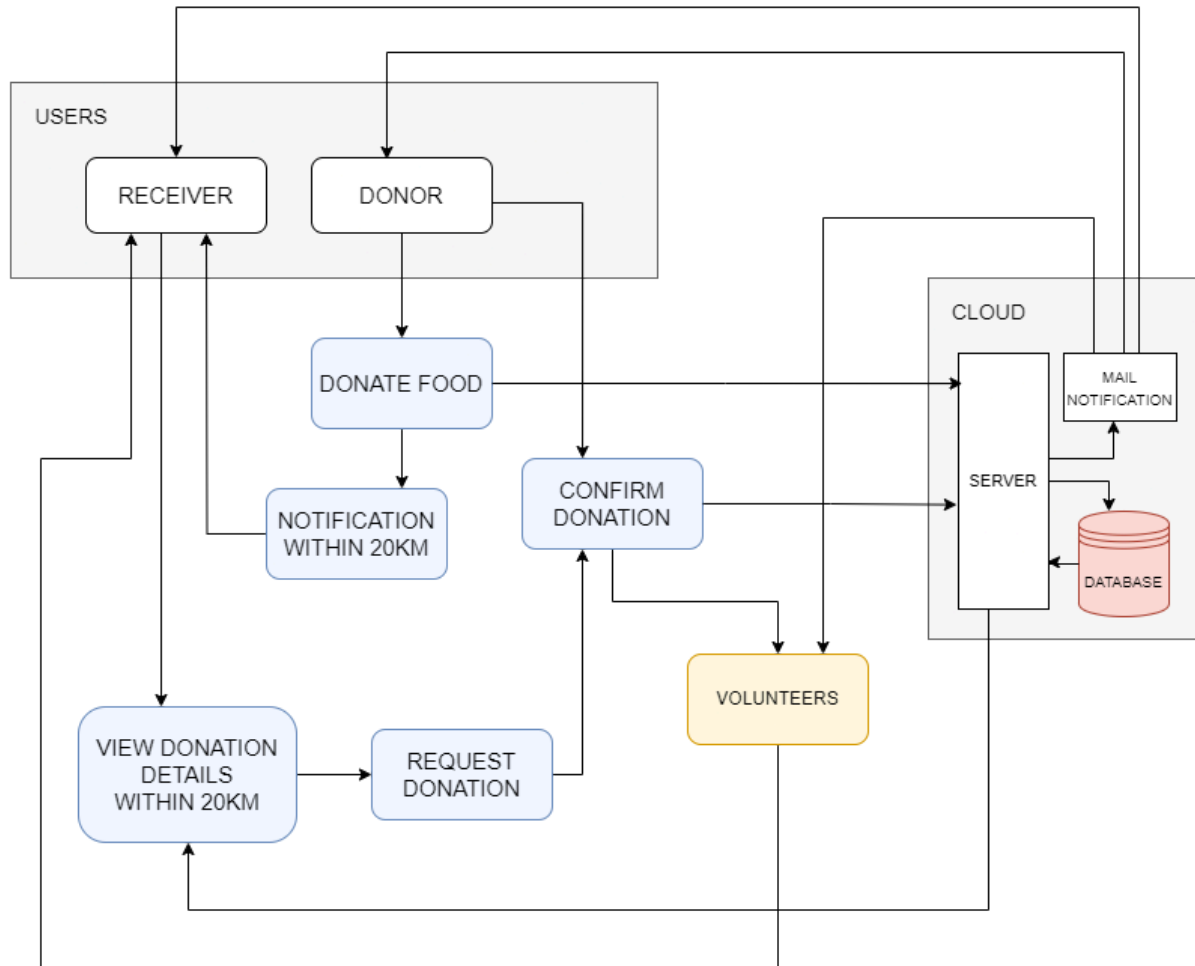


Fig 6.1 System Architecture diagram

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.

7. SAMPLE CODING

donorController.js

```
const Donors = require("../models/donorModel");
const Orders = require("../models/ordersModel");
const Receivers = require("../models/receiverModel");
const Users = require("../models/userModel");
const addDonation = async (req,res)=>{
  try {
    const donor = await Donors.findOne({userId:req.user});
    const {donations} = req.body;
    donor.donations = donor.donations.concat(donations);
    donor.donationHistory = donor.donationHistory.concat(donations);
    const updatedDonor = await donor.save();
    res.status(201).json(updatedDonor);
  }
  catch(error)
  {
    res.status(500).json({error:error.message});
  }
}

const getLiveDonations = async(req,res)=>{
  try {
    const {donations} = await Donors.findOne({userId:req.user});
    res.status(200).json(donations);
  } catch (error) {
    res.status(500).json({error:error.message});
  }
}
```

```
}
```

```
const getDonationHistory = async(req,res)=>{
```

```
  try {
```

```
    const {donationHistory} = await Donors.findOne({userId:req.user});
```

```
    res.status(200).json(donationHistory);
```

```
  } catch (error) {
```

```
    res.status(500).json({error:error.message});
```

```
  }
```

```
}
```

```
const getReceiverDetails = async(req,res) => {
```

```
  const {receiverId} = req.query
```

```
  try {
```

```
    if(!receiverId || receiverId===""){
```

```
      return res.status(400).json("Receiver id is required to access this route")
```

```
    }
```

```
    const receiver = await Receivers.findOne({_id:receiverId})
```

```
    if(!receiver){
```

```
      return res.status(404).json(`No receiver exists with id:${receiverId}`)
```

```
    }
```

```
    const user = await Users.findOne({_id:receiver.userId}).select('-password  
-latitude -longitude');
```

```
    if(!user){
```

```
      return res.status(404).json(`No user exists with id:${receiver.userId}`)
```

```
    }
```

```
    res.status(200).json(user)
```

```
  } catch (error) {
```

```
    res.status(500).json(error.message);
```

```

    }
  }

const getDonorOrders = async (req, res) => {
  try {
    const {status} = req.query
    const donor = await Donors.findOne({userId:req.user})
    if(!donor){
      return res.status(400).json({message:"Unauthorized to access this route"})
    }
    if(status!==null){
      const donorOrders = await Orders.find({ donor_id:donor._id});
      let statusOrders = []
      donorOrders.forEach(donorOrder=>{
        donorOrder.orders.forEach(order=>{
          if(order.status===status){
            let donOrder = {
              donor_id:donorOrder.donor_id,
              receiver_id:donorOrder.receiver_id,
              food: order.food,
              image: order.image,
              quantity: order.quantity,
              date: order.date,
              id: order._id,
              status: order.status,
            }
            statusOrders.push(donOrder)
          }
        })
      })
    }
  }
}

```

```

    })
    return res.status(200).json(statusOrders);
  }
  const donorOrders = await Orders.find({})
  let allOrders = []
  donorOrders.forEach(donorOrder=>{
    donorOrder.orders.forEach(order=>{
      let donOrder = {
        donor_id:donorOrder.donor_id,
        receiver_id:donorOrder.receiver_id,
        food: order.food,
        image: order.image,
        quantity: order.quantity,
        date: order.date,
        id: order._id,
        status: order.status,
      }
      allOrders.push(donOrder)
    })
  })
  res.status(200).json(allOrders);
} catch (error) {
  res.status(500).json(error.message);
}
};

const confirmOrder = async(req,res) => {
  try {
    const {orderId, donorId, receiverId, secret} = req.body

```

```

    let orders = await Orders.findOne({donor_id:donorId,
receiver_id:receiverId})
    console.log(orders)
    let isValidSecret = false
    orders.orders.forEach((order)=>{
      if(order._id==orderId){
        if(order.secret==secret){
          order.status="Delivered";
          isValidSecret = true;
        }
      }
    })
    if(isValidSecret){
      await orders.save();
      return res.status(200).json({message:"Order confirmed successfully"})
    }
    res.status(400).json({message:"Invalid secret provided"})
  } catch (error) {
    console.log(error)
    res.status(500).json({message: error.message});
  }
}

module.exports =
{addDonation,getDonationHistory,getLiveDonations,getDonorOrders,
confirmOrder, getReceiverDetails};

```

8. OUTPUT SCREENSHOTS

The donors and receivers can create an account in this application by giving their email id, password and role (Donor or Receiver) . The password is encrypted using Bcrypt. After a user is registered, a Json Web token is generated and sent to the frontend. The JWT is used to authenticate users, authorize access to protected resources, it is used to safeguard sensitive information. Fig 8.1 shows the SignUp page and the login page of the application.

The image displays two side-by-side mobile application screens. The left screen, titled 'Create an account', features three input fields: 'Email Address' with an envelope icon, 'Password' with a lock icon and a toggle eye icon, and a role selector dropdown currently set to 'Donor'. Below these is a black 'Register' button and a link 'Already have an account? Login Now'. The right screen, titled 'Login Now', has 'Email Address' and 'Password' input fields with the same icons. Below them is a black 'Login' button and a link 'Don't have an account? Create an account'.

Fig 8.1 User Registration and Login Page

(The user can register in this page by entering their email id, password and role)

The donors and receivers can create a profile in this application by giving their details like name, address and mobile number. After entering, their details will be stored in the Users Collection. Fig 8.2 shows the edit profile page and the profile page of the application.

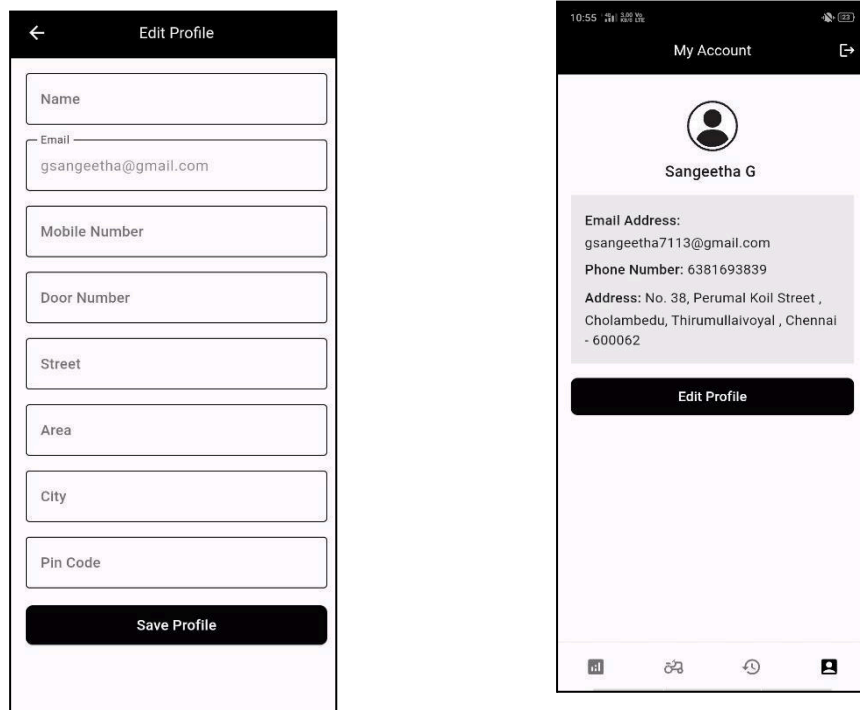


Fig 8.2 Profile Page

(Users can create profile in this page by entering their details)

The donors can add the food items they want to donate and their quantity in this page. The donation details will be stored in the donations array. After donation is made, a notification which shows the details of the donor will be sent to the receivers who are at a distance less than or equal to 20 kilometers. The donors can view their donation history. They can view their delivered, processed and pending donations.

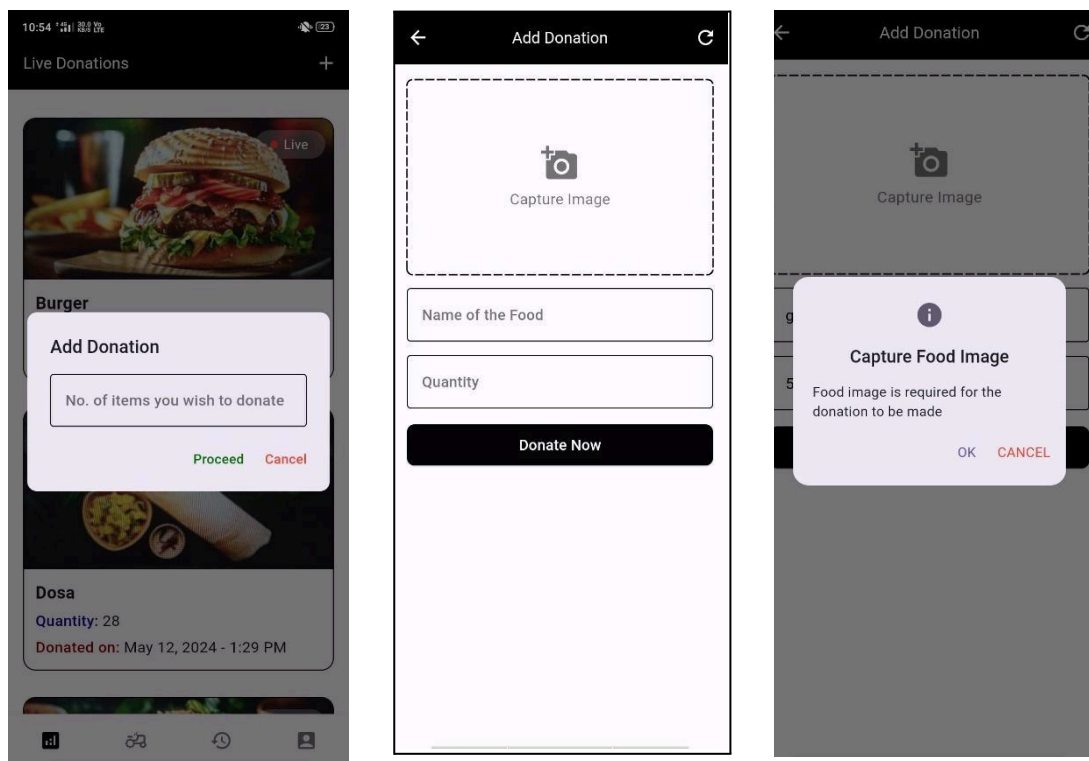


Fig 8.3 Donation Page (The donor can donate food by specifying the details of food like name, quantity and image)

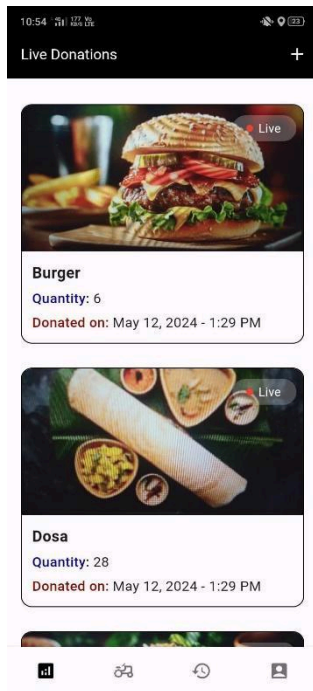


Fig 8.4 Live Donations Page (The donors can view their live donations)

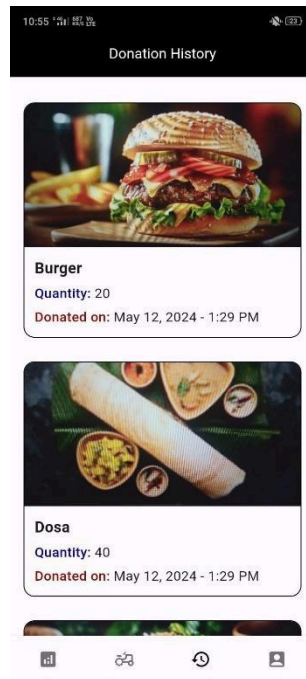


Fig 8.5 Donation History Page (The donors can view their history of donations)

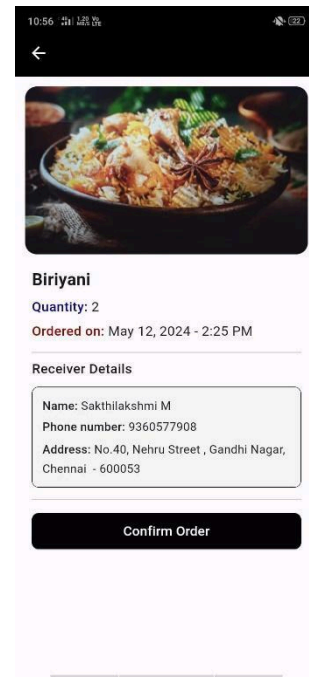


Fig 8.6 Receiver Details (The donor can view details of receiver who ordered the food)

Fig 8.3 shows the donation pages where the user can write the information about the type of food item, the quantity and also capture and upload the image of the food item for donation. Fig 8.4 shows the live donations page where all the live donations can be viewed. Fig 8.5 shows the donation history page where the previous donations of the user can be viewed. Fig 8.6 shows the Receiver Details page where the details of the receiver can be viewed.

This module shows the donors who are at a distance less than or equal to 11 kilometers to the receiver. The distance is calculated based on the latitude and longitude of the donor and receiver using Haversine formula. If the donor is not in this particular distance, he/she will not be visible to that receiver. Fig 8.7 shows the Nearest donations, Fig 8.8 shows the Donation Details Page and Fig 8.9 shows the Order History of the receiver.

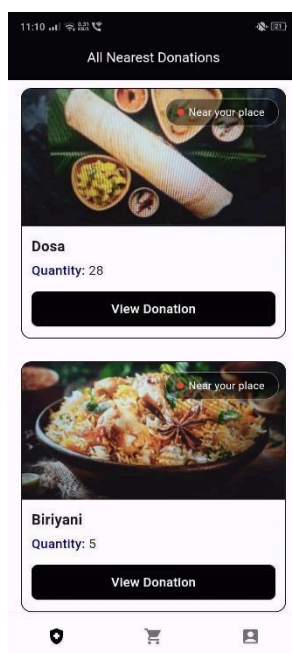


Fig 8.7 Nearest Donations Page
(The receivers can view donations near the distance of 20km)



Fig 8.8 Donation Details Page
(Receiver can view the details of the donor)

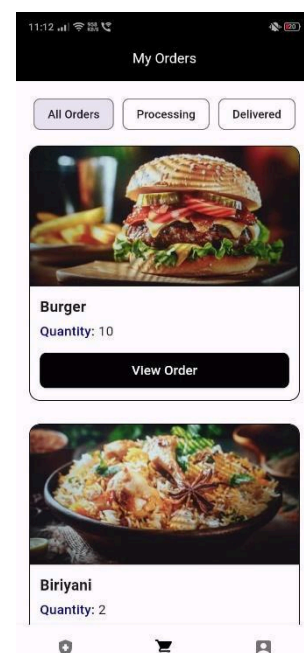


Fig 8.9 Order History (Receiver can view their order history)

The receiver can order the food in this module. They can specify the items and quantity they need and place the order. After ordering, a mail will be sent to the receiver which contains their order details and OTP. The OTP will be stored in the database. While collecting the food, the user has to share the OTP with the donor. If the OTP matches, the food will be given to the receiver.

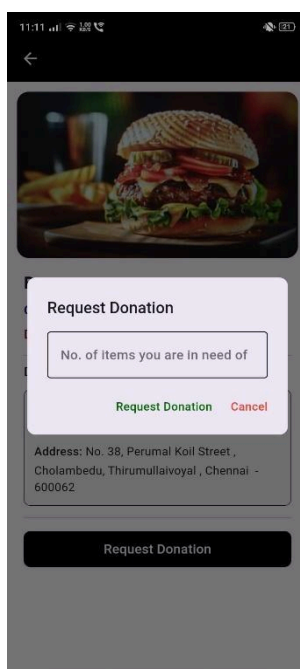


Fig 8.10 Order Page (The receiver can specify the quantity of food item they want to order)

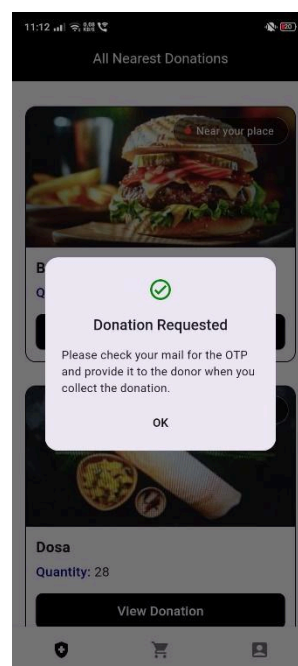


Fig 8.11 Donation Request Confirmation

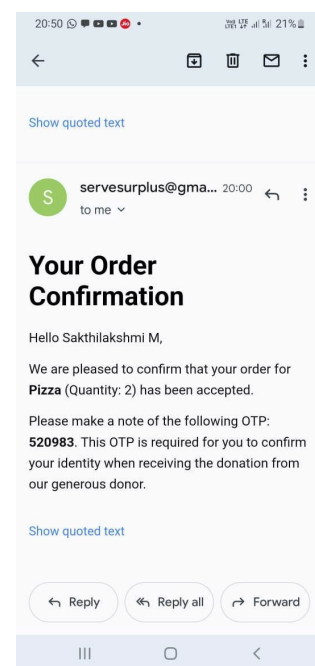


Fig 8.12 OTP sent to receiver via email.

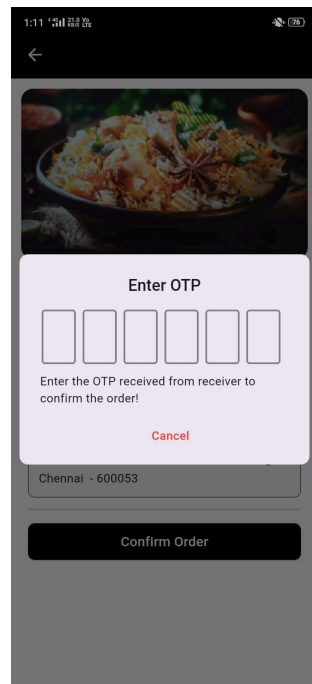


Fig 8.11 The donor gets the OTP from the receiver and enters here

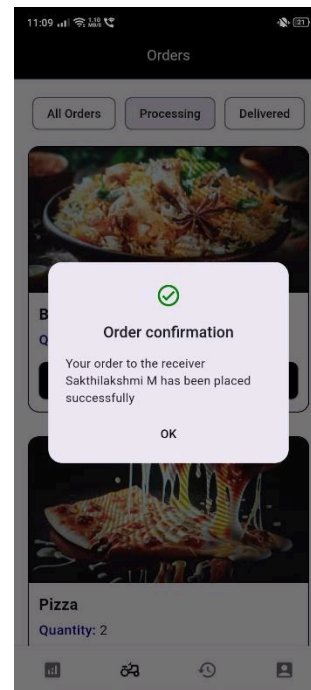


Fig 8.12 If the OTP matches, the order will be given to the receiver

Fig 8.10 shows the Order page, Fig 8.11 shows the Donation request confirmation page and Fig 8.12 shows the order confirmation mail received. Fig 8.13 and 8.14 shows the otp and the order confirmation pages.

9. CONCLUSION AND FUTURE ENHANCEMENT

To sum up, "Serve Surplus" is a creative answer to the problems of food wastage and hunger by means of its user-friendly interface, fast backend processing, and smooth communication features. In the future, the chat module could be improved by adding the AI-driven suggestions for food matches and the delivery tracking could be done with the use of the real-time GPS integration to make the user experience more suitable. This would not only optimize the donation process but also increase the app's impact in cutting food waste and solving hunger on a bigger scale, thereby making it a crucial instrument for social and environmental sustainability.

10. REFERENCES

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