American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

Food Cycle Management System

A Software Requirement Engineering Project Submitted
By

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The project will be Evaluated for the following Course Outcomes

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System Quality Attributes and Project Requirements	[10 Marks]	
UML and E-R Diagram with Data Dictionary	[10 Marks]	
UI/UX Prototyping	[10 Marks]	

Software Requirements Specification

for

Food Cycle Management System

Version 1.0 approved

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American International University-Bangladesh

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Revision History

Revision	Date	Updated by	Update Comments	Reason For changes
0.1	2023.04.29	ANIKA ANJUM	First Draft	Added One extra scope
0.2	2023.04.30	ANIKA ANJUM	Second Draft	Added Feature of notification in app
0.3	2023.04.30	ANIKA ANJUM	Third Draft	Revision done and no changes was made
0.4	2023.04.1	YAMLICK ABDULLAH	Fourth Draft	Added perspective diagram
0.5	2023.04.1	YAMLICK ABDULLAH	Fifth Draft	Added missing include, exclude relationship in UML diagram
0.6	2023.04.1	IFTHEKHAR AHMED TANJIM	Sixth Draft	Added subdivisions of Worker and organizer homepage
0.7	2023.04.1	IFTHEKHAR AHMED TANJIM	Seven Draft	Added My Profile
0.8	2023.04.2	MD. MOSHIUR RAHMAN	Final Draft	Added One Feature of Message in the UI Design
0.9	2023.04.2	MD. MOSHIUR RAHMAN	Revised	Revision done and no changes was made

1. Introduction

1.1 Purpose

- Food waste is the intentional discarding of edible items. Mainly by retailers and consumers about 1.3 billion tons of food is wasted globally per year. This is about one-third of all food being produced for human consumption. This waste food can fulfill 3 billion people's needs. Again, this wasted food destroys the ecological balance. So, if consumer and retailer can deliver their wasted food to the needy people it can remove the hunger and this problem can be solved and reduced.

The root of this problem is that the food is not eaten. It happens during production, processing, distribution retail, and food service sales and consumption. This problem is important because of needy people and keeps our environment fresh.

Wasted food will be stored in a booth and an organization will collect them and distribute them through the website to the needy people and animals.

We will build a website to solve the problem. Food is wasted all over around if we create a properly organized system then the problem might be solved. There are lots of NGOs that work with food it can save their time and also money as well.

The basic functionalities are there a login function to food donor and collector on both sides. On the donor side, there will be two types of food categories one is for humans and one for animals. There will also be quantity functionalities, A suggestion box, and a submit button. Two types of donor restaurants and homeowners on the other hand admin side, there will have a food quantities calculator. If store enough food, then informs their worker to collect food. The worker can log in and can see the order from the admin. Admin also contacts with locality informer that where the foods necessary. Locality informer can log in and informs their locality of food necessities. Also, everyone can log out from the system. It will provide food for needy people and needy animals and also it will keep the environment clean.

The target group of users is lots of organizers who work for food. They should benefit because it will be a smart and first system and also it will save a lot of o money and will save wasted food that makes a bad impact on the environment.

According to the age of the modern era, where we are developed through artificial intelligence, people are more dependent on smartphones. There are different applications, which are developed to control the wastage of food, and it gives the opportunity to send that extra food to the people who need it. There are many applications which control food waste. 'Mobile phone Based Waste Food Supply Chain for Aurangabad Using GIS Location-Based and Google Web Services', published in 2014, combine the client-server GIS and mobile application to make a craving-free city. The application for the client side gives the option to donate food to the people in demand. There is a lot of literature on this topic but our system will collect food from the root also it will collect dusty food for animals and distribute

it to needy people where it is actually needed. It will also connect with the locality which is the main feature.

There is software like a food waste management system. They collect food and distribute it to the needy but our software has the flexibility to collect food from door to door and also from restaurants and connectivity with locality also it is a combined package they can provide humans as well as animals.

Scope:

1. **Food Donation and Collection:**
    - Donors can donate wasted food, categorized for humans and animals.
    - The system will facilitate the collection of donated food from donors, including restaurants and homeowners.
    - Admin dashboard will manage the collection process based on food quantities.
2. **User Authentication and Management:**
    - The system will have login functionality for food donors, collectors, and locality informers.
    - Different user roles and access levels will be implemented.
    - User authentication and management will be an integral part of the system.
3. **Food Donation Details:**
    - Donors can provide information about the quantity of food available for donation.
    - Additional details and suggestions related to the donated food can be provided.
4. **Organizer Dashboard and Coordination:**
    - The admin dashboard will have a food quantities calculator to determine when enough food has been collected for distribution.
    - The system will notify workers when food collection is required.
    - The admin interface will manage donation orders and coordinate the distribution process.

5. **Locality Information:**

    - Locality informers can log in and provide information on specific food necessities in their respective localities.
    - The system will consider this information to ensure efficient distribution of donated food.

6. **System Accessibility:**

    - The system will provide a user-friendly interface accessible through web browsers.
    - Logout functionality will be available for all users.

The software being specified is a website-based Food Cycle Management System. Its purpose is to tackle the problem of food waste by providing a platform for food donors and collectors to connect and facilitate the distribution of wasted food to people and animals in need.

The main objective of the software is to minimize food wastage globally by creating an organized system where food can be efficiently collected, stored, and distributed to those who require it. By implementing technology and connectivity, the software aims to bridge the gap between surplus food and hunger, while also promoting environmental sustainability.

The benefits of the software include:

1. Addressing Hunger: By connecting food donors with needy individuals and organizations, the software helps ensure that excess food reaches those who are in need, thus reducing hunger and food insecurity.
2. Waste Reduction: The system enables the collection and redistribution of wasted food, thereby reducing the amount of food that ends up in landfills. This contributes to environmental conservation and helps maintain ecological balance.
3. Time and Cost Savings: The software streamlines the food collection and distribution process, saving time and resources for both food donors and organizations involved in managing food assistance programs. It eliminates the need for extensive manual coordination and enables efficient utilization of available resources.
4. Community Engagement: The software fosters community involvement by allowing locality informers to provide information on specific food necessities in their areas. This promotes collaboration and empowers local communities to actively participate in addressing food waste and hunger.

In relation to corporate goals or business strategies, the software aligns with the following objectives:

1. **Social Responsibility:** The software supports corporate social responsibility initiatives by actively addressing societal challenges such as hunger and food waste. It demonstrates a commitment to making a positive impact on the community and the environment.

2. **Operational Efficiency:** By optimizing the food collection and distribution process, the software enhances operational efficiency for both food donors and organizations involved in food assistance programs. It helps maximize resource utilization and minimize waste.

3. **Stakeholder Engagement:** The software facilitates engagement and collaboration among various stakeholders, including food donors, collectors, locality informers, and organizations working in the food assistance sector. It fosters partnerships and strengthens relationships to collectively work towards the shared goal of reducing food waste.

The business requirements of the Food Cycle Management System can be elaborated as follows:

1. **User Registration and Login:** The system should provide a user-friendly interface for food donors, collectors, and locality informers to register and create their accounts. Users should be able to log in securely using their credentials.

2. **Food Donation Categories:** The system should allow food donors to categorize their donations into two types: food for humans and food for animals. This categorization helps in efficient distribution based on specific needs.

3. **Quantity Tracking:** The system should have functionality to track and record the quantity of donated food. Donors should be able to input the quantity accurately to ensure proper allocation and distribution.

4. **Suggestion Box:** The system should include a suggestion box where users can provide feedback, suggestions, or report any issues they encounter. This allows continuous improvement of the system based on user input.

5. **Food Collection and Distribution Orders:** The system should have an administrative interface where authorized personnel can manage food collection and distribution orders. It should provide a comprehensive view of available donations and enable the scheduling and coordination of collection activities.

6. **Locality Informer Integration:** The system should allow locality informers to log in and provide information on specific food necessities in their areas. This integration helps in identifying areas with high demand and ensuring targeted distribution.

7. **Notifications and Alerts:** The system should have notification functionality to inform donors, collectors, and informers about new donation opportunities, collection requests, or important updates related to the food cycle management process.

8. **Reporting and Analytics:** The system should generate reports and provide analytical insights to track the effectiveness of food collection and distribution activities. It should allow stakeholders to monitor key metrics, such as the amount of food donated, distributed, and utilized.

9. **Security and Privacy:** The system should prioritize the security and privacy of user information. It should implement appropriate measures to safeguard user data and ensure compliance with relevant data protection regulations.

10. **Scalability and Flexibility:** The system should be designed to accommodate future growth and scalability. It should be flexible enough to adapt to changing requirements and easily integrate with other systems or platforms if needed.

11. **Mobile Accessibility:** The system should have mobile accessibility, allowing users to access the platform and perform necessary functions through smartphones or tablets. This enhances convenience and accessibility for users on-the-go.

12. **Training and Support:** The system should provide training resources and support to users, ensuring they are well-equipped to utilize the system effectively. It should have a help desk or customer support channels to address any queries or issues faced by users.

1.2 Document Conventions

This document was created based on the IEEE template foe System Requirement Specification Documents. Priority is assigned to requirements to show how they will be implemented. Bold type is used to highlight defined keywords. The normal text font size that has been used in this document is 12pt with 1.0 line spacing, and for all the texts “Times New Roman” font is used, and justified aligned. Defined terms are highlighted with **bolding**.

1.3 Intended Audience and Reading Suggestions

The document serves as a comprehensive guide for various types of readers involved in the project. Here's a description of the different types of readers and how the document is relevant to each of them:

Developers: Developers involved in building the software system will benefit from the document by gaining a clear understanding of the project's requirements, functionalities, and overall architecture. It provides technical details, such as system design, data flow, and integration points, enabling developers to implement the system effectively.

Project Managers: Project managers responsible for overseeing the development and deployment of the software system can use the document to gain insights into the project's scope, objectives, and deliverables. It provides an overview of the functionalities, timeline, and resource requirements, helping project managers in planning, coordination, and tracking progress.

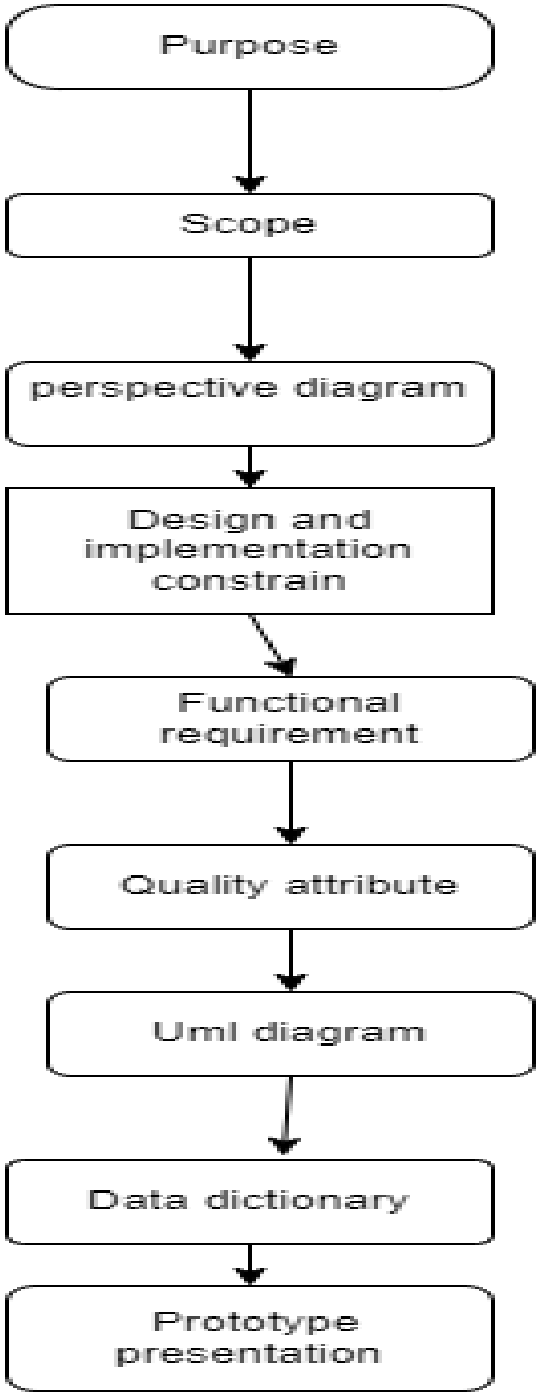
Marketing Staff: Marketing staff members involved in promoting the software system and attracting stakeholders can leverage the document to understand the key features, target audience, and value proposition of the project. It provides information on how the system benefits different stakeholders and addresses food waste, which can be used for marketing and communication purposes.

Users: The document is also intended for end-users, including food donors, collectors, admins, locality informers, and potential recipients of the donated food. It outlines the system's functionalities, user interfaces, and login processes, providing clear instructions on how to interact with the system effectively.

Testers: Testers responsible for validating the software system's functionality, usability, and performance will find the document valuable. It outlines the expected behavior of the system, test cases, and acceptance criteria, helping testers design and execute comprehensive test plans.

Documentation Writers: The document serves as a reference for documentation writers responsible for creating user manuals, help guides, and system documentation. It provides a comprehensive overview of the system's features, user workflows, and technical specifications, enabling writers to produce accurate and detailed documentation.

Sequence for reading the document:



1.4 References

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3. *United States 2030 Food Loss and Waste Reduction Goal | US EPA*. (2023, April 4). US EPA. https://www.epa.gov/sustainable-management-food/united-states-2030-food-loss-and-waste-reduction-goal#goal

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2. Overall Description

2.1 Product Perspective

Context and origin of Food Cycle software

This program is innovative and almost brand-new project. Food waste is the international discarding of edible items. This software will tackle the problem of food waste and hunger. Through this software it will gathering extra food from homes, restaurants and bakeries and delivering it to people in need and feeding street animals. Here will be two categories of food, one is Human Consumable and another one is for Animal Consumable food.

The program functions independently as a platform that links recipients, collection agencies, and food donors. It works as a centralized system to plan, organize, and maximize the collecting, distribution, and effect of food donations.

The software is an independent product but it may have interfaces or integration points with external systems. For example:

Integration with restaurant inventory management systems to automate the donation process. Integration with recipient databases or social service platforms to connect with organizations serving people and animals in need.

These interfaces would enable seamless data exchange and enhance the functionality of the software within the larger context of food waste management and hunger alleviation efforts.

Diagram of Food Cycle Management System

Given below the simple diagram of our Food Cycle Management System:

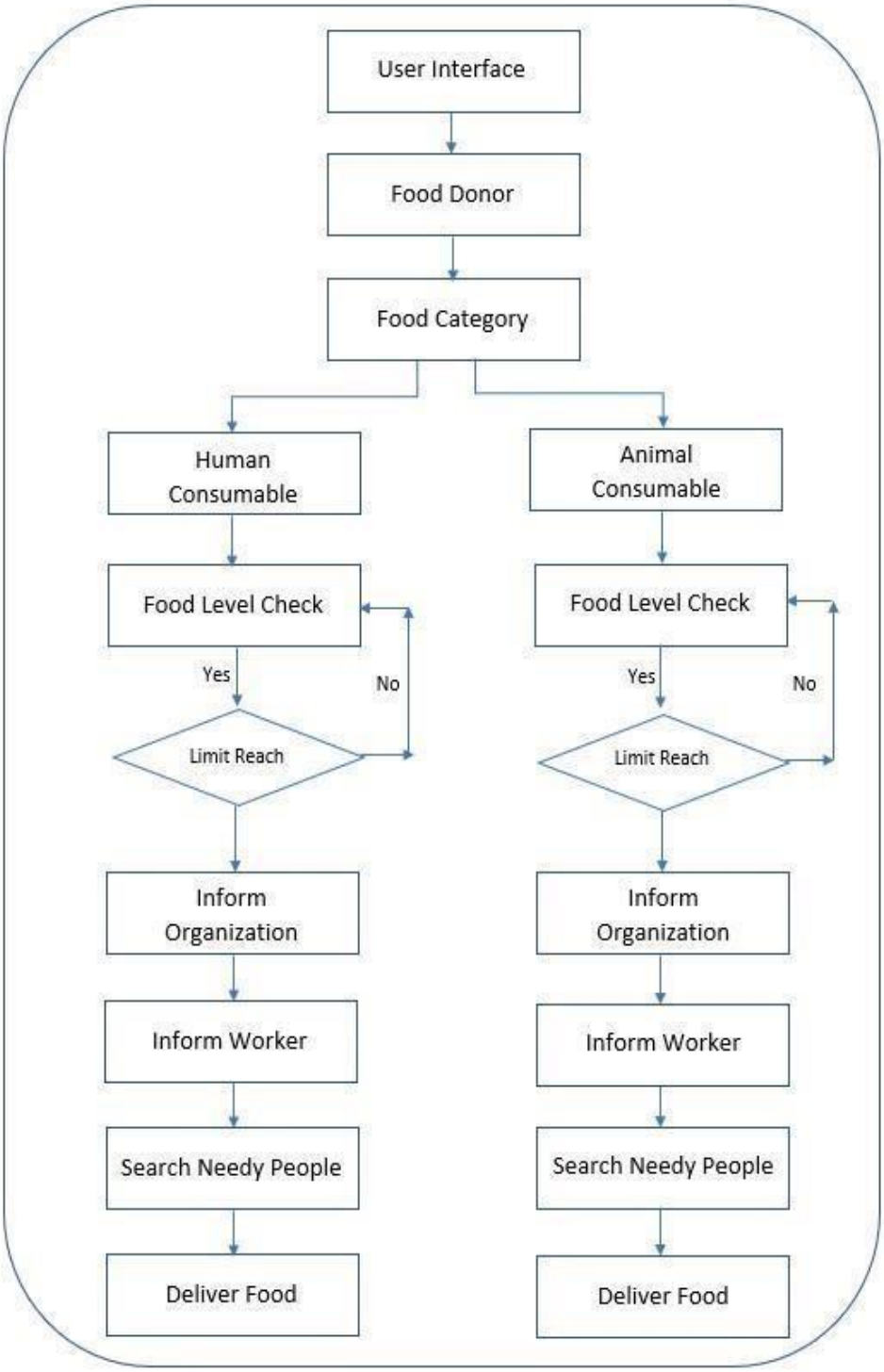


Figure: Diagram of our Food Cycle Management System.

2.2 Product Functions

User registration: User must create an account they should provide some information that will store in central database.

Food donation listings: Donors, restaurants and collection organizations can specify their preferences and availability for donations.

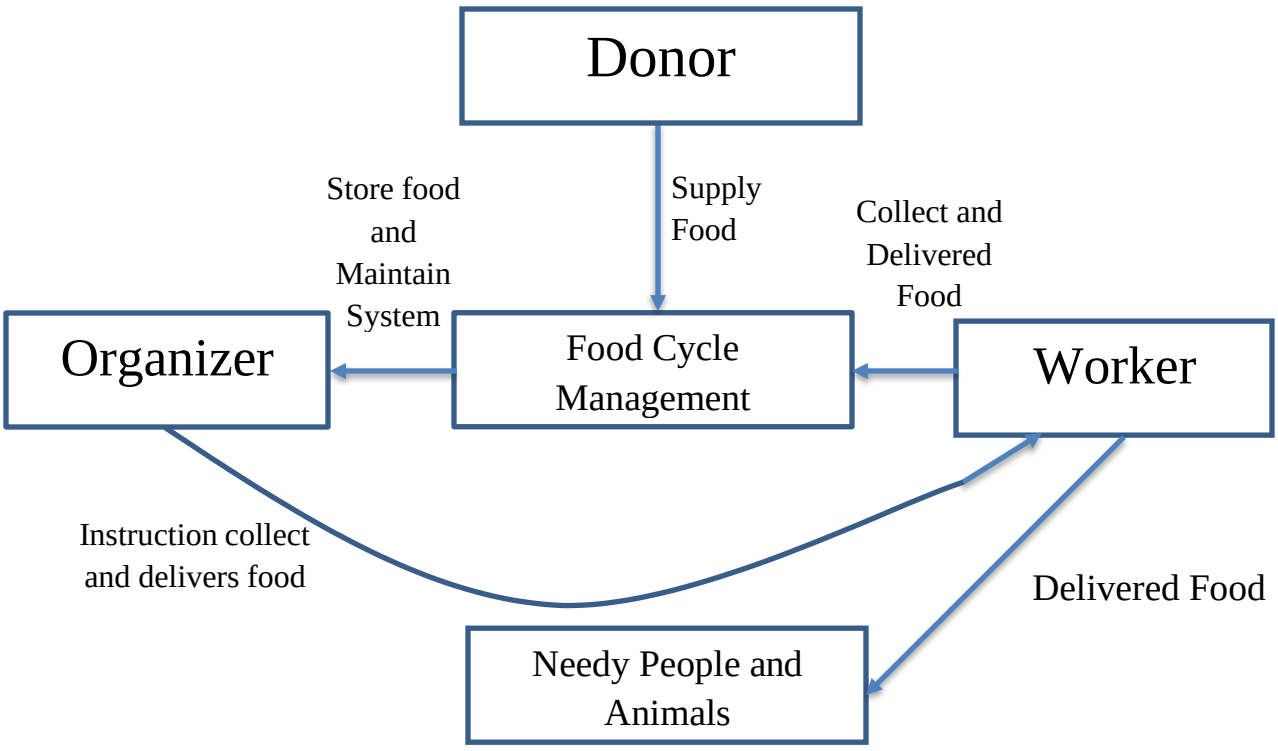
Donors and restaurants can create listings describing available food, including quantity, type, and expiration date. Listings may include additional details like dietary restrictions, packaging, or special handling requirements.

Food level checks: In donation booth if food reach a certain level, then it will ready for collection.

Notifications and communication: The software sent notification after reach the level to the organizations. Organization will notify worker through message tools. Organization will receive information from their worker about needy people and allocating area.

Collection request management: Organization can view donation lists, and collect foods about their capacity. Donors, restaurants and bakeries can approve collection request and set the pickup time.

Picture of major group of related requirements:



Given below the hardware platform, operating system and versions, and any other software components or applications which will operate our software:

Hardware: Computers, laptops, Arduino anu and servers that are common hardware platforms for software applications are all capable of running the program.

Operating system:

The software will run with the below popular operating systems:

- Windows (e.g., Windows 10, Windows Server)
- macOS (e.g., macOS Mojave, macOS Catalina)
- Linux distributions (e.g., Ubuntu, CentOS)
- Arduino IDE.

Software component:

- **Web Server:** The software may require a web server software component such as Apache HTTP Server or Nginx to handle HTTP requests and serve web-based user interfaces.
- **Database System:** A database management system (DBMS) is needed to store and manage data related to users, donation listings, collection requests, recipient information, and analytics. Common choices include MySQL, PostgreSQL, or MongoDB.
- **Programming Languages and Frameworks:** The software may be developed using programming languages like Python, Java, or .NET, along with relevant frameworks and libraries for web development, database interaction, and backend processing.
- **Messaging Services:** External messaging services like email providers or SMS gateways may be used for communication and notifications between users.
- **Mapping and Routing Services:** Integration with mapping or routing services, such as Google Maps or Map box, might be required to optimize collection routes and provide real-time tracking.

Peaceful Coexistence:

- The software should be designed to peacefully coexist with other applications and software components that may be running on the same hardware or interacting with the same data sources.
- Compatibility with commonly used web browsers (e.g., Chrome, Firefox, Safari) should be ensured for the user interface.

2.3 Design and Implementation Constraints

Actually, design and implementation constrain is the thing that create some barriers to developer to implement another functionality.

A government regulation: All software applications must comply with government regulations for usage by visually impaired persons.

Organizational Policies: To donate food donor should have registered account.

Language requirements: English is the only language to communicate. As English is the most usable language that will be helpful stuff but it can be harm for sometimes for native.

Time constraints: In order to ensure that the software is delivered to the consumers on time, it must be built within a particular time frame.

Security requirements: In order to guarantee that the software is safe and free of vulnerabilities, it must follow security requirements such as OWASP, NIST, and ISO 27001.

Usability: The software must be made to be simple to use and comprehend, with an intuitive user interface and detailed instructions.

Hardware: For signal generating it can use only Arduino anu.

2.4 User Documentation

User documentation for the Food Cycle Management System:

User-manuals:

- A comprehensive guide that provides instructions on how to use the software.
- It covers topics such as registration, login creating donation listings, managing pickup requests, notifications and communications etc.

Tutorials:

- Step-by-step tutorials or walkthroughs that demonstrate common tasks or workflows.
- They help users understand the software's functionality and how to accomplish specific actions effectively.

Frequently ask question:

- A compilation of commonly asked questions and their answers.
- It addresses potential concerns or uncertainties that users may encounter while using the software.

Release notes:

- Information about the software's updates, bug fixes, and new features.
- It keeps users informed about the changes and enhancements in each software release.

Contact information:

- Contact details for technical support or customer service.
- It allows users to reach out for assistance or clarification regarding the software.

The components of the user documentation mentioned above give users the tools they need to properly comprehend, use, and navigate the product. These elements enhance user satisfaction and enable users to get the most out of the food distribution and collection program.

Identify the Non-User documentation delivery formats or standards:

PDF (Portable Document Format): PDF is a widely used format for delivering user manuals, guides, and other documentation. It ensures the preservation of document formatting and can be easily viewed and printed by users.

HTML (Hypertext Markup Language): User documentation can be delivered in HTML format, allowing users to access it through web browsers. HTML documentation can include hyperlinks, images, and interactive elements for enhanced usability.

Online Help Systems: Software applications often include built-in online help systems, accessible from within the software interface. These help systems provide context-sensitive assistance and guidance to users based on their current context or task.

Video Tutorials: User documentation can be delivered in the form of video tutorials, demonstrating step-by-step instructions and workflows visually. Videos are particularly effective in illustrating software usage and demonstrating complex tasks.

Interactive Guides: Some user documentation is delivered as interactive guides or walkthroughs integrated into the software interface. These guides offer interactive assistance, highlighting features and providing instructions as users navigate through the application.

Knowledge Base: A knowledge base is a centralized repository of user documentation, often in the form of articles or FAQs, accessible online. Users can search for specific topics and find detailed information, troubleshooting guides, and best practices.

Printed Manuals: Although less common in today's digital age, some software still provides printed manuals or guides. These can be physical books or pamphlets that come with the software package, providing comprehensive instructions and reference material.

The choice of user documentation delivery format depends on various factors such as the target audience, software platform, accessibility requirements, and preferences of the software development team. It is important to select a format that effectively communicates information to users and supports their learning and usage of the software.

3. System Requirements

3.1 Functional Requirements (System Features)

3.1.1 Software Login

- The software shall allow users to log in with their given phone number and password.
- The login credentials (phone number and password) will be verified with database records.
- If the login is successful, the home page of the user account will be displayed.
- If the phone number and/or password have been inserted wrong, the system will generate and send an OTP to the user's email address or phone number to retry login by resetting their password

Priority Level: High

Precondition: User has a valid user id and password

Cross-references: N/A

3.1.2 Registration:

New users will be given 3 options to choose the category where they want to register. The options are:

- As a Donor
- As a Worker
- As an Organizer

3.1.2.1 As a Donor

- After selecting the donor option, they will be directed to a sign-up page where they will be able to fill up their information as the donor.

- After the registration they have to click submit. Then automatically they will receive an OTP to their phone (The phone number was given while registering). They have to fill up the OTP and press ok.
- After successfully inserting the OTP, they will be directed to Google Maps to pinpoint their location. After they locate their position, they are all set for that one particular option they have chosen

Priority Level: High

Precondition: User has to log in as a donor.

Cross-references: 3.1.1, 3.1.2

3.1.2.2 As a Worker

- After selecting the worker option, they will be directed to a sign-up page where they will be able to fill up their information as a worker
- After the registration they have to click submit. Then automatically they will receive an OTP to their phone (The phone number was given while registering). They have to fill up the OTP and press ok.
- After successfully inserting the OTP, they will be directed to Google Maps to pinpoint their location. After they locate their position, they are all set for that one particular option they have chosen

Priority Level: High

Precondition: User has to log in as a worker.

Cross-references: 3.1.1, 3.1.2

3.1.2.3 As an Organizer

- After selecting the organizer option, they will be directed to a sign-up page where they will be able to fill up their information as an organizer.
- After the registration they have to click submit. Then automatically they will receive an OTP to their phone (The phone number was given while registering). They have to fill up the OTP and press ok.
- After successfully inserting the OTP, they will be directed to Google Maps to pinpoint their location. After they locate their position, they are all set for that one particular option they have chosen.

Priority Level: High

Precondition: User has to log in as an organizer.

Cross-references: 3.1.1, 3.1.2

3.1.3 Donor Homepage

- When the user comes to this page, they will get three options. The options will be:
    - Donate Food Categories
    - Suggestion Box
    - Food Donation Listing
- They will be redirected to the next steps according to their selection.

Priority Level: High

Precondition: User is logged in as a donor.

Cross-references: 3.1.1, 3.1.2.1

3.1.3.1 Donate Food Categories:

- If the first option is selected the software will present the user with a screen that includes the two food category options the user wishes to donate. The options are:
    - Human Consumable
    - Animal Consumable
- In both categories the user will be asked to provide details about the food and if there is any need for utensils there.
- The software will prompt the user to submit the selection of food that they want to donate. If prompted, the user has to click submit to place the donation.
- Once the user makes all of their desired food category to donate, they can proceed to the next step in using the software.

Priority Level: High

Precondition: User is logged in as a donor.

Cross-references: 3.1.1, 3.1.2.1

3.1.3.2 Suggestion Box

- The software shall allow users to give feedback here.
- Users will be able to select a suggestion box and then can write their opinion.
- If complete their write there will submit button to submit it.
- If a submission is successful will display successful submission.

- If any problem arises will display and try again after some time.

Priority Level: Medium

Precondition: User is logged in and on the Donor Homepage.

Cross-references: 3.1.1, 3.1.2.1, 3.1.3.1

3.1.3.3 Food Donating Lists

- To list the food the user has to fill up the form. First, they have to give a title and provide a description of the food.
- Then they select the type of food i.e., veg, non-veg.
- After choosing they will be given the option to select the quantity.
- Adding photos and expiration dates are also available for the user to fill up.
- After clicking the submit button a confirmation check box will pop up.

Priority Level: High

Precondition: User is logged in and on the Donor Homepage.

Cross-references: 3.1.1, 3.1.2.1

3.1.4 Organizer Homepage

- If anyone registers themselves as an organizer, they will be accessing this page.
- Where they will be in authority of some actions i.e., food level check, inform workers, food necessities, food quantity calculation, receive a suggestion from other users.

Priority Level: High

Precondition: User is logged in as an organizer.

Cross-references: 3.1.1, 3.1.2.3

3.1.4.1 Food Level Check

- While operating as an organizer one can push this button to check the level of food that everyone donated.
- It will help the organizer to determine the quantity as well as the number of foods are on stock.

Priority Level: Medium

Precondition: User is logged in as an organizer and on the Organizer.

Cross-references: 3.1.1, 3.1.2.3, 3.1.4

3.1.4.2 Inform worker

- The software will notify the admin with a screen that includes that the food is ready to deliver.
- The admin will then get information about the location where the storage is full also the available worker at that location.
- After selecting the worker if the admin press “confirms”, that particular worker will get notified.

Priority Level: Medium

Precondition: User is logged in as an organizer and on the Organizer Homepage.

Cross-references: 3.1.1, 3.1.2.3, 3.1.4

3.1.4.3 Food Necessities

- The software gives an option for the organizer where they will be receiving notifications from the workers.
- When they push the ‘notify from the worker’ button they will see the location and quantity of the foods.
- If the next button is pressed another window will come up where they can count the quantity of food for both categories.

Priority Level: Medium

Precondition: User is logged in as an organizer and on the Organizer.

Cross-references: 3.1.1, 3.1.2.3, 3.1.3.2

3.1.4.4 Quantity Calculation

- The software will present the admin with a screen that includes the option to check the collection list for both human and animal consumable foods.
- Also, there will be a section where the distribution list will be registered.
- The software will then calculate the total food by subtracting distributed food from collected food and let the organizer know.
- Another feature is there will be a suggestion box where suggestions can be given and stored in the database by clicking on the “store in Database”.

Priority Level: Medium

Precondition: User is logged in as an organizer and on the Organizer Homepage.

Cross-references: 3.1.1, 3.1.2.3, 3.1.4

3.1.4.5 Receive Suggestion

- The organizer will receive suggestions from workers and other users. These suggestions will be checked by the organizer by typing the 'Receive suggestion' button.

Priority Level: Medium

Precondition: User is logged in as an organizer and on the Organizer Homepage.

Cross-references: 3.1.1, 3.1.2.3

3.1.5 Worker Homepage

- The software will give the workers options to receive notifications from the organizer, collect the food, deliver food, and info the necessity.
- To receive messages workers will have to press the receive message button.
- To collect food, they first will have to select the food category option and the quantity and press confirm to collect it.
- Similarly, to deliver food they first will have to select the food category option and the quantity and press confirm to deliver it.
- Workers can send messages to the organizer too by clicking the necessary information.

Priority Level: High

Precondition: User is logged in as a worker.

Cross-references: 3.1.1, 3.1.2.2

3.1.6 Messages

- This page will only be used to interact between the user and the organizer about donating food or collecting food.
- Also, if there are any problems regarding delivery and collecting the food can be shared through this interface.

Priority Level: Low

Precondition: User has to login in with a valid account.

Cross-references: 3.1.1, 3.1.2.2, 3.1.5

3.1.7 My Profile

- In this interface users can see their personal info, donation, rewards, and achievement.
- They can change their settings also can reach out for help in the community.

Priority Level: Low

Precondition: User has to login in with a valid account.

Cross-references: 3.1.1

3.1.8 Sign out

- If the user clicks on the logout option, the software may prompt the user to confirm if they want to log out.
- If prompted, confirm that they want to log out by clicking on the "yes" or "confirm" button.
- The software will log them out of their account and return them to the login page of the application.

Priority Level: Low

Precondition: User has to login in with a valid account.

Cross-references: 3.1.1

3.2 Non-Functional/Quality Requirements

QA1: Availability

This requirement specifies a minimum level of availability for the software, which is measured over a specified time period. The system shall be available at least 90% on weekdays between 6 am to midnight local time and at least 95% available on weekdays between 10 am to 2 pm. This requirement helps to ensure that the software is highly available and reliable for users, which can contribute to a positive user experience and overall satisfaction with the software.

Priority Level: High

Precondition: User should log in to the system.

Cross-references: QA6, QA7

QA2: Performance

The system shall be able to handle a large number of users and requests simultaneously, without experiencing any significant slowdowns or crashes. The response time for the system to process requests shall not exceed two seconds.

Priority Level: Medium

Precondition: User has to log in with a valid ID.

Cross-references: QA1, QA3, QA4, QA8

QA3: Usability

This requirement emphasizes the importance of designing software with the user in mind and ensuring that it is easy and intuitive for users to interact with. This requirement helps to ensure that the software is user-friendly and easy to use.

Priority Level: Medium

Precondition: Software should be designed in favor of the consumers

Cross-references: QA1, QA2, QA4

QA4: Efficiency

This requirement specifies a desired level of efficiency for the software, in terms of its response time to user requests. It sets both an average and a maximum response time, to allow for some variation in response times while still ensuring that the software is generally responsive to user inputs. This requirement helps to ensure that the software is efficient and effective in meeting user needs, which can contribute to a positive user experience and overall satisfaction with the software.

Priority Level: High

Precondition: Having clear goals and performance measurements analysis of the software.

Cross-references: QA2, QA5

QA5: Integrity

This requirement helps to ensure that the software's data is trustworthy and reliable, which can be critical for users who rely on the software to make important decisions or take important actions

Priority Level: High

Precondition: Admin should log in along with a valid username and password.

Cross-references: QA3, QA4, QA8, QA9

QA6: Reliability

The system shall be reliable and available for use 24/7, with minimal downtime or interruptions. The system shall have a mean time between failures of at least 1000 hours.

Priority Level: High

Precondition: Software should have fault tolerance and redundancy, Error Handling and Exception Management to perform 24/7

Cross-references: QA3, QA4, QA5

QA7: Robustness

This requirement emphasizes the importance of designing software that can handle unexpected inputs and edge cases, such as invalid user inputs or unexpected system errors. By ensuring that the software is able to handle these situations gracefully, without crashing or compromising data integrity, developers can ensure that the software remains robust and resilient even in unpredictable circumstances. This requirement helps to ensure that the software is reliable and able to function effectively even in challenging conditions, which can be critical for users who depend on the software for important tasks or decisions.

Priority Level: High

Precondition: Software should have Resilient Architecture and defensive programming to be able to tackle any unexpected challenges.

Cross-references: QA2, QA3, QA4, QA5

QA8: Testability

This requirement emphasizes the importance of designing software that is easily testable, in order to facilitate efficient testing and debugging by developers. Additionally, by designing for testability, developers can reduce the amount of time and effort required to test and debug the software, which can lead to faster development cycles and better overall efficiency. This requirement helps to ensure that the software is reliable and of high quality, which can be critical for users who depend on the software for important tasks or decisions.

Priority Level: Medium

Precondition: Software with test environment management, testability as a design principle.

Cross-references: QA2, QA4, QA5

3.3 Project Requirements

3.3.1 Tools

- IDE: Eclipse or IntelliJ
- Database: MySQL or Oracle
- Framework: Spring Boot
- Front-end: HTML/CSS, JavaScript, React
- Testing: Selenium

3.3.2 Project Timeline

Project timeline for Food Cycle management System:

Time: We require Seven months to build the software

- Month 1-2 (8 weeks): Requirements gathering and analysis
- Month 3 (4 weeks): Design and prototyping
- Month 4 (4 weeks): Development and implementation
- Month 5 (4 weeks): Testing and quality assurance
- Month 6 (4 weeks): Deployment and user training
- Month 7 (4 weeks): Final testing and bug fixing

Budget:

Developer Salary in 7 Months:

Per Developer Salary per Working Hour = 400 Taka

Total Developer Salary = 400 * 1232 Taka

= 4, 92,800 Taka

Requirement Analysis:

Time needed: 1/2 month (11 Working Days = 88 Working Hour)

Requirement Analysis Person's Hourly Wage = 300 Taka

Total Requirement Analysis Expense = 300 * 88 Taka

= 26,400 Taka

Transportation Cost Estimation:

7,000 Taka

Training & Hardware Expenses Estimation:

50,000 Taka

Rent Expenses:

Room per Month = 5,000 Taka

Total in 7 Months = 35,000 Taka

Total Utilities in 7 Months:

21,000 Taka

Resource: We have to need two human resources to build the software.

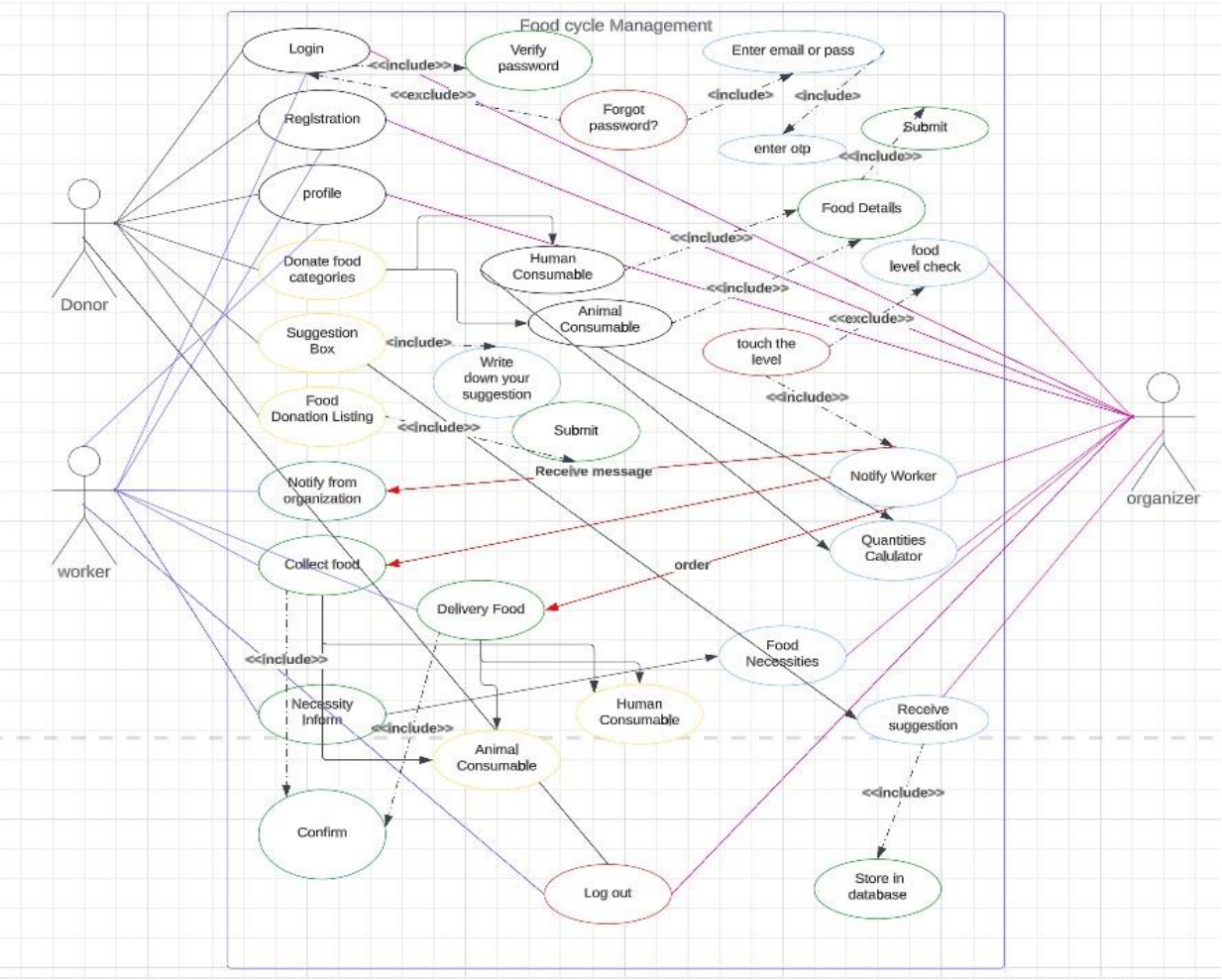
Environment: Web Application.

4. Design and Interface Requirements

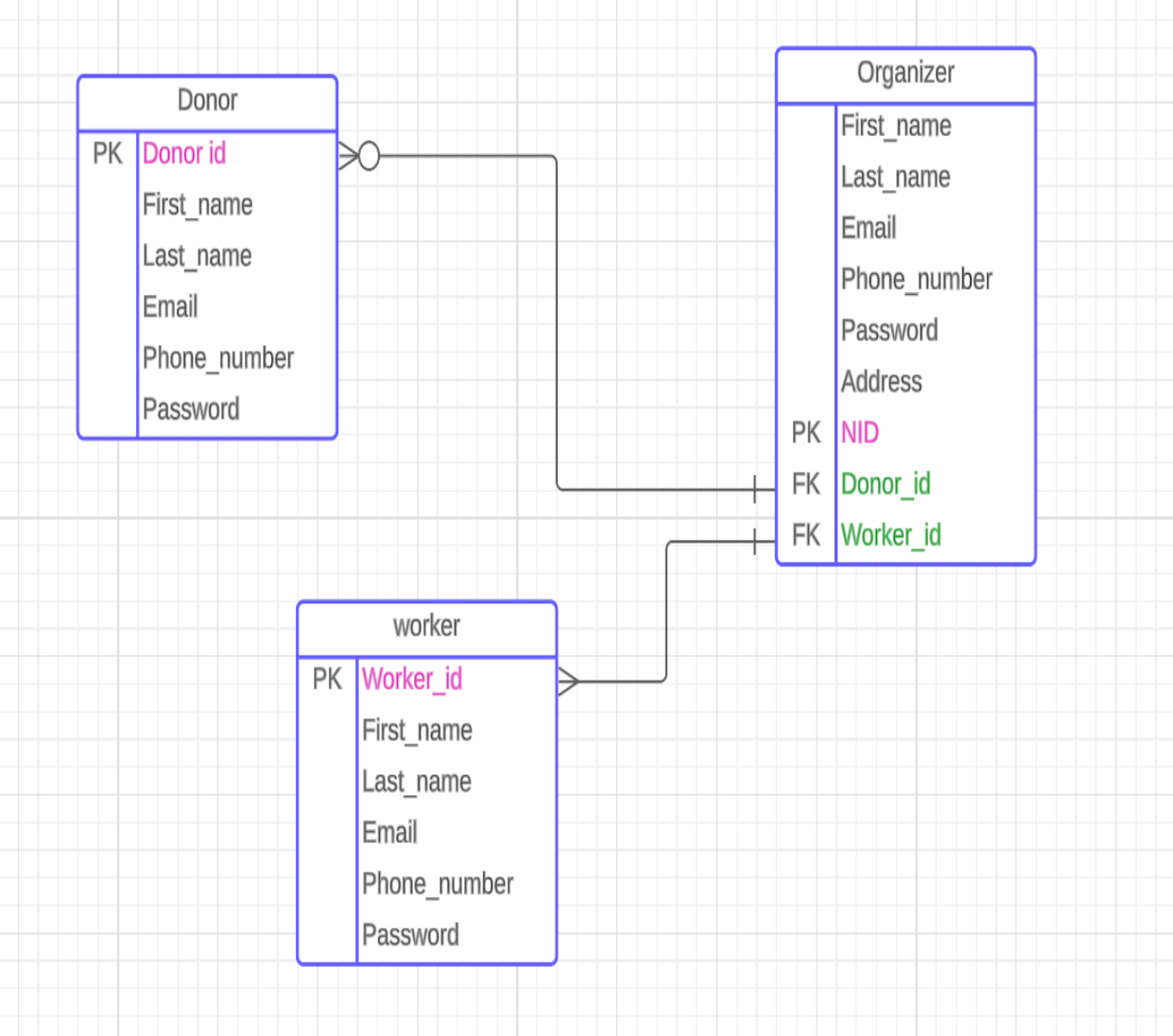
4.1 UML Diagrams

Here the UML (Unified Modeling Language) diagram shows a visual representation of the system's structure and behavior of Food Cycle Management System. We use lucid chart for UML diagram.

USE Case Diagram:



ER Diagram:


Donor
PK
Donor id
First_name
Last_name
Email
Phone_number
Password
Organizer
First_name
Last_name
Email
Phone_number
Password
Address
PK
NID
FK
Donor_id
FK
Worker_id
worker
PK
Worker_id
First_name
Last_name
Email
Phone_number
Password

4.2 Data Dictionary

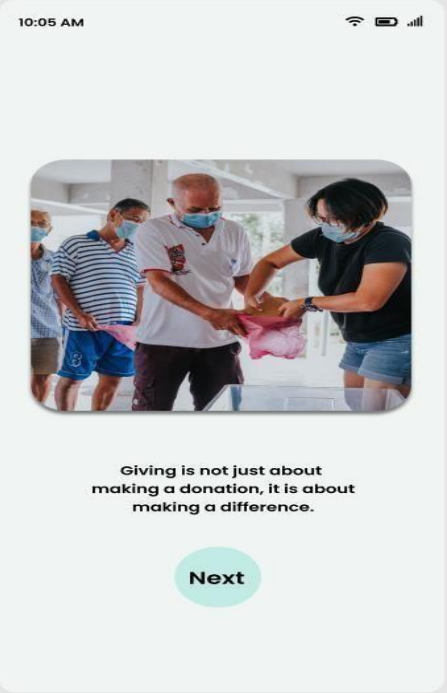
Here the Data Dictionary shows overall data items, their attribute and their relationship within the system.

Entity	Attribute	Type/Size	Validation	Key
Donor	Donor_id	Number(10)	Required	Primary
Donor	First_name	Text(15)	Required	
Donor	Last_name	Text(15)	Required	
Donor	Email	Text(30)	Required	
Donor	Phone_number	Number(11)	0-9	
Donor	Password	Text(30)	Required	
Worker	Worker_id	Number(10)	Required	Primary
Worker	First_name	Text(15)	Required	
Worker	Last_name	Text(15)	Required	
Worker	Email	Text(30)	Required	
Worker	Phone_number	Number(11)	0-9	
Worker	Password	Text(30)	Required	
Organizer	First_name	Text(15)	Required	
Organizer	Last_name	Text(15)	Required	
Organizer	Email	Text(30)	Required	
Organizer	Phone_number	Number(11)	0-9	
Organizer	Password	Text(30)	Required	
Organizer	Address	Text(80)	Required	
Organizer	NID	Number(10)	Required	Primary
Organizer	Donor_id	Number(10)	Required	Foreign
Organizer	Worker_id	Number(10)	Required	Foreign

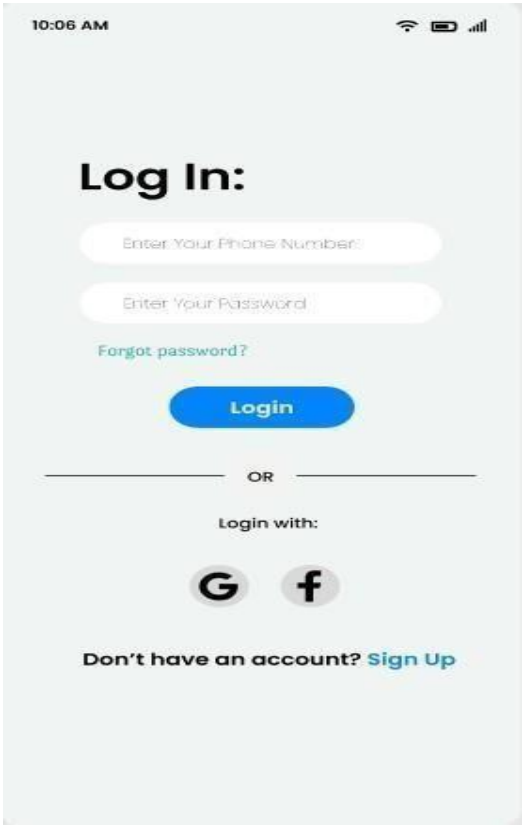
4.3 UI/UX Design Specification

Here we used Figma tool for UI design. Basically, Figma is a design tool. It used for creating user interfaces (UIs).

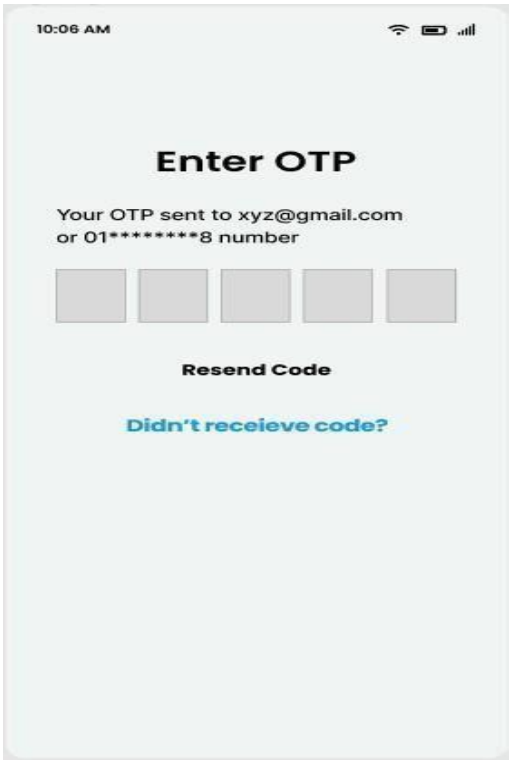
Splash:

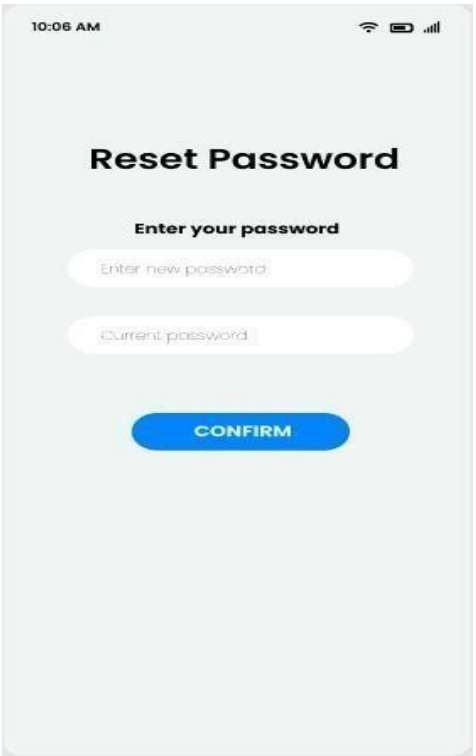


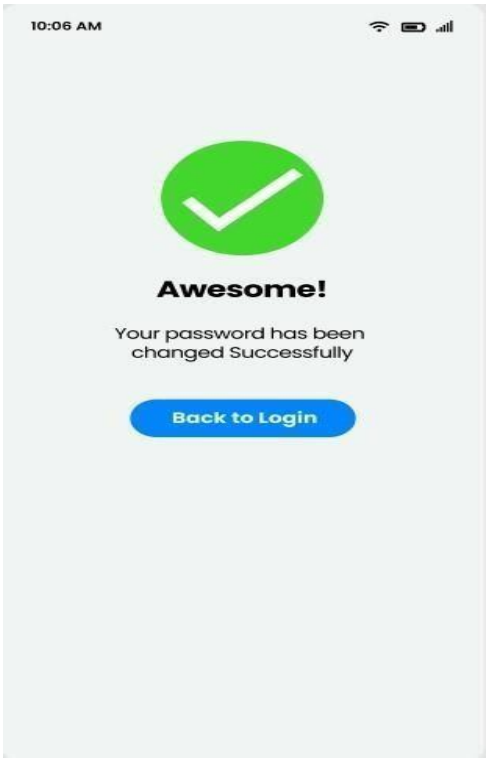
Login:


10:06 AM
Log In:
Enter Your Phone Number
Enter Your Password
Forgot password?
Login
OR
Login with:
Don't have an account? Sign Up


10:06 AM
Forgot Password?
Enter your Email or Phone Number
Enter Your Email or Phone Number
Send OTP

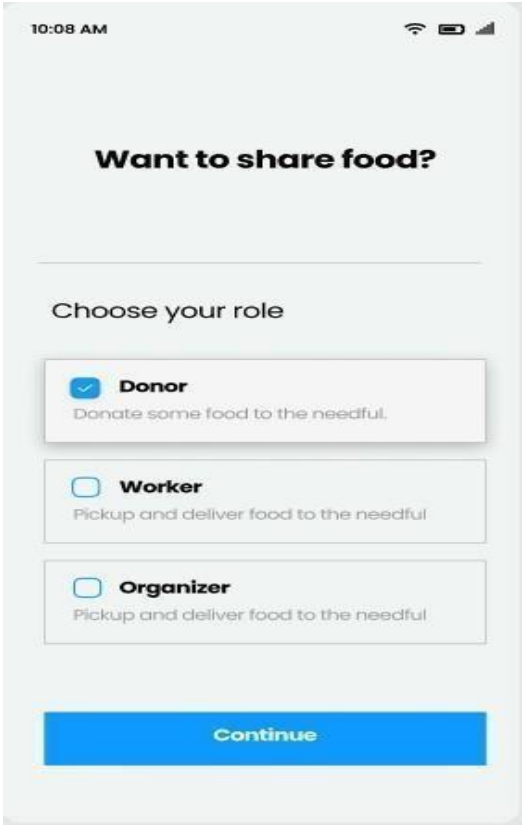

10:06 AM
Enter OTP
Your OTP sent to xyz@gmail.com
or 01********8 number
Resend Code
Didn't receieve code?

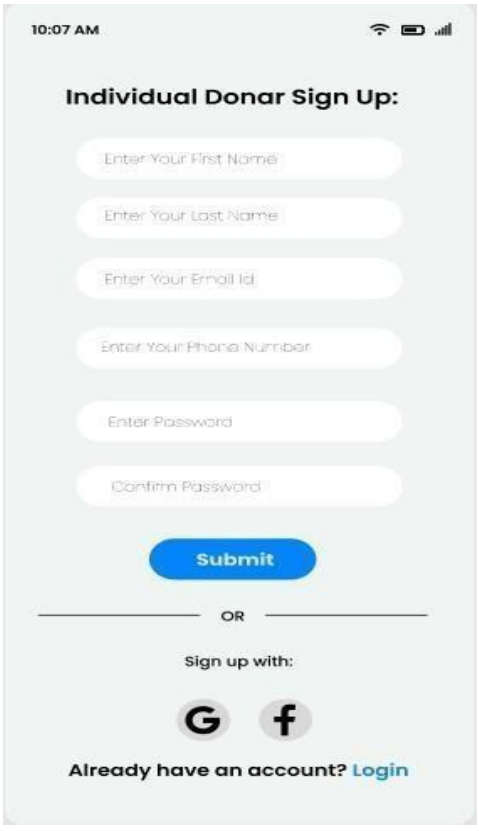

10:06 AM
Reset Password
Enter your password
Enter new password
Current password
CONFIRM



Registration:

(For Donor)

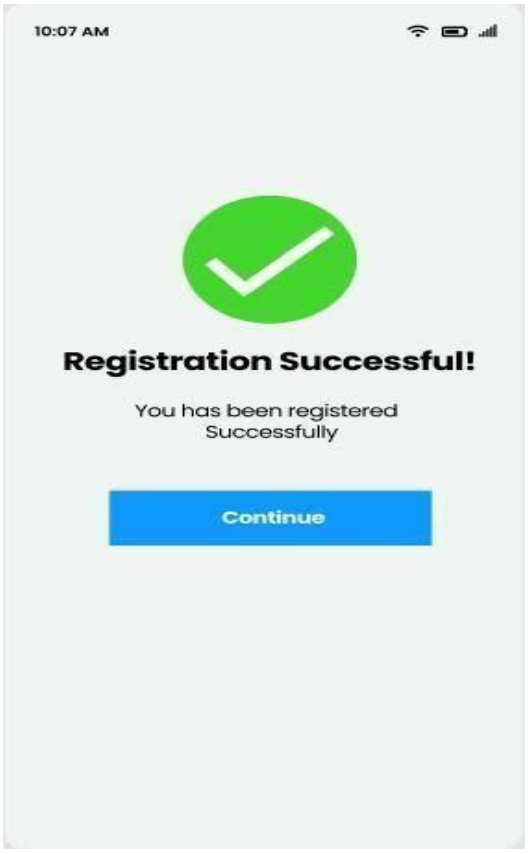




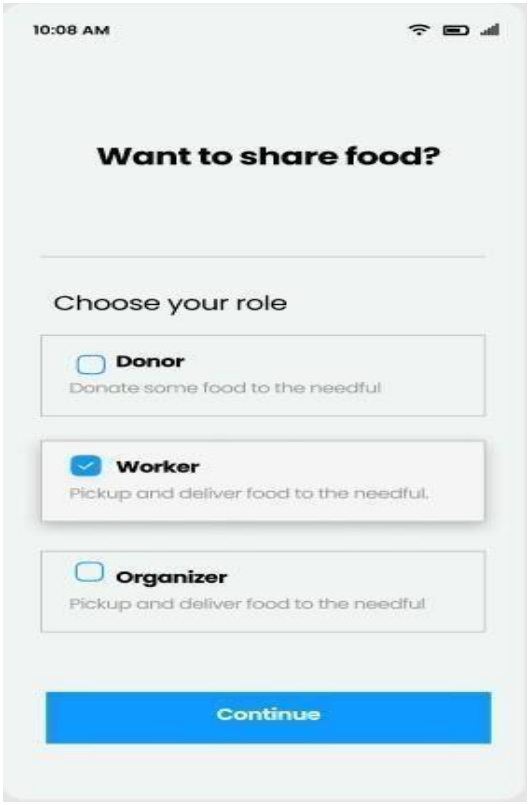

10:07 AM
Enter OTP
Your OTP sent to +88 017*****128
this number
Resend Code
Didn't receieve code?

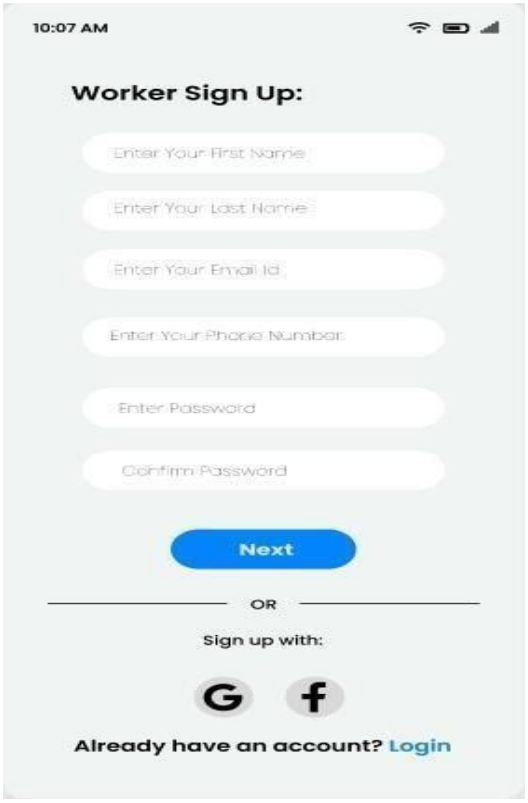

10:07 AM
Enter OTP
Your OTP sent to +88 017*****128
this number
OTP Successful!
Your phone number has been registered changed Successfully

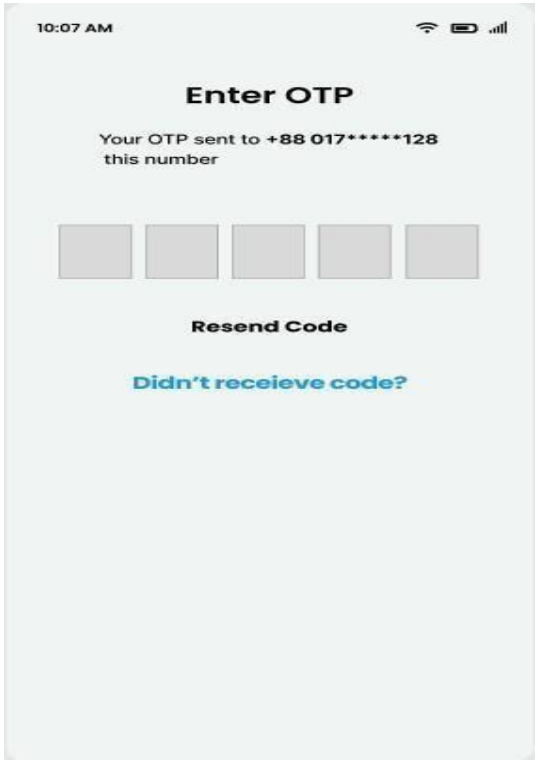

10:08 AM
Select your location
Welcome Moshiur
Mamun Auto Electric Works, RCCC+QPV, Dhaka 1229
Kuril Truck Stand
Kuril-Kuratoli Adarshaw High School
Islami Bank Bangladesh Limited
Nearby Locations
জিদান খাবার হোটেল
4.3 (4)
Restaurant · RC8F+HQH
Open · Closes 11 PM
Dine-in · Takeaway
Set Location


10:07 AM
Registration Successful!
You has been registered Successfully
Continue

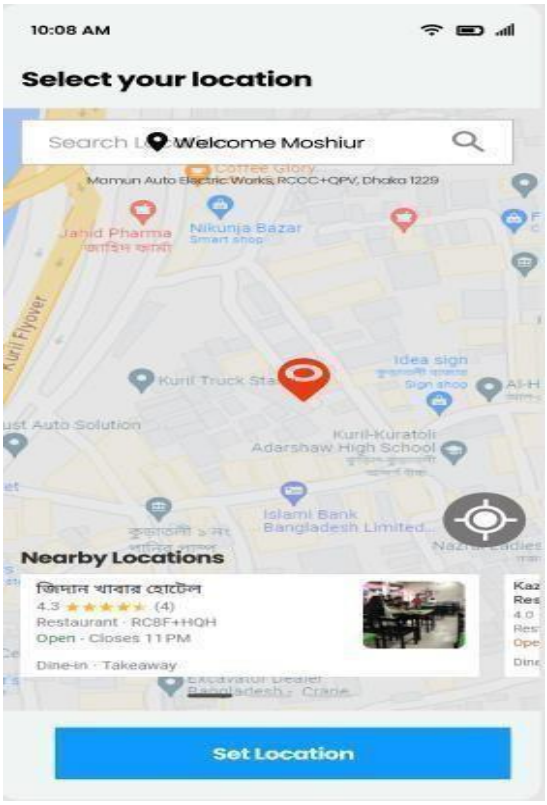
(For worker)

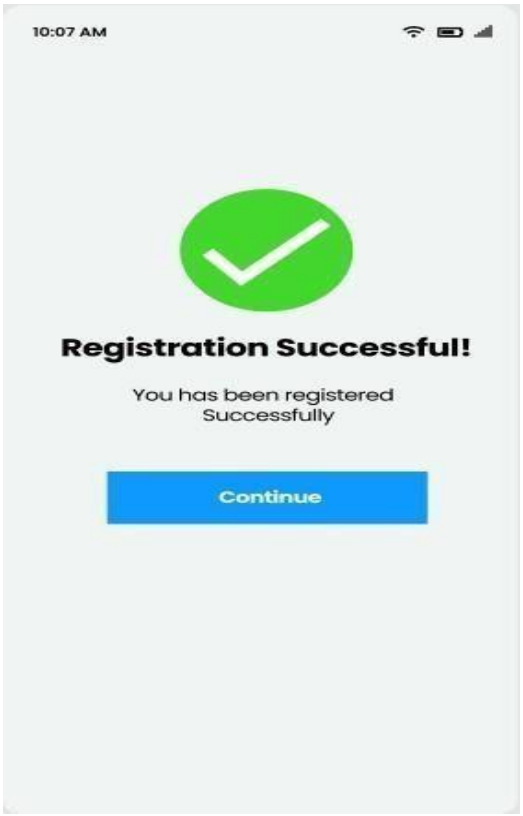

10:08 AM
Want to share food?
Choose your role
Donor
Donate some food to the needful
Worker
Pickup and deliver food to the needful.
Organizer
Pickup and deliver food to the needful
Continue


10:07 AM
Worker Sign Up:
Enter Your First Name
Enter Your Last Name
Enter Your Email Id
Enter Your Phone Number
Enter Password
Confirm Password
Next
OR
Sign up with:
Already have an account? Login

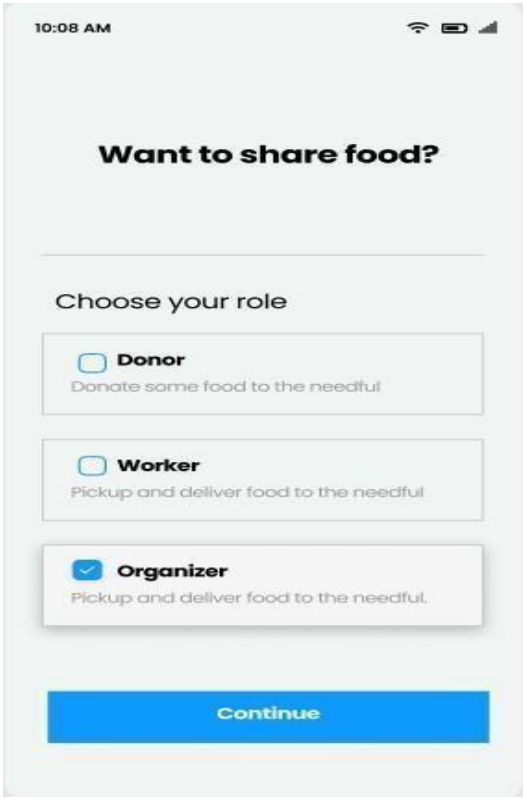

10:07 AM
Enter OTP
Your OTP sent to +88 017*****128
this number
Resend Code
Didn't receieve code?

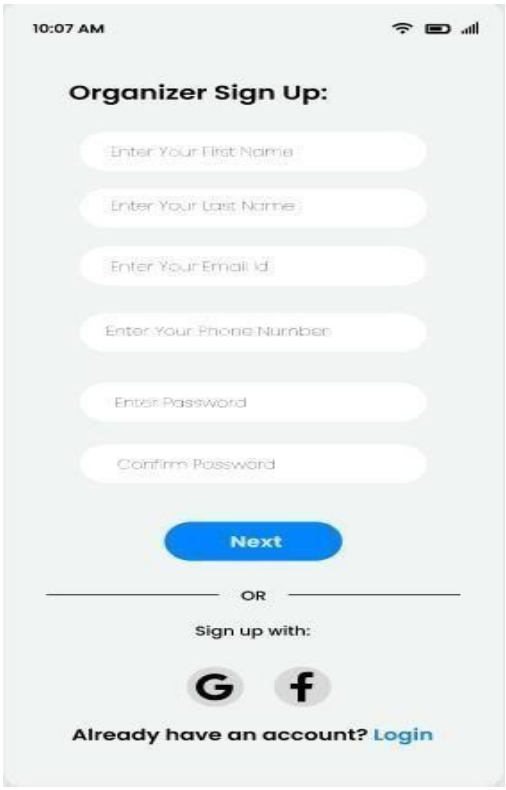

10:07 AM
Enter OTP
Your OTP sent to +88 017*****128
this number
OTP
Successful!
Your phone number has been
registered changed Successfully

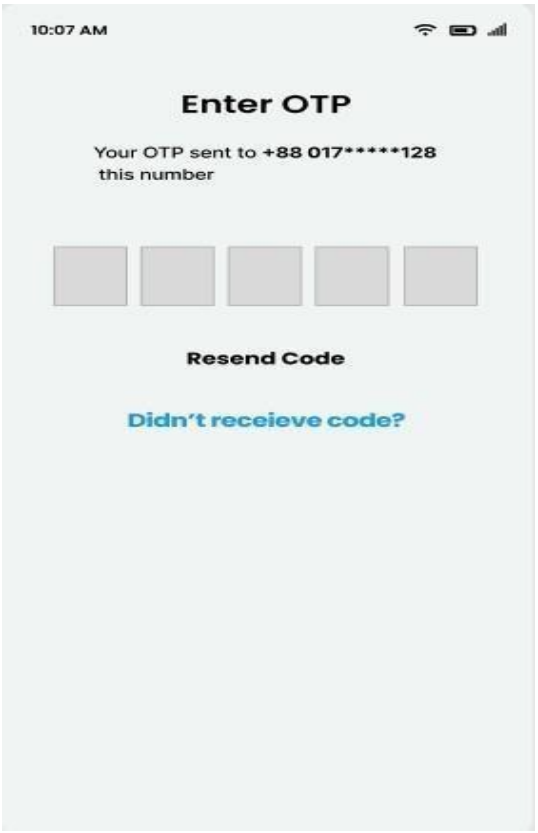




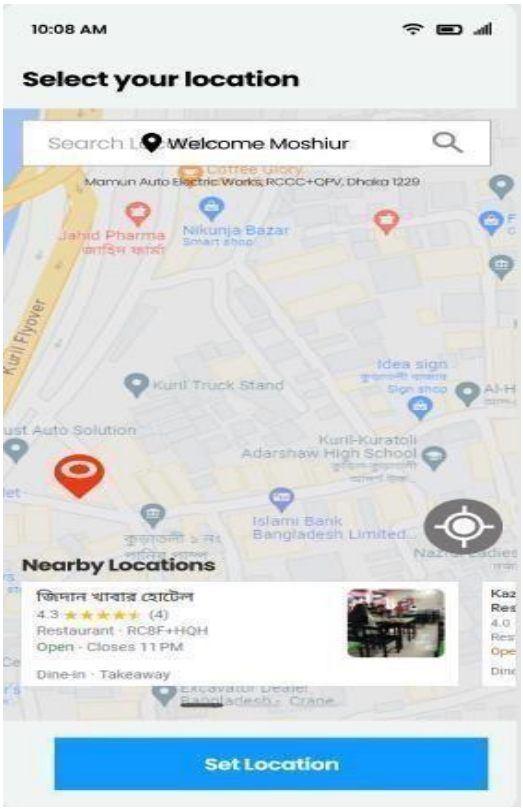
(For Organizer)

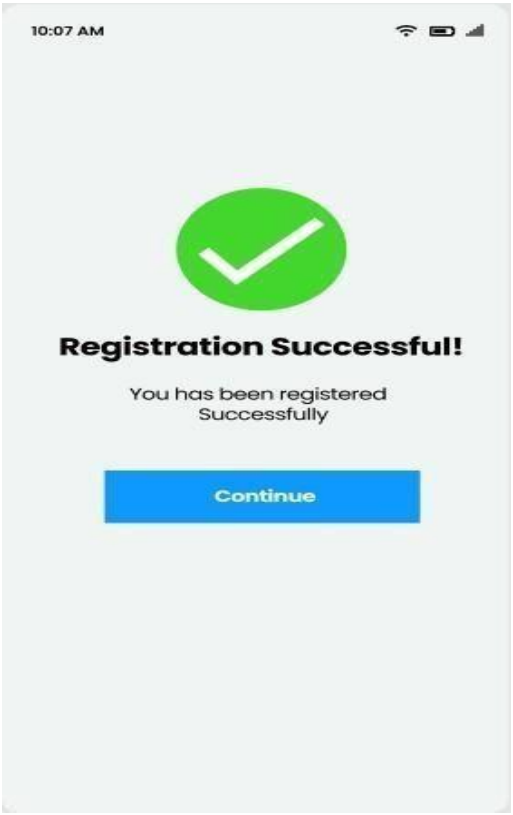





10:07 AM
Enter OTP
Your OTP sent to +88 017*****128
this number
Resend Code
Didn't receieve code?


10:07 AM
Enter OTP
Your OTP sent to +88 017*****128
this number
OTP
Successful!
Your phone number has been
registered changed Successfully

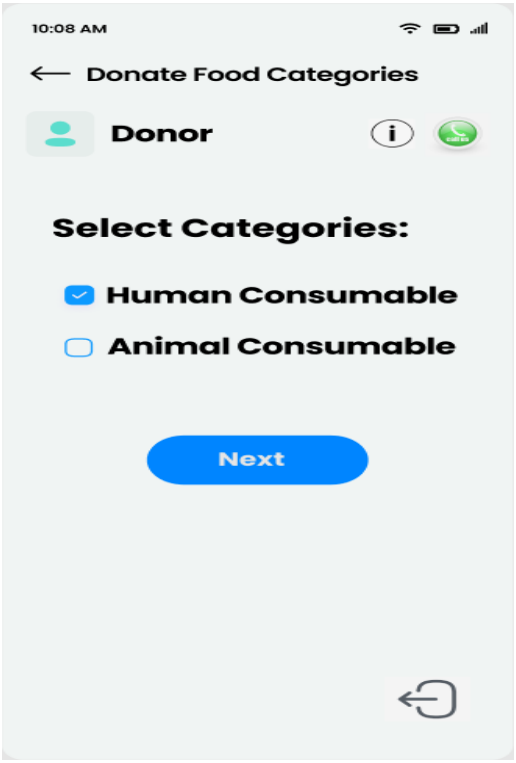

10:08 AM
Select your location
Welcome Moshiur
Mamun Auto Electric Works, RCCC+QPV, Dhaka 1229
Jahid Pharma
Nikunja Bazar
Kuril Flyover
Kuril Truck Stand
Idea sign
Kuril-Kuratoli
Adarshaw High School
Islami Bank
Bangladesh Limited
Nearby Locations
জিমদান খাবার হোটেল
4.3 (4)
Restaurant · RC8F+HQH
Open · Closes 11 PM
Dine-in · Takeaway
Set Location


10:07 AM
Registration Successful!
You has been registered
Successfully
Continue

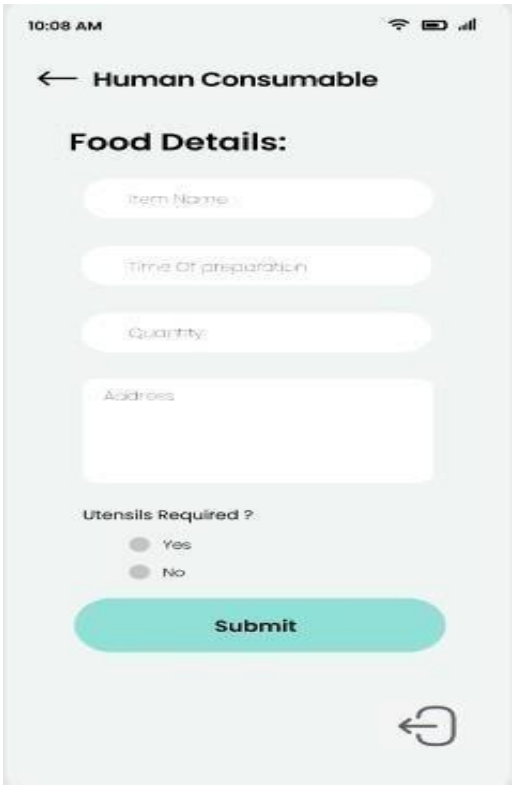
Donor:

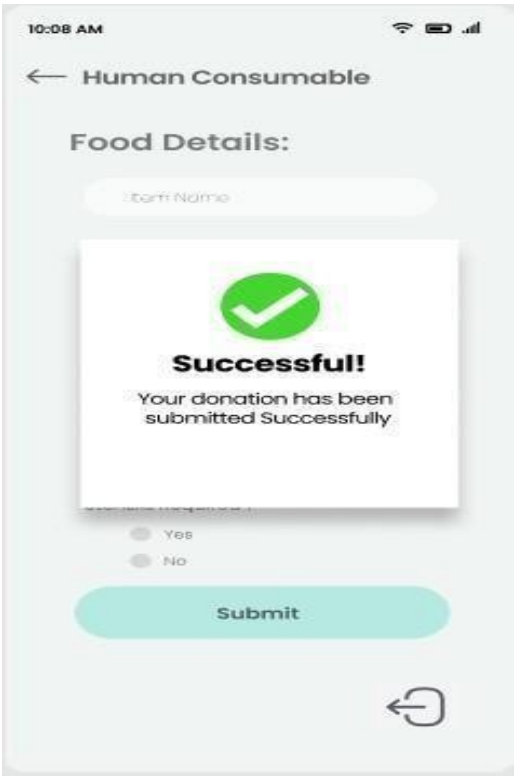
(Home Page)

(Donate Food Categories)

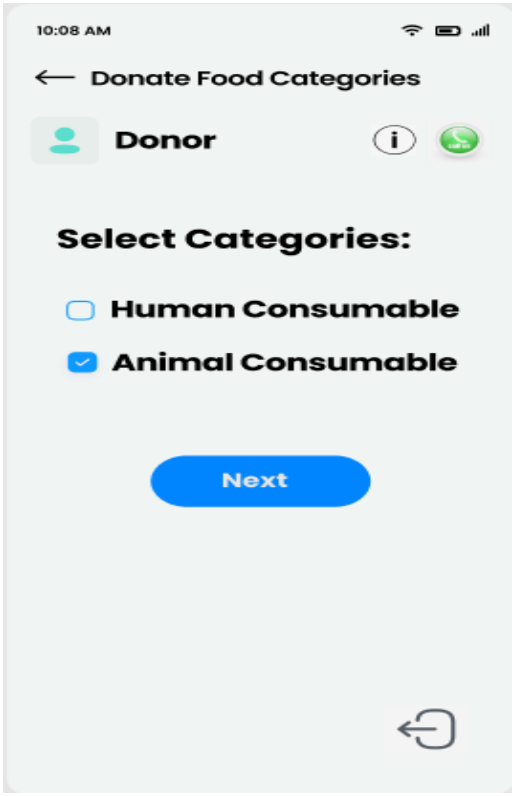


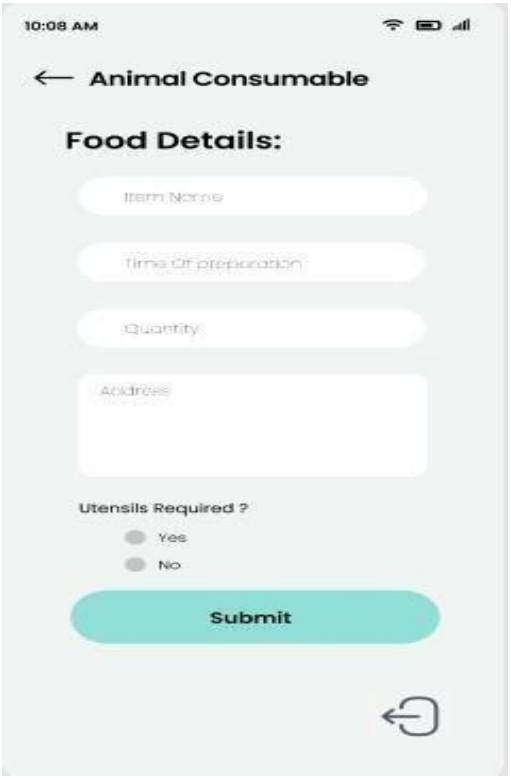
(Human Consumable)

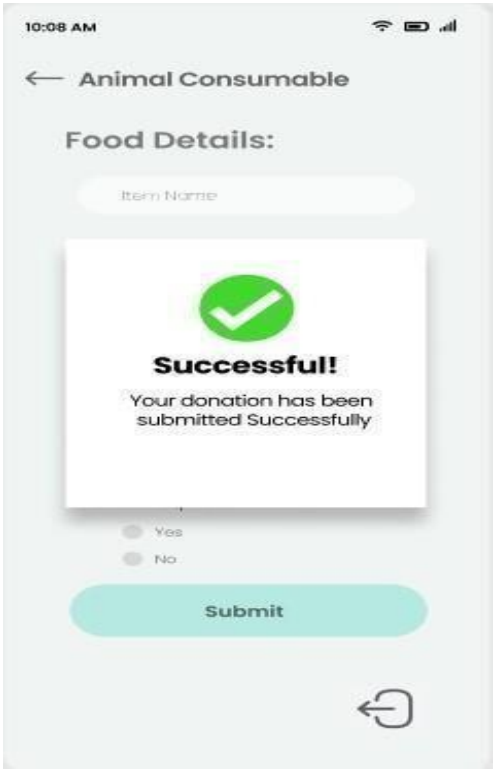




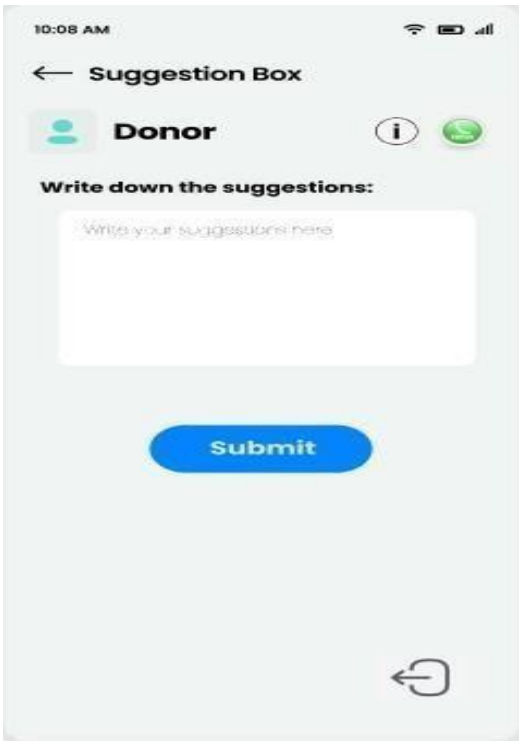
(Animal Consumable)

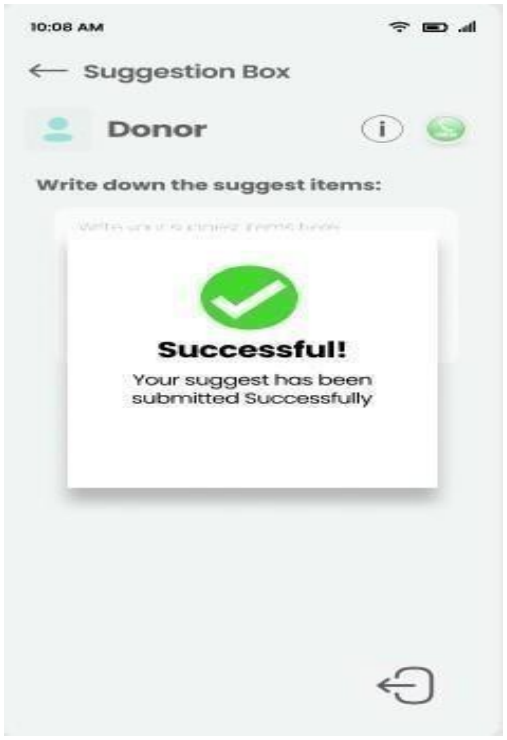






(Suggestion Box)



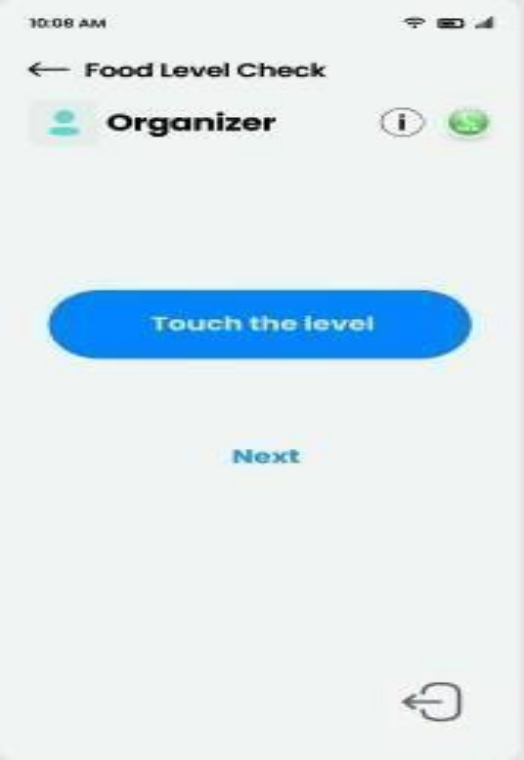


(Food Donating Lists)

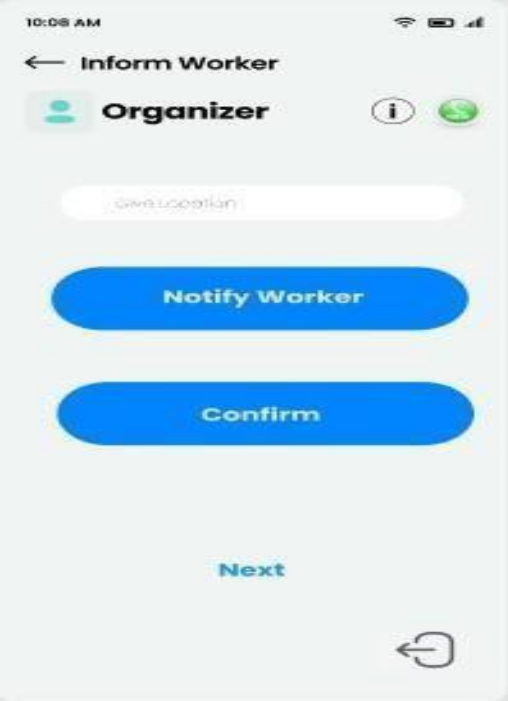
Organizer:

(Home Page)

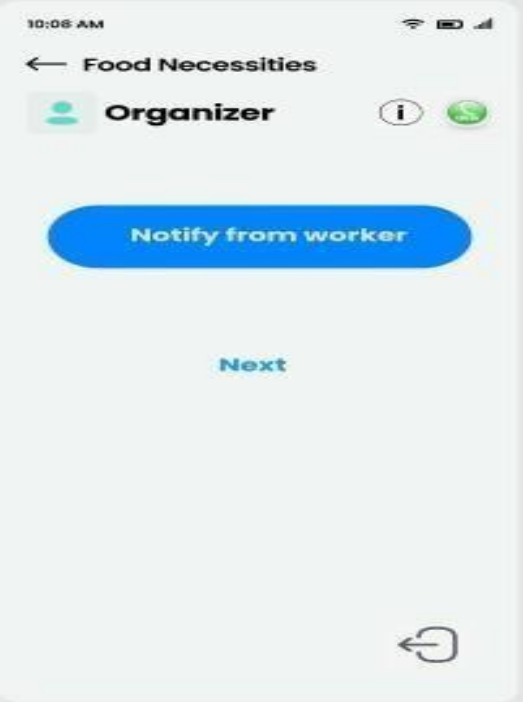
(Food Level Check)



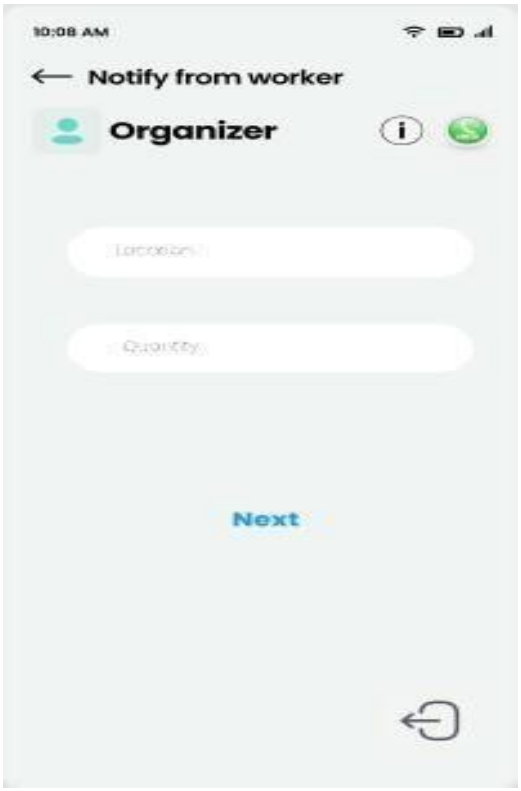
(Inform Worker)



(Food Necessities)



(Notify from worker)

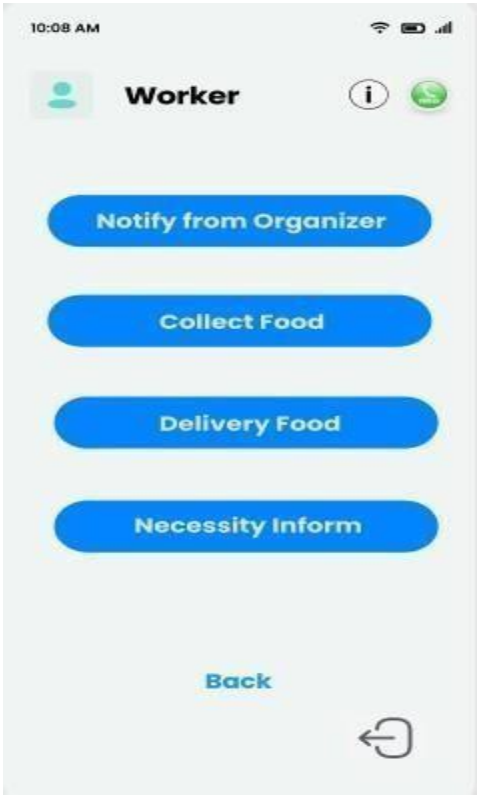


(Quantities Calculation)

(Receive Suggestion)

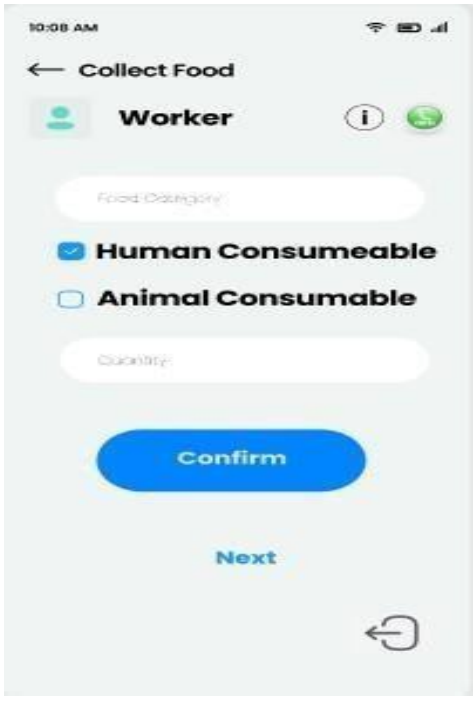
Worker:

(Home Page)

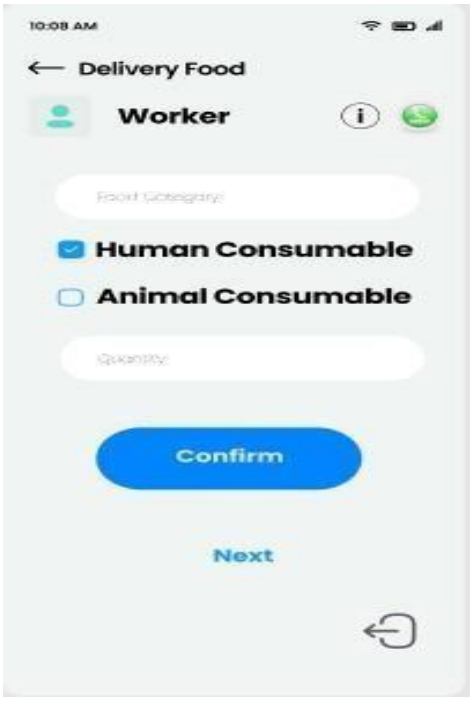


(Notify from Organizer)

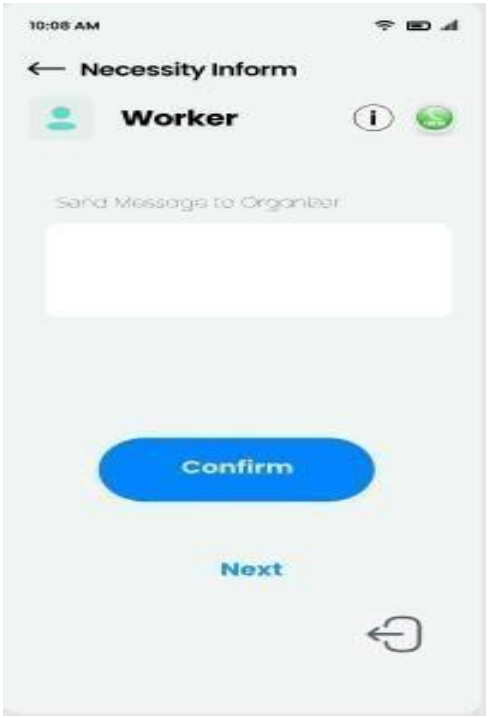
(Collect food)



(Delivery food)

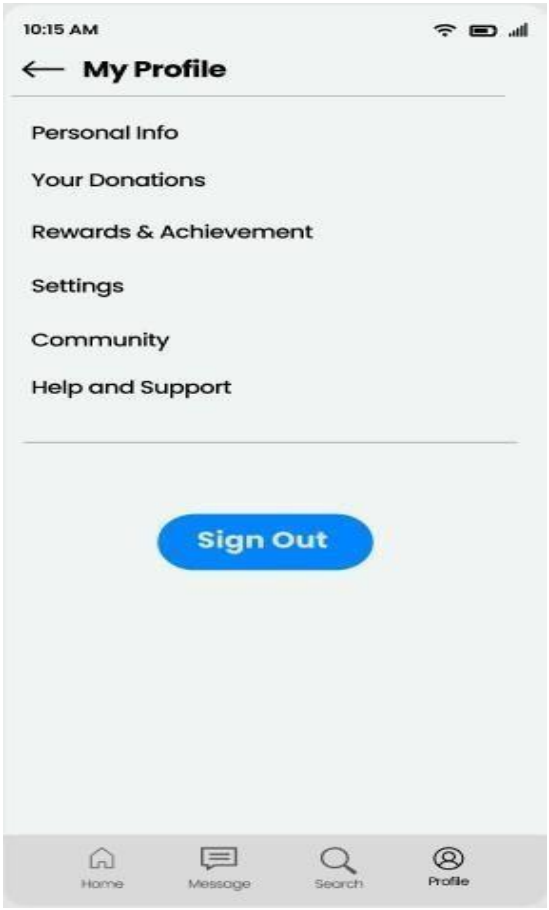


(Necessity Inform)



Message:

Profile:


10:15 AM
My Profile
Personal Info
Your Donations
Rewards & Achievement
Settings
Community
Help and Support
Sign Out
Home
Message
Search
Profile