FOOD WASTE MANAGEMENT SYSTEM

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project is titled "**FOOD WASTE MANAGEMENT SYSTEM**", submitted by **MD. HRIDOY AHMED**, ID No: **172-15-10143,** and **MD HASIBUR RAHMAN,** ID No: **173-15-10402** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 2 February 2023.

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DECLARATION

We hereby declare that this project has been done by us under the supervision of **Shah Md. Tanvir Siddique, Assistant Professor, and Department of CSE** Daffodil International University. Additionally, we affirm that no portion of this project or any component of it has ever been presented elsewhere for the purpose of receiving a degree or diploma.

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We would like to thank everyone of our Daffodil International University classmates who participated in this discussion while completing their course work.

Finally, we must express our gratitude for our parents' unwavering support and patience.

ABSTRACT

There is mounting evidence that a considerable quantity of food is wasted globally, negatively impacting sustainability. Food waste reduction is a key sustainability concern for the food service business. Despite its importance to the worldwide food service sector, the relationship between innovation strategies and food waste management has gotten little attention in academic research. Waste management improvements are used in this application. It is based on an evaluation of incremental and revolutionary waste management systems and innovations that combine practice-driven initiatives with waste management systems. The study shows a variety of waste management initiatives, demonstrating how management's beliefs, knowledge, goals, and actions affect how each initiative is implemented in the food service industry. Practitioners could gain a better understanding of the factors that influence the adoption of technologies to reduce food waste by using the concepts presented here.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

Food is a substance eaten by living things to help them eat. It contains essential supplements like carbohydrates, fats, proteins, nutrients, or minerals and is a standard part of the beginning of a plant or animal. We really want food to live. Notwithstanding, we squander a ton of food in our regular routine.

Across the world, there are cafés that squander lots of overabundance food consistently. Where a great many individuals stay hungry. Bangladesh is one of the most thickly and exceptionally populated nations on the planet. People and eateries in the nation, where the shortage of food is the area of strength for exceptionally, squander a ton of food.

We have fostered an Android application to lay out relations between cafés or food givers and the foundation association as specialists to empower an abundance of food gifts. People can likewise give squandered food through our application. Enrolled foundation associations can get the squandered food that is given by eateries or individual clients. Then volunteers of the association will serve the food to vulnerable and hungry individuals.

The accessibility of cell phones offered us the chance to convey trend-setting innovation in our pockets. Every individual actually looks at their telephone subsequent to awakening and plugs in the charger to charge the telephone prior to resting. In light of innovation, everything is becoming computerized. Everything is becoming online from offline. Nowadays, we are doing courses online, shopping online, and so on. There is a variety of end uses for food waste management. Food waste management is an android application that will help to collect extra food from donors' homes, restaurants, etc. The system is planned to consist of various useful features for the said purpose. By working on this project, we have gained technical knowledge of Kotlin, XML, Firebase Authentication, and Firebase Real-time Database.

1.2 Motivation

Following are some of the motivations for this Food Waste Management:

There are many foodless people around the country. They can hardly afford food for their family and themselves as well. Therefore, we took a step to reach food to those helpless people from the wasted food of the restaurant, community centers, and party centers.

1.3 Objective

Some objectives are:

- Donors will post the food detail; pick the location address and the number of people available for donated food.
- Our agents will collect those foods from the pick address and reach the foodless people.
- Blogs can help humans with this application.

1.4 Expected Outcome

In this application, foodless people will get food from restaurants and social events by agents. It will reduce food crises among the homeless and foodless people who live below the poverty level.

1.5 Report Layout

Chapter 1: Introduction

This chapter discusses work inspiration, motivation, project objectives, and programme outcomes..

Chapter 2: Background

Background information is crucial, and this chapter examines background-related tasks including comparing the project to other initiatives to identify its problems and difficulties.

Chapter 3: Requirement Specification

This chapter defines several critical project needs, such as the use case model, business process modelling, and logical database.

Chapter 4: Design Specification

This chapter defines several critical project needs, such as the use case diagram, business process modelling, and logical database.

Chapter 5: Implementation and Testing

This chapter demonstrates the project's testing and implementation process using a project screenshot. Any project's testing results and success after completion indicate whether it is ready to go live.

Chapter 6: Impact on Society, Environment, and Sustainability

This chapter went over the impact on society, the environment, restrictions, challenges, and success.

Chapter 7: Conclusion and Future Scope

This chapter discusses the future implementation scope as well as how limits can be overcame in any project.

CHAPTER 2
BACKGROUND

2.1 Introduction

The world has undergone a profound change thanks to the Internet. We are getting more and more reliant on technology that is based online in today's environment. The internet is our lifeline in almost every way. We made an effort to create the "Food Waste Management" android application, which will be accessible to society's most vulnerable members.

2.2 Related Works

Food Waste Management is an Android application for providing social and human rights-related services. Nosh, OLIO, and ShareTheMeal are a few examples of similar applications in Bangladesh: Donate to charity, GoMkt, etc.

OLIO

Food and other items can be shared through OLIO, thereby reducing waste and saving money. It serves free stuff, borrows things, and shops homemade directly from neighbors [8].

nosh

With the nosh app, you can now keep track of your household's food inventory, medications, expiration, use-by, and best-before dates while receiving recipe recommendations based on your food inventory. In order to prevent food waste and save money, nosh is driven by artificial intelligence (AI), which also monitors your food purchasing and waste behaviors [9].

ShareTheMeal: Charity Donate

The World Food Program's ShareTheMeal charity app enables you to feed a hungry child with a single swipe of your phone. The rate of hunger is rising as the world deals with a record number of crises. The good news is that there is an end to hunger. The World Food Program of the United Nations includes ShareTheMeal [10].

GoMkt

GoMkt connects clients looking for deals with restaurants in New York City that have food that has not been consumed. Customers can save up to 75% off the original price when ordering meals for takeout through the app, which also helps to prevent food waste. In order to connect larger food enterprises with charities, composters, and anaerobic digestion facilities, the business-to-consumer platform will grow [8].

2.3 Scope of the Problem

People may be afraid of being scammed because so many internet service providers have fooled them in the past. It is challenging to share with individuals who are hungry. Therefore, we can hardly find foodless people and help them, in this circumstance this application can be the proper solution to end up this social issue and reach the foodless people to feed them.

2.4 Challenges

Every task has challenges. Some of the main challenges of Food Waste Management are:

- Since Food Waste Management is an online application, our main obstacle may be a lack of an internet connection.
- Our programme needs to be correctly built, functionally sound, and user-friendly.

CHAPTER 3
REQUIREMENT SPECIFICATION

This chapter will cover all of the specifications, tools, and technologies required to complete the suggested system. This chapter describes the use case diagram, description, and other requirements.

3.1 Requirement Collection Analysis

The agent is a collector of donated food. They collect food from donors and deliver them to poor people. Donor handovers foods to agents.

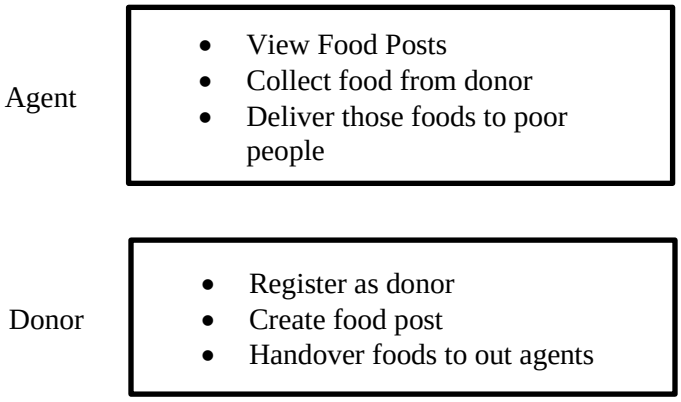

Figure 3.1: Requirement Collection Analysis

3.2 Use Case Modeling and Description

A use-case model describes how several user types interacts with the system in order to solve an issue.

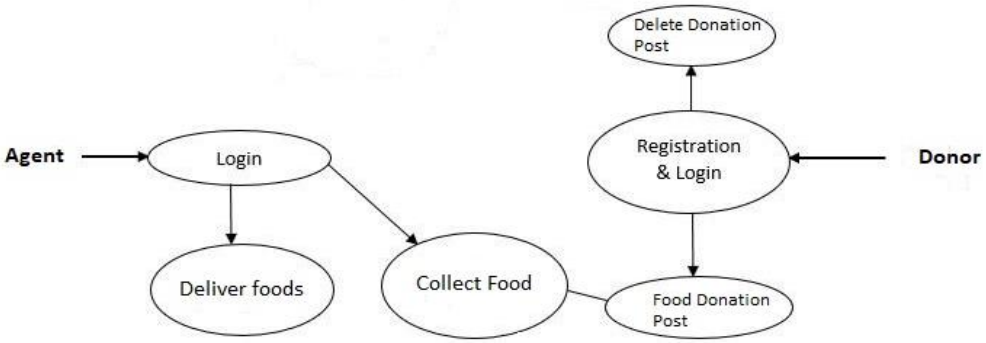

Figure 3.2: Use Case Modeling and Description

3.3 Logical Data Model

The application, which is depicted in the Logical Data Model picture, will receive the response from the API once it is called, and the current time will be held accountable. Data will be transferred from the database to the Android app.

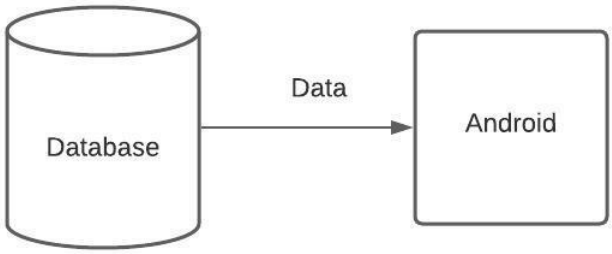

Figure 3.3: Logical Data Model

3.4 Proposed Diagram

Database management, phone calls between agents and donors, and application interface connectivity is shown below:

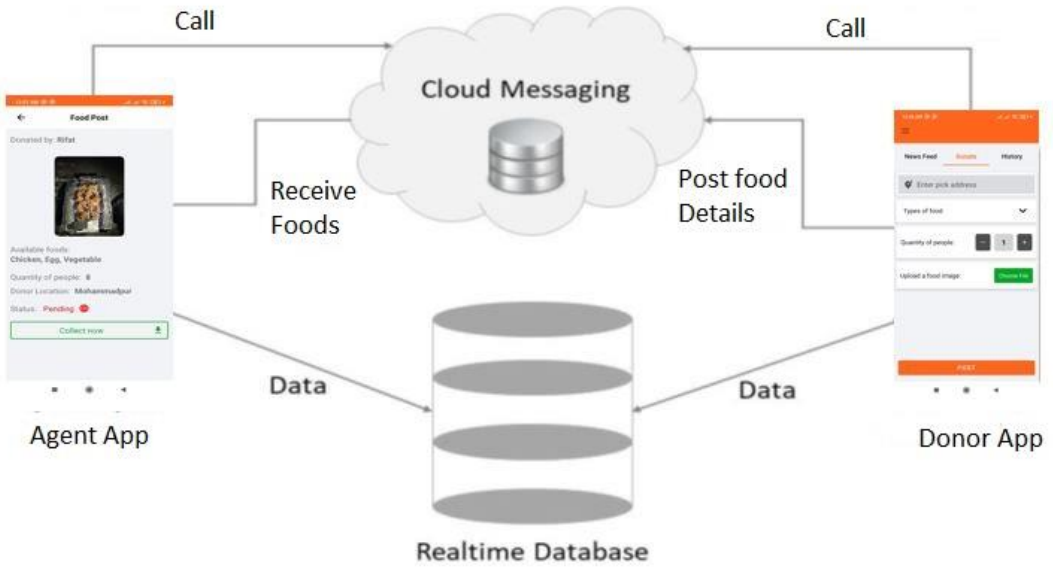

Figure 3.4: Proposed Diagram

3.5 Design Requirements

Mobile apps demand certain design specifications. The user is drawn to using it. Therefore, we need expertise in mobile application design in order to finish the design. We need to be familiar with a variety of computer programming languages and design software, such as AdobeXd, in order to accomplish this. A useful design tool can be market research. In order to guarantee that the database runs smoothly and without difficulty, we need to pay close attention to its design.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-End Design

The front-end is where users interact with the system. We, therefore, built a user-friendly and fluid design after taking this into account. This application is simple to use for all users.

Figure 4.1: Front-End Design (Splash Screen)

4.2 Back-End Design

Server-side rendering is referred to as the "back-end" in software development. Typically, backend programming is broken down into three parts: database, server, and application. For the backend, we have used technologies that are Kotlin, Firebase Realtime Database, and Firebase Cloud Storage.

4.3 Interaction Design and UX

We tried to keep our project's user experience design as straightforward as possible. We used various Android applications after conducting research on the internet and visiting various websites. Then we created the application's UX design.

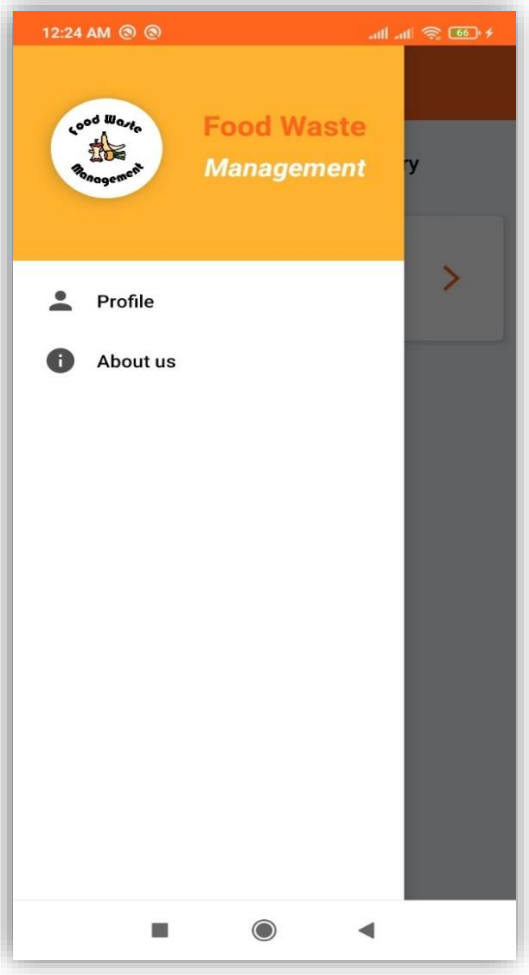

Figure 4.2: Interaction Design and UX

4.4 Implementation Requirements

Our initial employment was in the service sector. We had to spend a lot of time learning new technologies and meeting all of the requirements as a result.

CHAPTER 5
IMPLEMENTATION AND TESTING

The process of implementing backend code and database, as well as the interaction with front-end UI design and testing, are all covered in this chapter.

5.1 Implementation of Database

The ability of any software programme to store data is determined by the database's architecture and implementation. This project takes use of Firebase Database, a cloud-hosted NoSQL database that allows developers to store and sync data amongst users in real time. For its data model, the database stores far too much data.

5.2 Implementation of Front-end Design

Due to how it is presented to users, front-end design is crucial. A streamlined and user-friendly front end must be taken into account while creating an application's design. The ideal design that appeals to everyone is quite tough to create.

Login

User login with phone number and password.

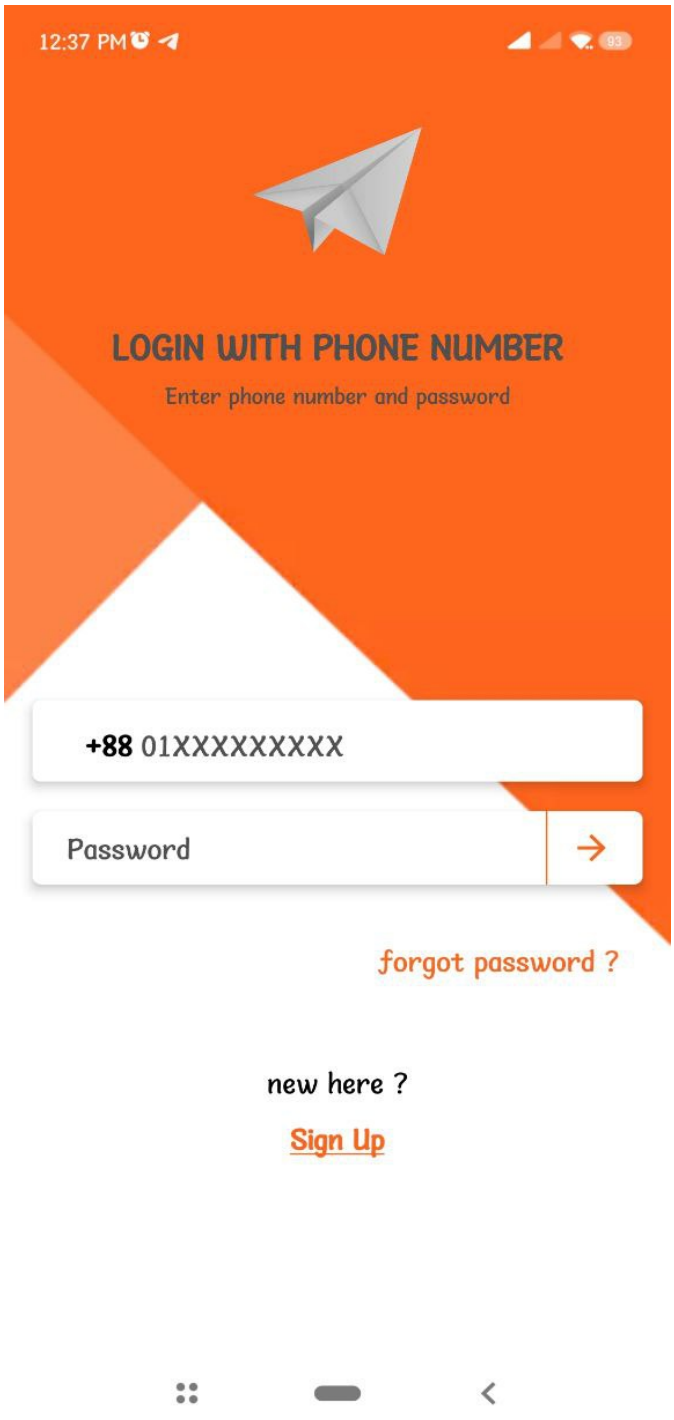

Figure 5.1: Login View

Signup View

In the login screen, we have the project title, logo, forms for inputting login information, and a login button.

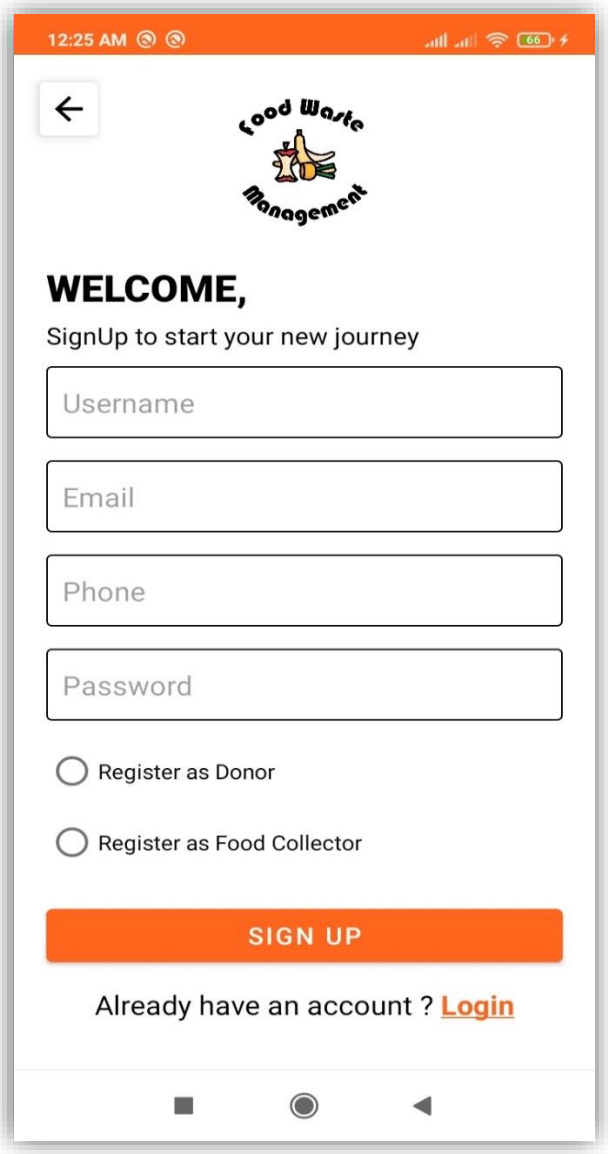

Figure 5.2: Signup View

Donor Dashboard

On the donor dashboard, page users will see all food donation posts in the newsfeed.

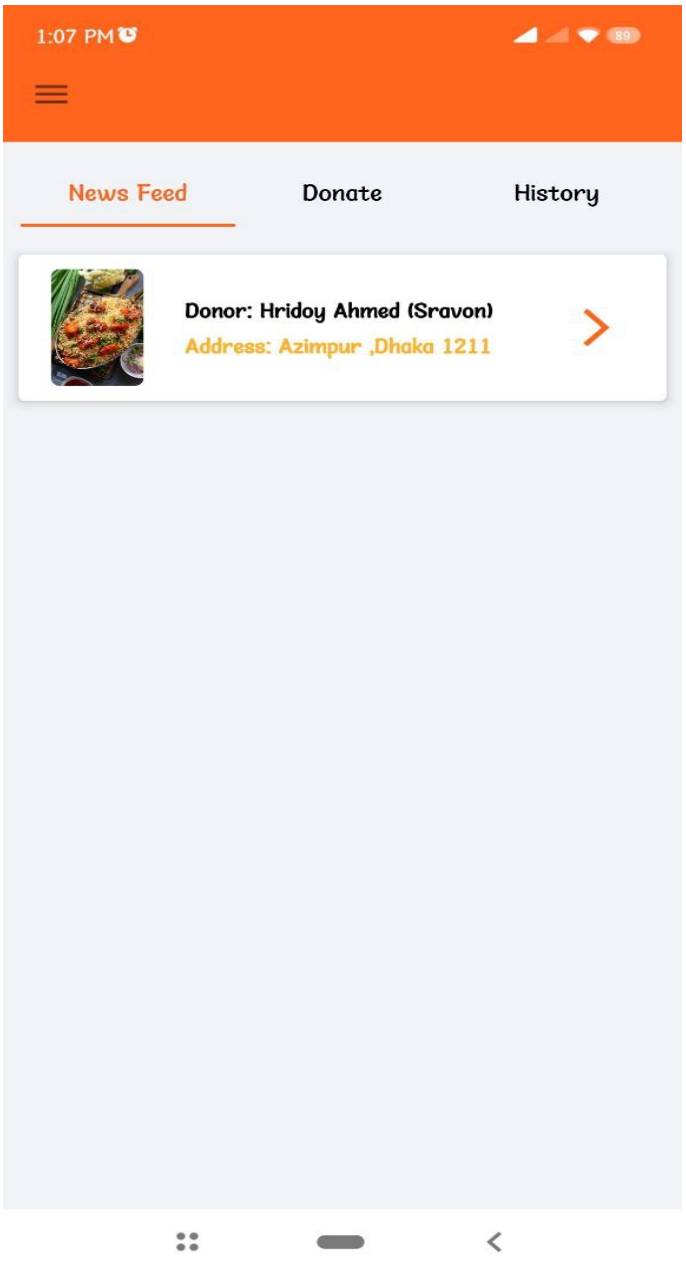

Figure 5.3: Donor Dashboard

Agent Dashboard

On Agent, dashboard page users will see all food donation posts in the newsfeed.

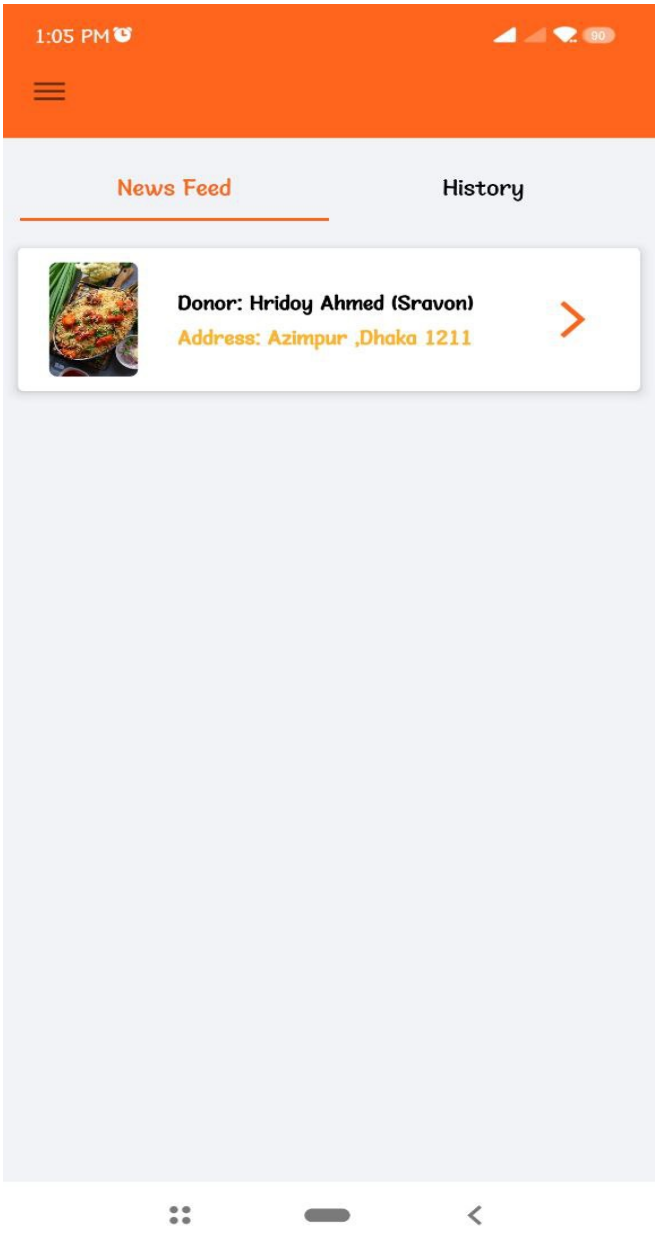

Figure 5.4: Agent Dashboard

Create Donation Post

Donors can post the extra foods; they want to donate including pick address, food types, available for people quantity, and food image.

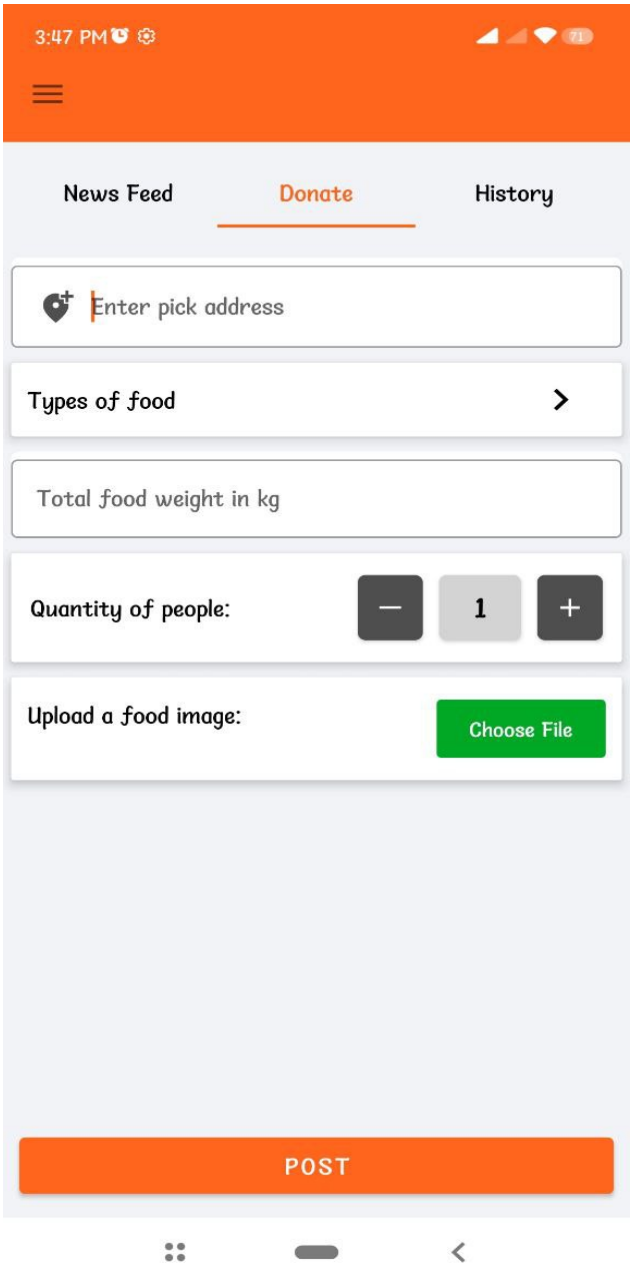

Figure 5.5: Create Donation Post

Food Types in Donation Post

Donors can select food types during creating a donation post.

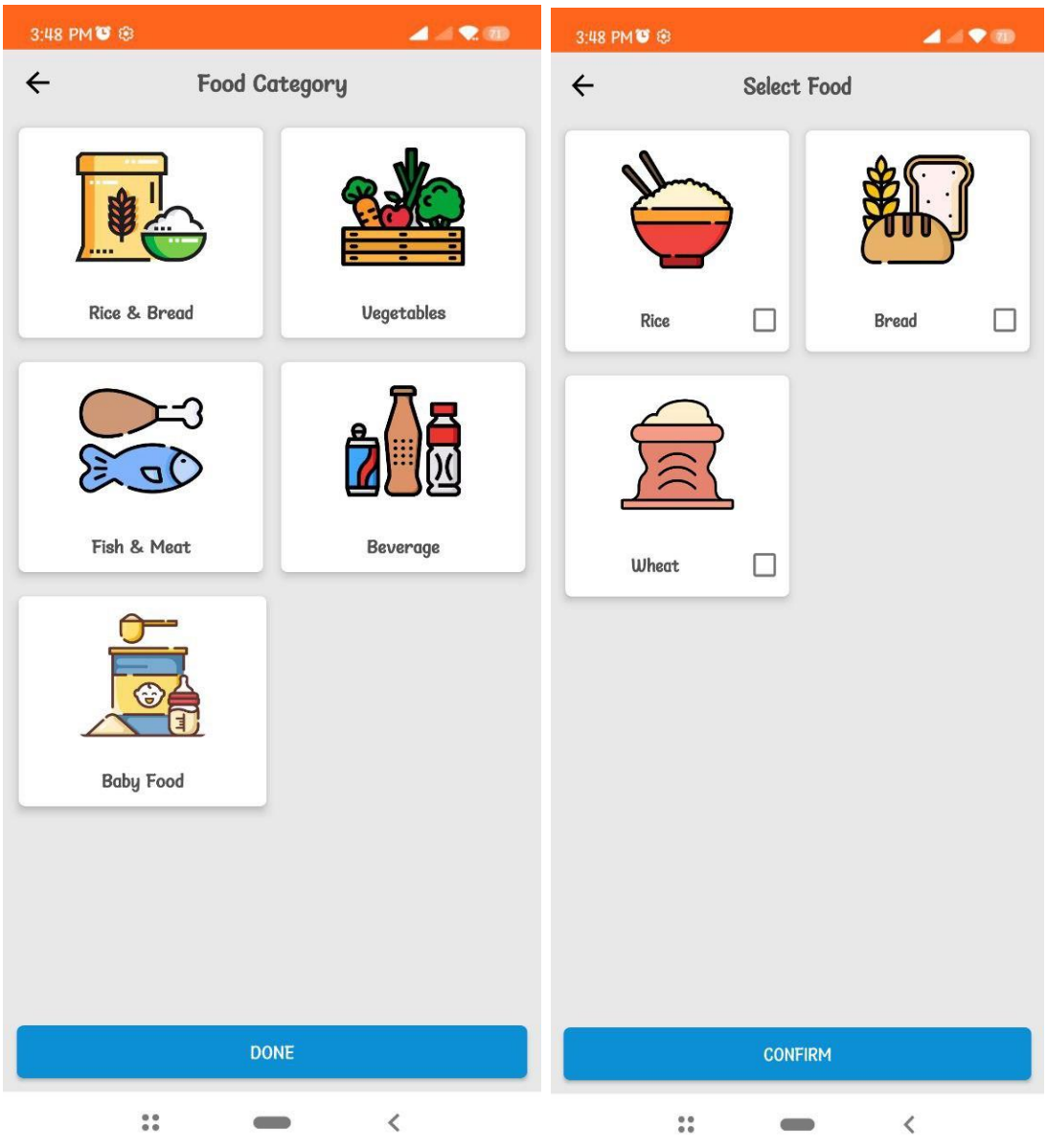

Figure 5.6: Food Types

Pending Post (Donor End)

Post description of pending post in donor end app.

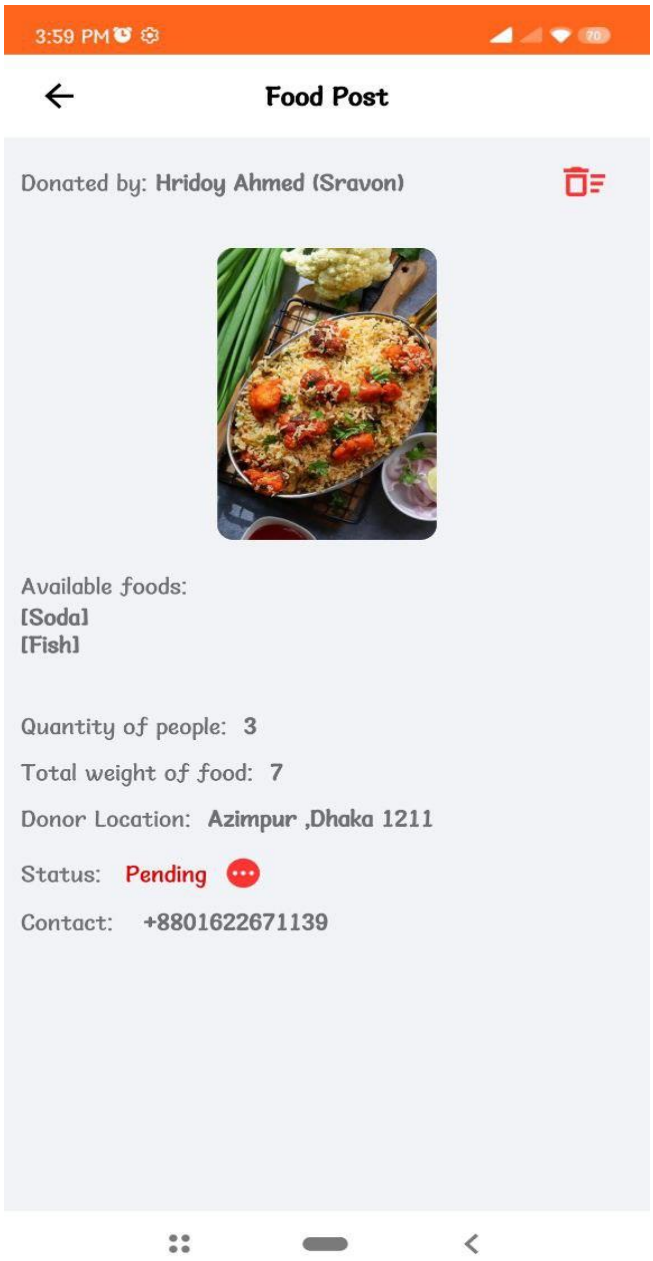

Figure 5.7: Pending Post (Donor End)

Pending Post (Agent End)

Post description of pending post in agent end app.

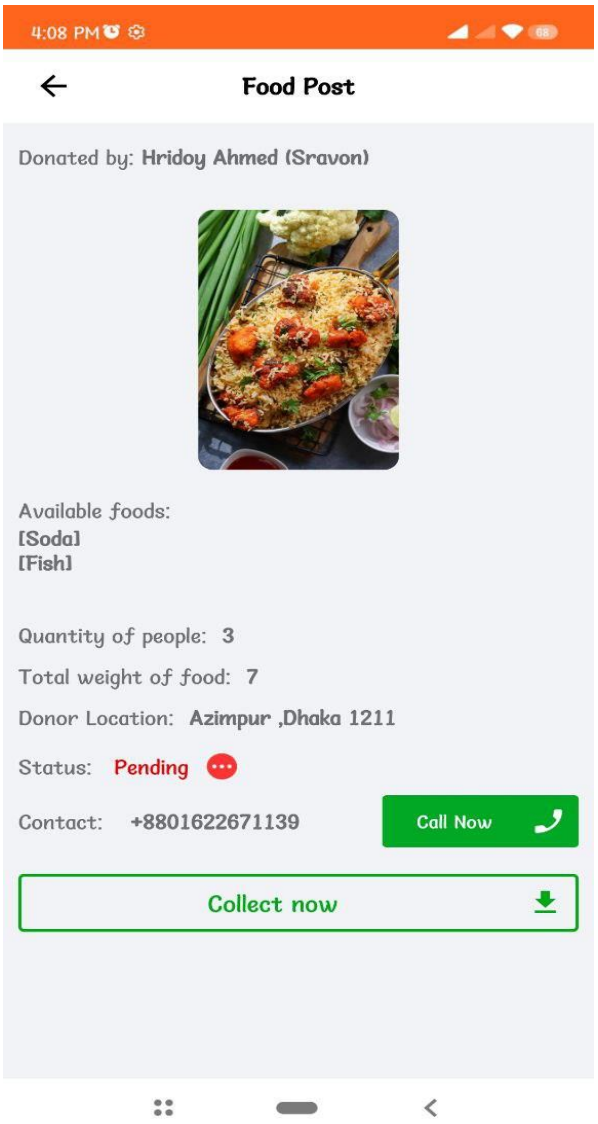

Figure 5.8: Pending Post (Agent End)

Continued…

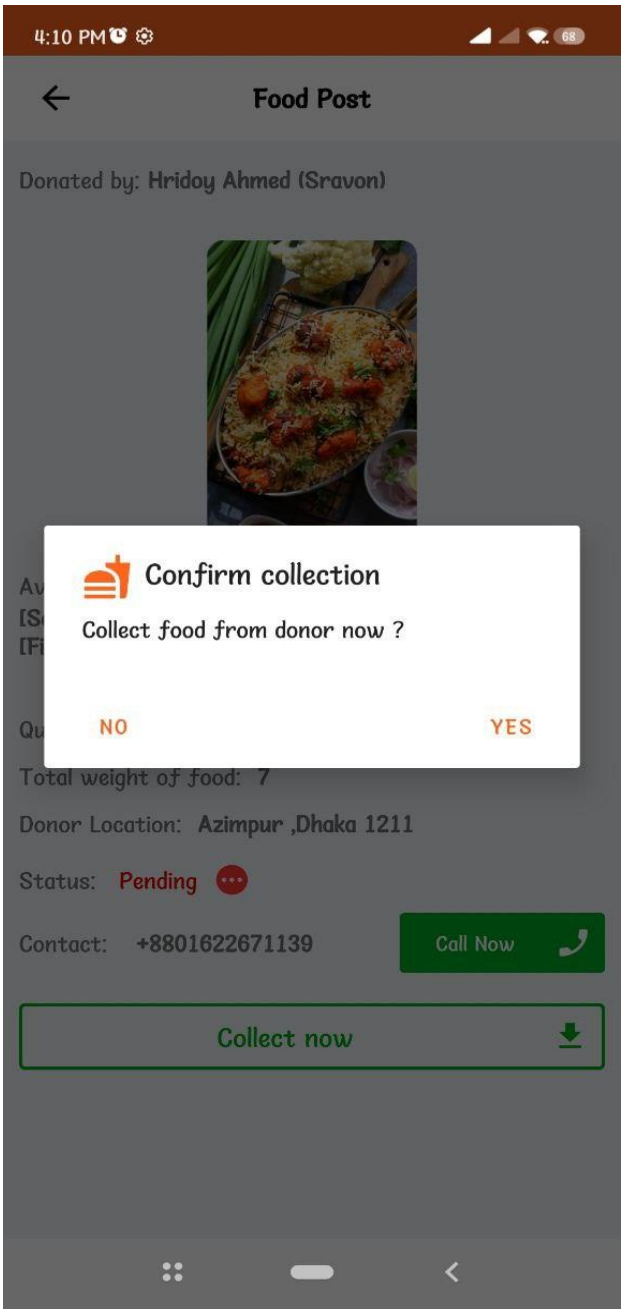

Figure 5.9: Food collection process by an agent on the post description page.

Continued…

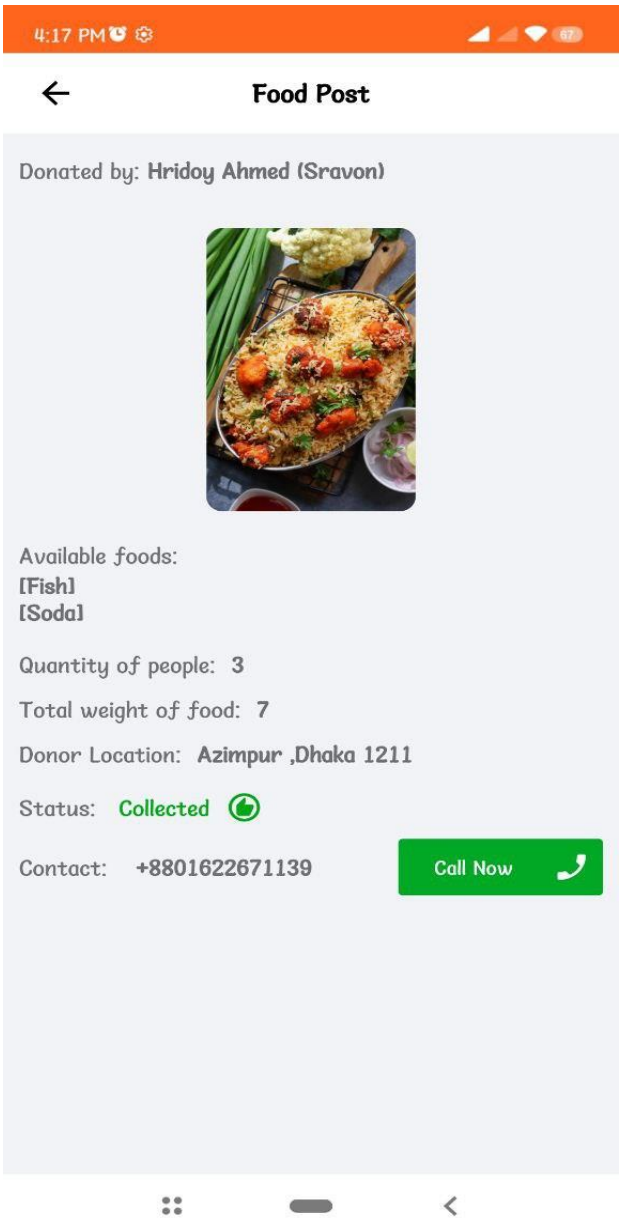

Figure 5.10: Food collection completed by an agent on the post description page.

Collected food list in history

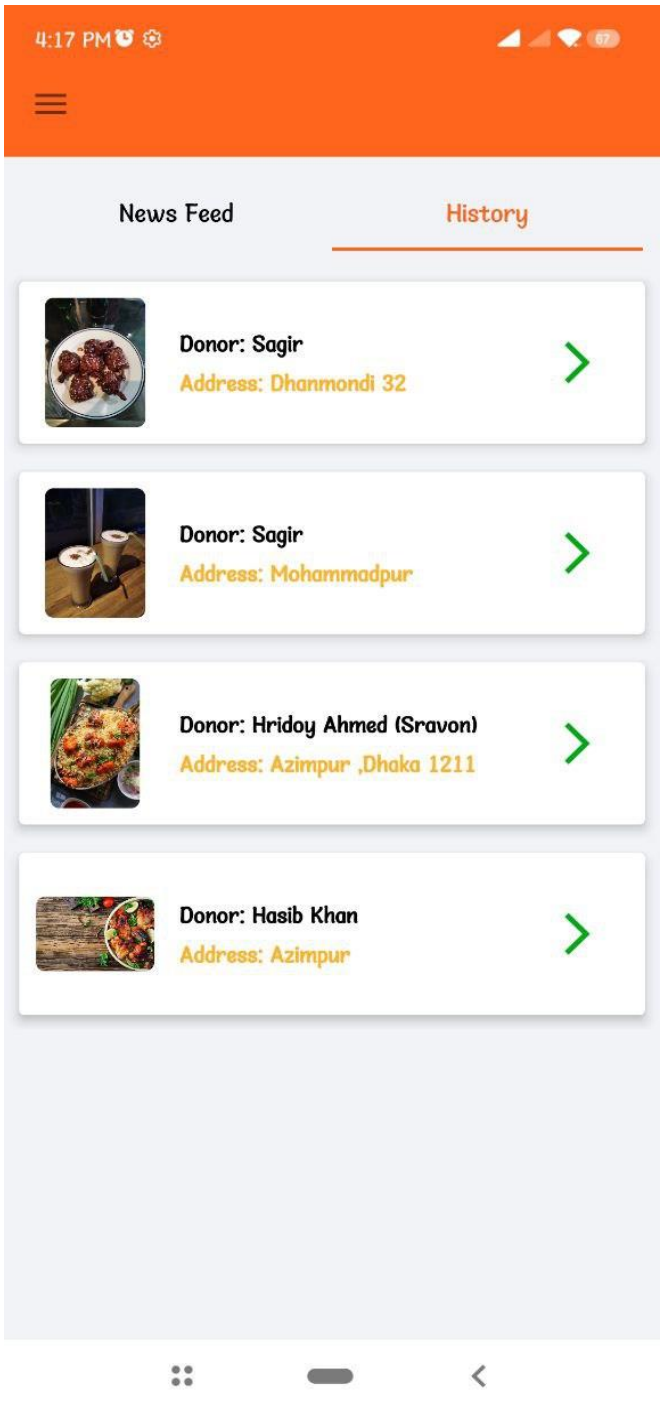

Figure 5.11: Collected Food

User Profile

Profile page contains username, email, address, phone number, logout option.

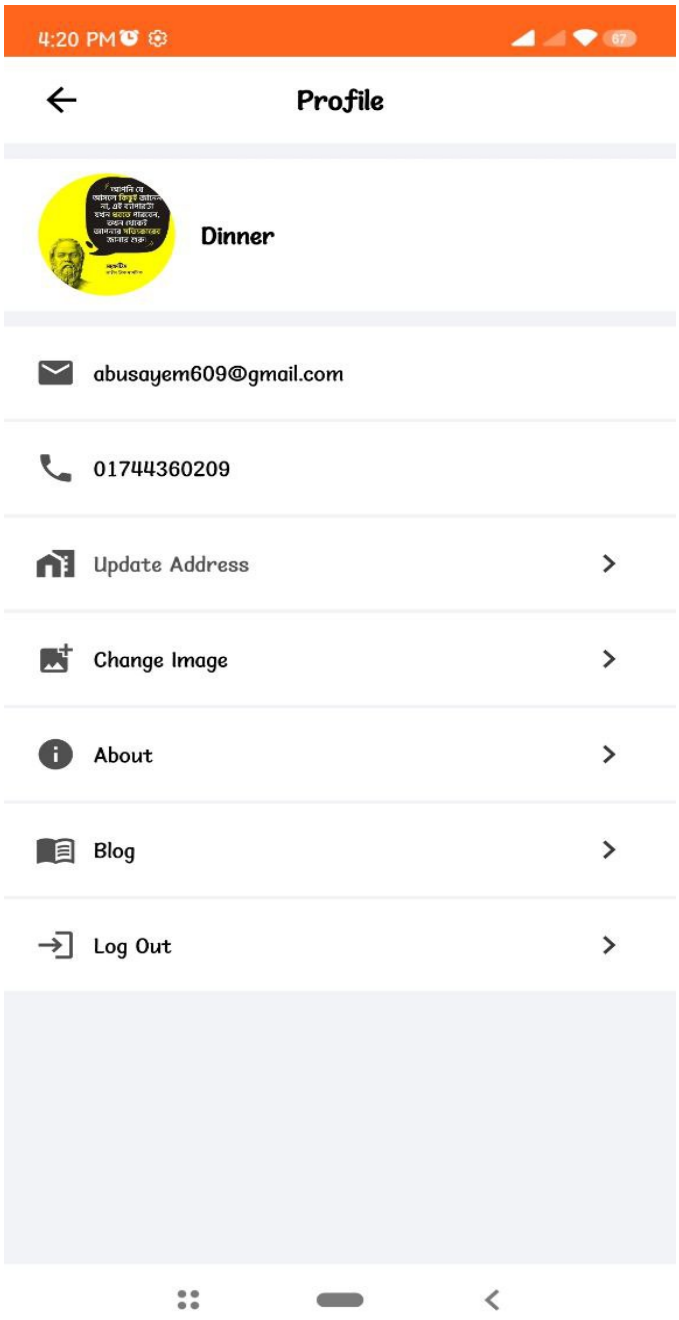

Figure 5.12: User Profile

About

About application and developers.

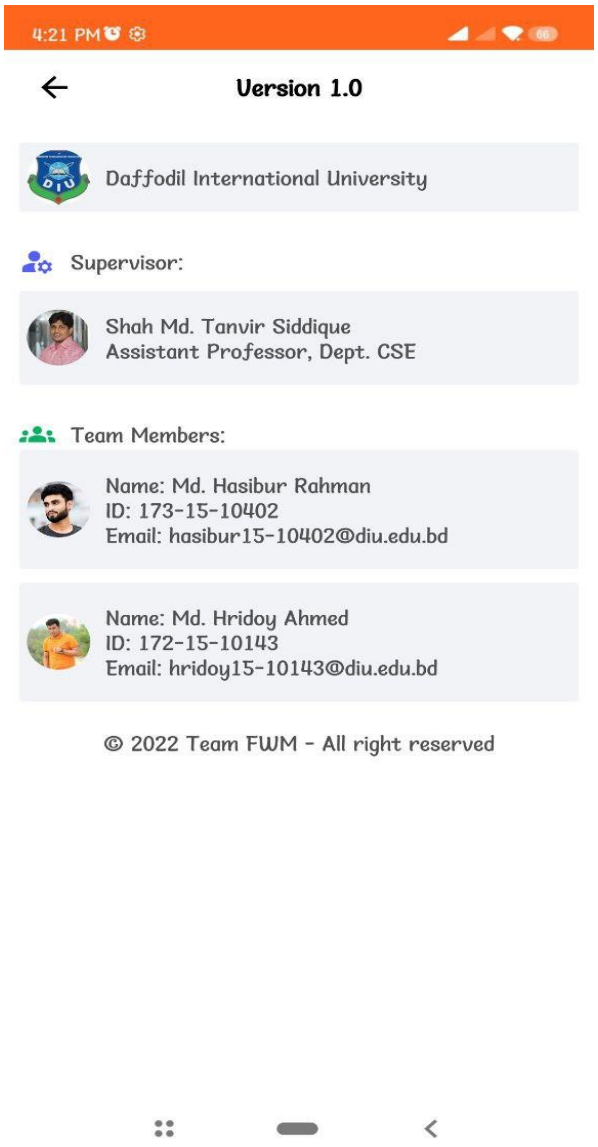

Figure 5.13: About

Blog

The blog page contains the procedures for donating and collecting food through the application.

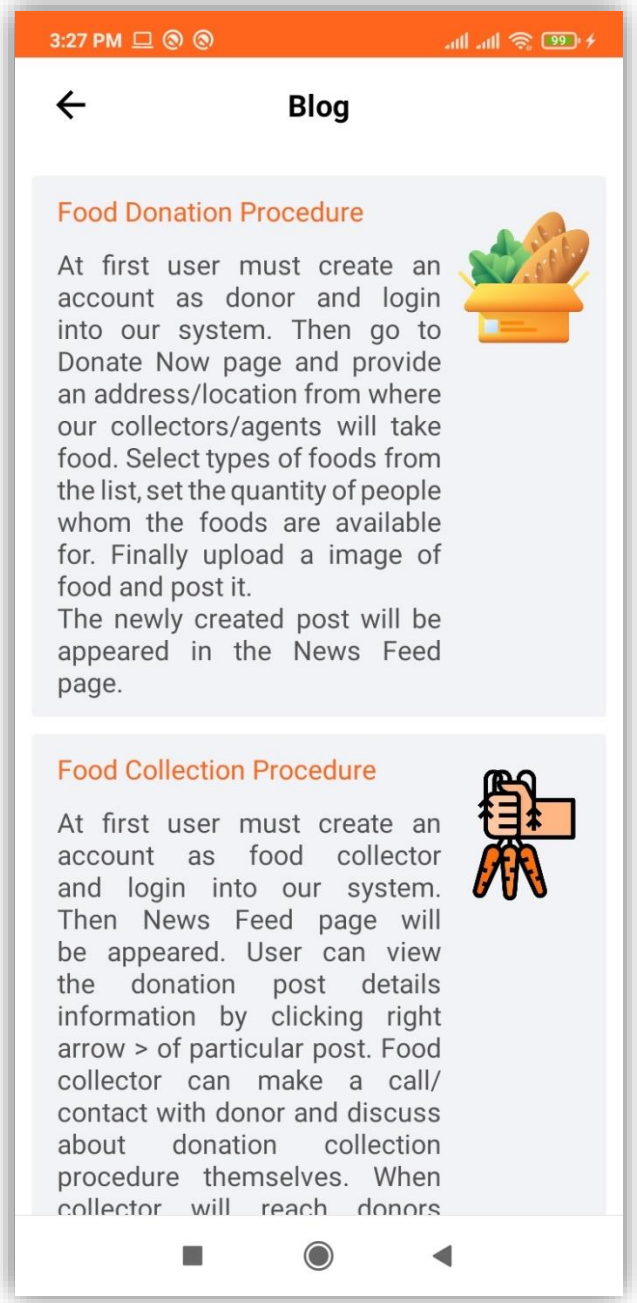

Figure 5.14: Blog

5.3 Testing Implementation

User and Password Error Validation

When a user enters an inaccurate mobile number or password, an error message will be shown.

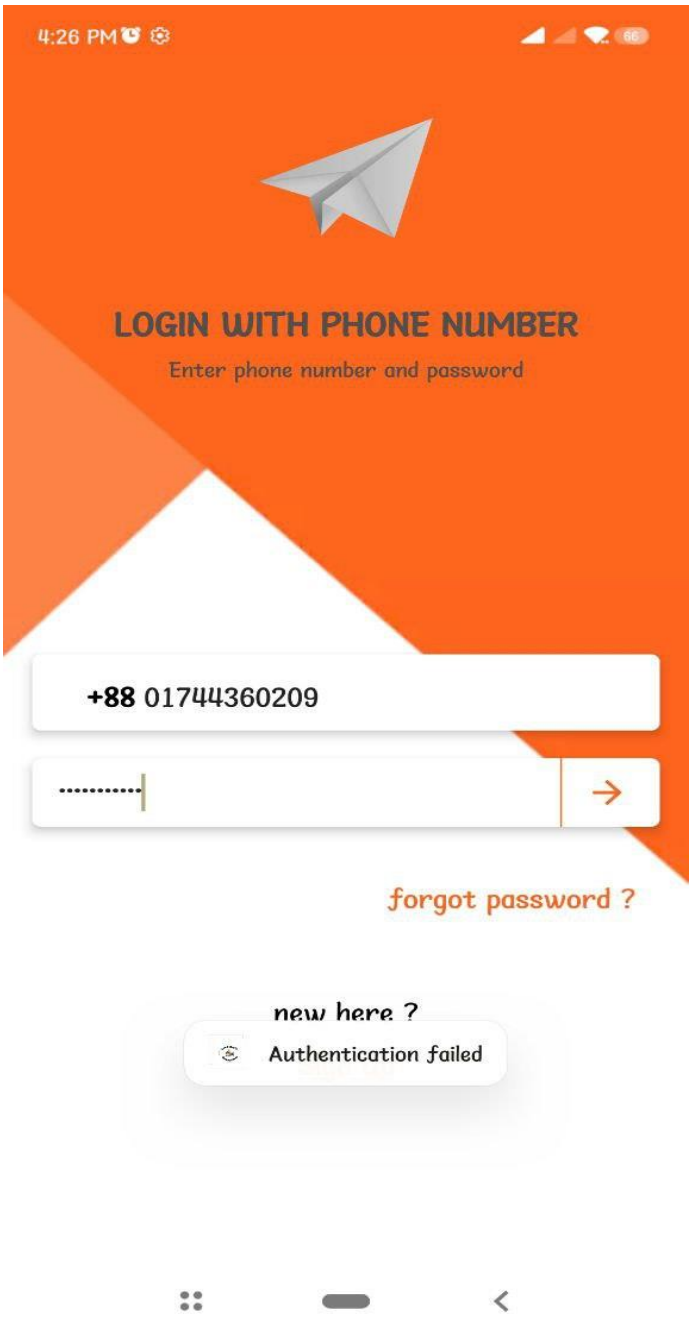

Figure 5.15: User and Password Error Validation

CHAPTER 6

IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY

6.1 Impact on Society

This application is intended for those who enjoy lending a hand to others. Pets can be bought and sold by interested parties. This app is also quite instructive regarding folks who lack access to food (for example, information about food, donor, etc.). Mainly this application will be beneficial for people of all occupations and ages. Users can perform a role to help poor and foodless people in this society through this application.

6.2 Limitation

No software is flawless. Every system is constrained in some way. The following list outlines the projects' limitations:

- Food Waste Management is an online application, having a poor internet connection may be our biggest problem.

6.3 Obstacles & Achievements

We encountered numerous challenges while developing the application, most of which we successfully overcame. Some of the challenges included:

- We had to learn about firebase and cloud storage for databases.
- Getting the response from the Database and display according to the design of the app.

Finally, after developing the project, we were able to accomplish:

- Food Waste Management and Donation application that will help many poor people who cannot eat properly or buy food.

CHAPTER 7
CONCLUSION AND FUTURE SCOPE

7.1 Discussion and Conclusion

This project's goal was to implement waste management strategies in the food service sector with the intention of identifying innovations and exploring their consequences for managing food waste. The fact that few businesses are actively developing in the garbage sector is a significant conclusion. However, they are becoming more conscious of the value of managing food waste from an economic and social perspective. As the data demonstrates, there are not many restaurants that practice low- or zero-waste dining, and there are not many chefs that cook using only 29 food scraps. As a result, our programme offers agents to address waste concerns relating to food service companies and distribute meals to the homeless.

The food service industry falls behind other industries in terms of managing food waste, possibly due to the absence of clear, universal terminology and uniformity between researches. Additionally, it calls for the development of novel methods that would promote efficient waste management systems. Future research may address these concepts and technologies, as well as a variety of innovations and sources of cooperation between agents and traditional food service businesses.

7.2 Scope for Further Development

Time, knowledge, and experience constraints prevented us from developing some aspects for our project. We want to build those functionalities one at a time in the future. These traits are:

- Push Notification to let the user know that the agent is willing to collect his/her donated food.
- Publish the app on Play Store.

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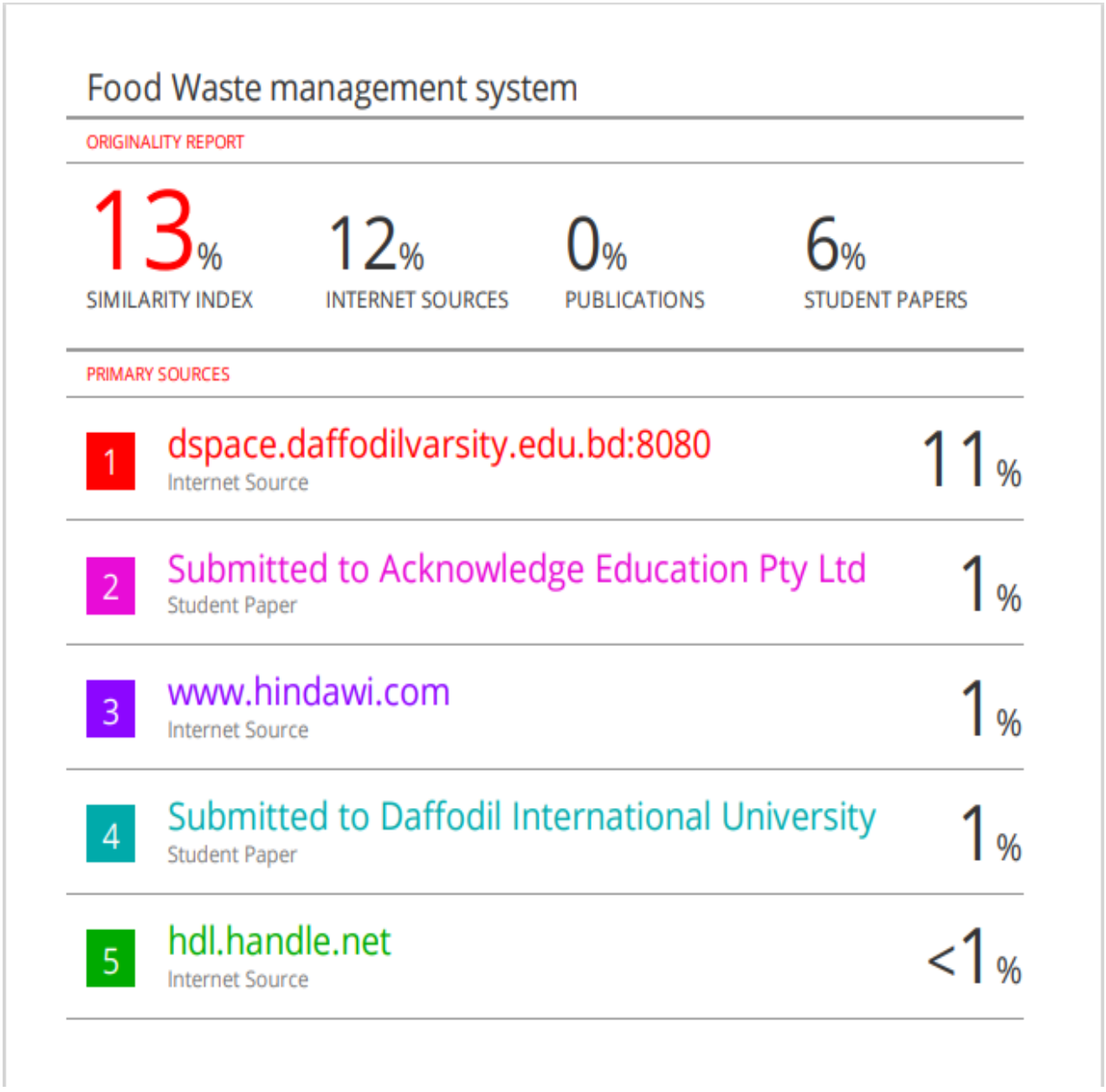
PLAGIARISM REPORT



Food Waste management system

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