Project Report

On

"Food Waste Management"

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A project submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering.

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April 2022

CANDIDATES DECLARATION

This is to certify that the work presented in this project, titled, "**Food Waste Management**", has been done by us under the supervision of Jannatul Ferdaous.

We also declare that neither this project nor any part of this project has been submitted anywhere else for the award of any degree, diploma or other qualifications.

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CERTIFICATE OF APPROVAL

This project titled, **"Food Waste Management"**, submitted by the group as mentioned in the candidates' declaration page has been accepted as satisfactory in partial fulfillment of the requirements for the degree B.Sc. in Computer Science and Engineering in 25th March 2022.

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ACKNOWLEDGEMENT

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ABSTRACT

There is growing evidence that a significant share of global food is thrown away, with concomitant detrimental repercussions for sustainability. Reducing food waste is a key sustainability challenge for the food service industry. Despite the significance of this issue to the global foodservice industry, the link between innovation practices and food waste management has received limited attention in the academic literature. This application uses innovations in waste management. It is based on the evaluation of food waste solutions and innovations that combine strategic dimensions of waste management with practice-driven initiatives, including incremental and radical innovations. The project presents a range of waste management initiatives, showing that their implementation in the foodservice sector varies depending on management's beliefs, knowledge, goals and actions. The concepts discussed here could help practitioners to become more aware of the factors that drive the adoption of food waste innovations.

Chapter 1
Introduction

1.1 Introduction

Technology has become part and parcel of our daily life. Especially the availability of smartphone gave us the opportunity to carry advanced technology in our pocket. Almost every person checks their phone after waking up and plug the charger to charge the phone before sleeping. Because of technology, every single thing is becoming automated. Everything is becoming online from offline. Now a days, we are doing courses online, shopping via online and so on. There are a variety of end uses to food waste management. Food waste management is android application which will help to collect extra food from donor's home, restaurants etc. The system is planned to consist of various useful features for the said purpose.

The proposed system aims to develop a food collection app is to collect the food from donor and distribute them to foodless people.

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. So, we took a step to reach food to those helpless people from the wasted food of restaurant, community centers and party centers.

1.3 Objective

1. Donors will post the food detail, pick location address, quantity of people available for donated food
2. Our agents will collect those foods from the pick address and reach to the foodless people.

1.4 Expected Outcome

Through the application, foodless people will get foods from restaurants and social events by agents. It will reduce food crisis among the homeless and foodless people who live in below poverty level.

Chapter 2
Background

2.1 Introduction

Internet has changed the world in a significant way. In this modern world, we are becoming more and more dependent on online based technology. We rely on the internet for each and everything in life. We have tried to make an android application named "**Food Waste Management**" which will reach the helpless people of our society easily.

2.2 Related Works

Weather Forecast is an android application which is implemented to provide service in environment & geography sector. In Bangladesh, some of the examples of similar applications of Weather Forecast are: nosh, OLIO, ShareTheMeal: Charity Donate**,** Foodbank, Food Rescue US, GoMkt etc.

OLIO

OLIO gives the opportunity to share food and item's preventing waste and saving money. It serves free stuff, borrow things, and shop homemade directly from neighbors.

nosh

With the nosh app, you can now track your food inventory, medicines and expiry date or use by or best before date while you get recipe suggestions on your food inventory, do shopping planning, and reduce food waste in the household. nosh is powered by Artificial Intelligence (AI) which also keeps track of your food buying and wasting habits to reduce food waste and save money in the process.

Foodbank

Food is donated Schools, churches, businesses and individuals donate non-perishable, in-date food to a Foodbank. Food is also collected at 'Supermarket Collections': These are events held at supermarkets where volunteers give shoppers a 'Foodbank shopping list' and ask them to buy an extra item or two for local people in crisis. Food is sorted and stored Volunteers sort food to check that it's in-date and pack it into boxes ready to be given to people in need. Frontline care professionals identify people in need We partner with front-line care professionals who

identify people in crisis and give them a voucher. Clients receive food Foodbank clients bring their voucher to a Foodbank center where it can be redeemed for three days emergency food. On taking their voucher to the Foodbank center, people receive a warm welcome, a hot drink and a food parcel. We also put people in touch with agencies who can help resolve the underlying causes of the crisis.

ShareTheMeal: Charity Donate

ShareTheMeal is the charity app from the World Food Program that allows you to feed a hungry child with a tap on your phone. As the world faces a record number of emergencies, the rate of hunger is increasing. The good news is hunger is entirely solvable. ShareTheMeal is part of the United Nations World Food Program.

Food Rescue US

The Food Rescue US app fights food insecurity by connecting food donors with hunger relief organizations. The app targets anyone who wants to donate or receive food. Users answer a few questions and then request a food pick-up. The algorithm matches surplus food to a nearby shelter and sends a driver to transport the food. More than 2,200 registered volunteers have rescued and delivered 23.1 million meals to people in need.

GoMkt

In New York City, goMkt connects restaurants that have unsold food with customers looking for discounts. By purchasing food as take-out through the app, customers save up to 75 percent off the original price—and reduce potential food waste. The business-to-consumer platform plans to expand to larger food businesses and connect them to charities, composters, and anaerobic digestion facilities.

2.3 Challenges

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

1. Lack of internet connection might be our main challenge as Food Waste Management is an online application.
2. We should build our application properly and make sure it works smoothly and also user friendly.

Chapter 3
Requirement Specification

3.1 Requirement Collection Analysis

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

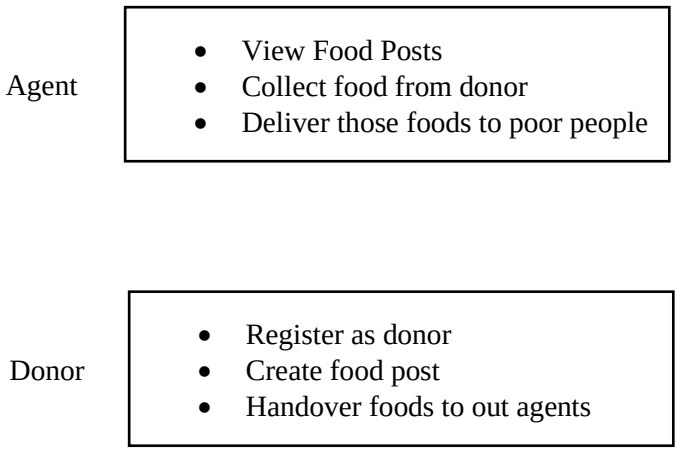

Figure 3.1: Requirement Collection and Analysis.

3.2 Use Case Modeling and Description

A use-case model is a model of how different types of users interact with the system to solve a problem.

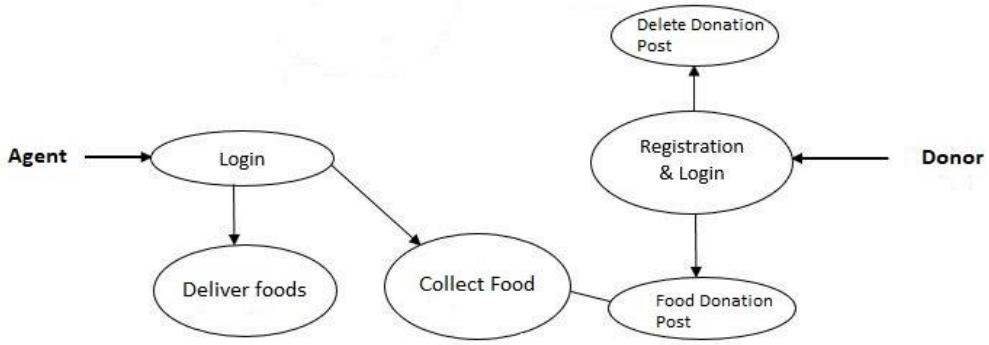

Figure 3.2: Use Case Modeling and Description

3.3 Logical Data Model

API will be called and the response will be sent to the application which is shown in Logical Data Model figure and it will be the current time responsible. Data will transfer from database to android application.

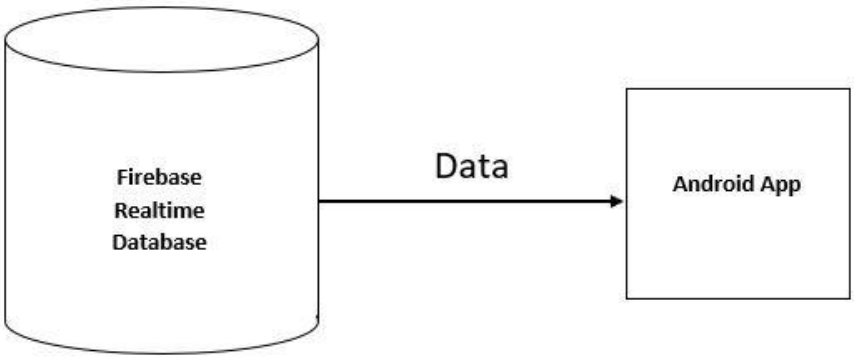

Figure 3.3: Logical Data Model

3.4 Design Requirements

Design requirements are very important for mobile application. It attracts the user to use. So, to complete the design, we must have mobile application design skills. For this, we have to know the various types of computer programming languages and design tools like AdobeXd. Market analysis can be a good trick for the design. We have to give proper attention to design the database so that it works appropriately and easily.

CHAPTER 4

Design Specification

4.1 Front-End Design

Front-End is the place where the user interacts. So, considering this factor, we have created a user friendly and smooth design. Every user can easily use this application.

Figure 4.1: Front-End Design (Splash Screen).

4.2 Interaction Design and UX

We have tried to make our project UX design as simple as possible. Because we have researched on the internet and visit various site, used various android applications. Then we made the UX design of our application.

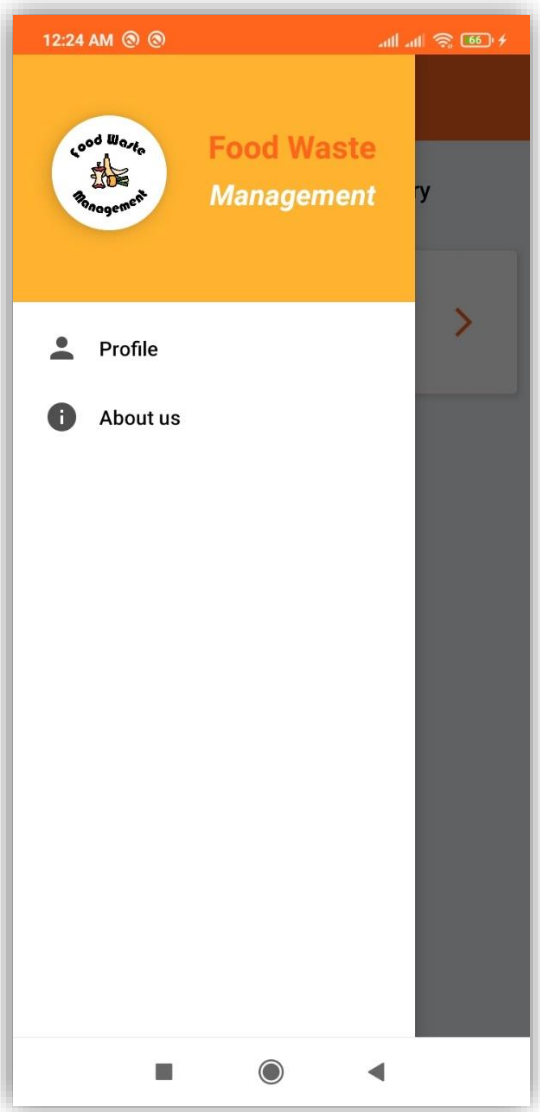

Figure 4.2: Interaction Design and UX

4.3 Back-End Design

Basically, in software development back-end means rendering server side. Usually, the backend programming consists of three parts: application, server and database. For backend we have used technologies that are Kotlin, Firebase Realtime Database, Firebase Cloud Storage.

4.4 Implementation Requirements

It was our environment & geography related work. So, we had to learn a lot of new technologies and spent a huge time to fulfill all the requirements.

Chapter 5

Implementation and Testing

5.1 Implementation of Database

Implementation of the Database was fundamental for this application. In this project, we have used Non-SQL Database Firebase in real time. The database returns efficient and good amount of data for its data model.

5.2 Implementation of Front-end Design

Front-end design is very essential because of its visualization to the users. Developing a design for an application, we have to consider user friendly and smooth front end. It is very difficult to make the perfect design that attracts all.

Login

User login with phone number and password.

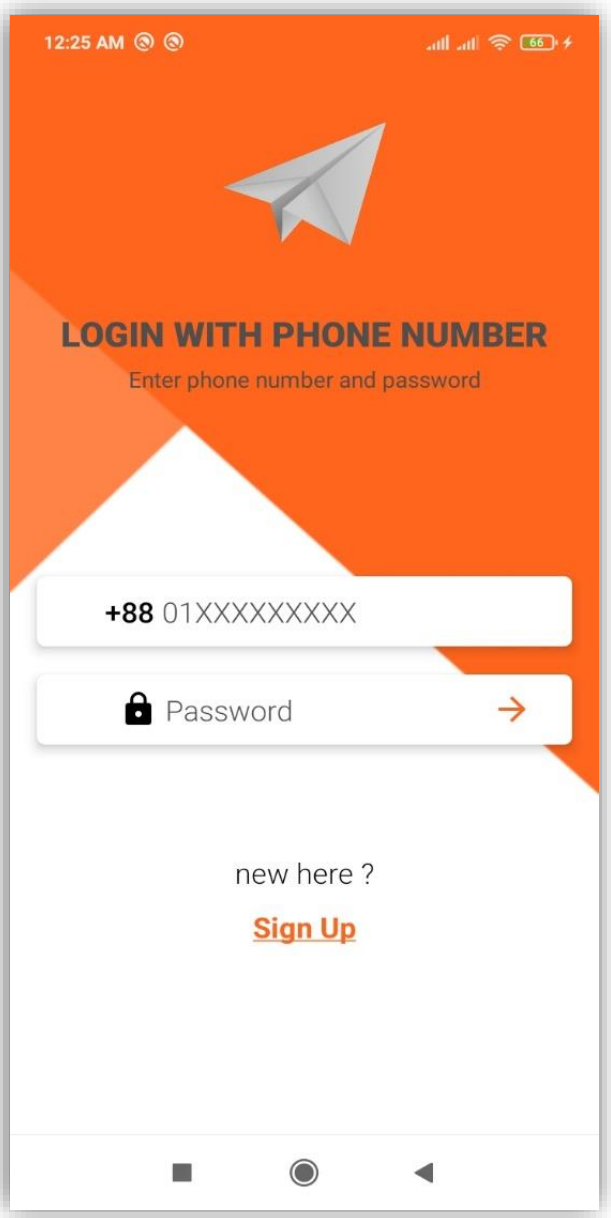

Figure 5.2.1: Login

Signup

User signup with username, email, phone number, password and user type (donor/agent).

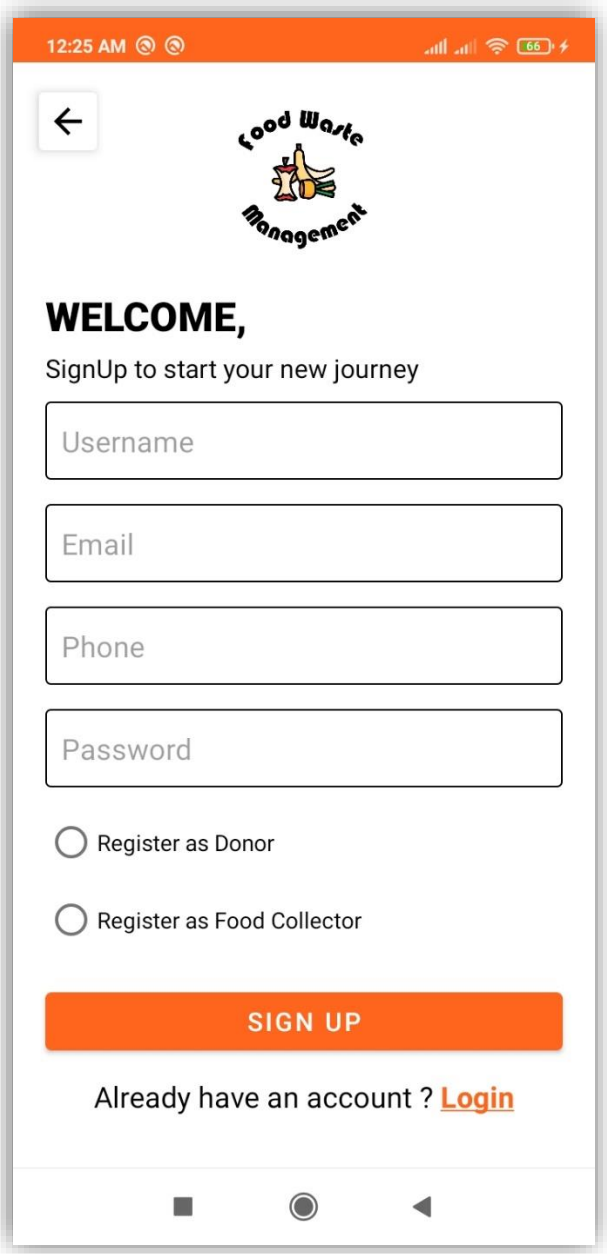

Figure 5.2.2: Signup

Donor Dashboard

In Donor dashboard page user will see all food donation posts in newsfeed.

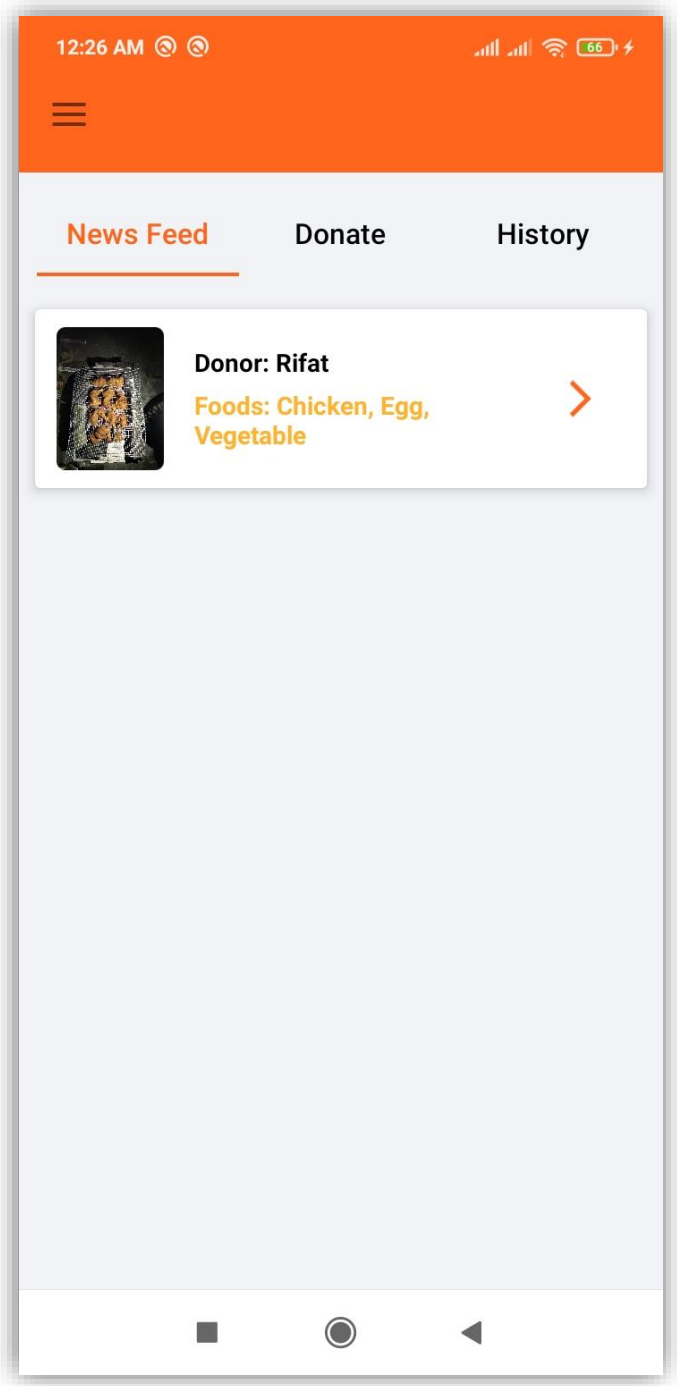

Figure 5.2.3: Donor Dashboard

Agent Dashboard

In Agent dashboard page user will see all food donation posts in newsfeed.

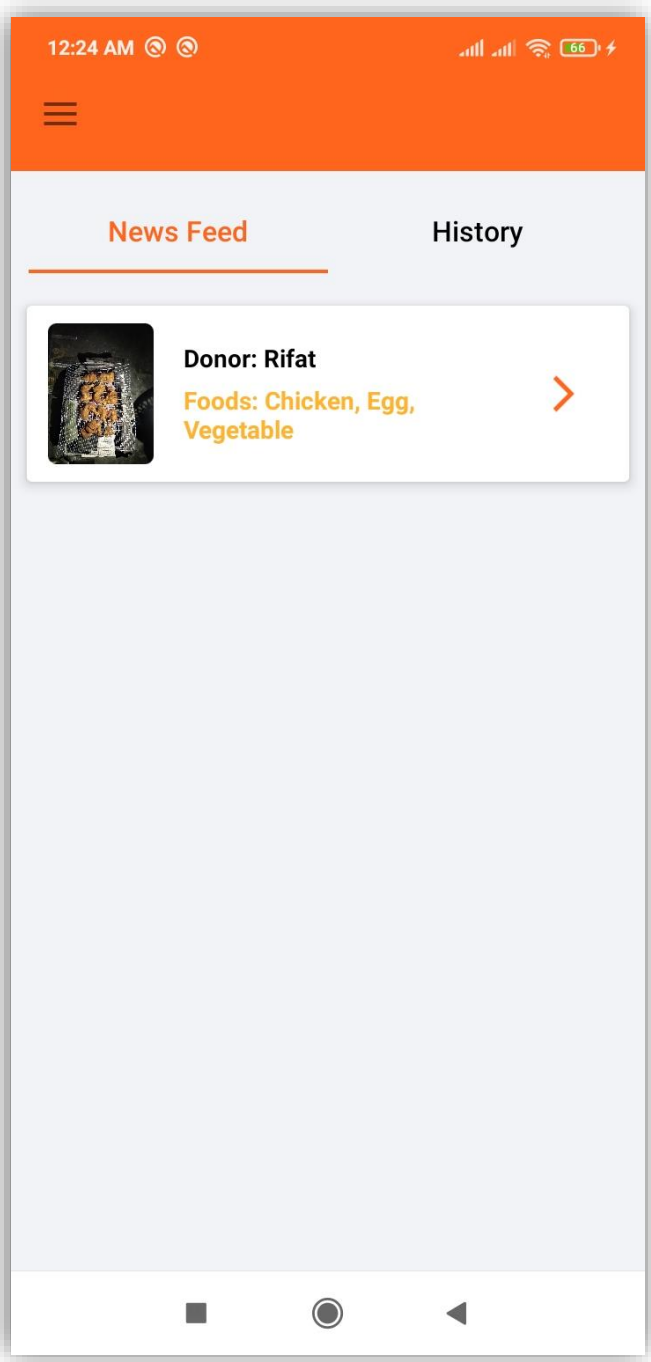

Figure 5.2.4: Agent Dashboard

Create Donation Post

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

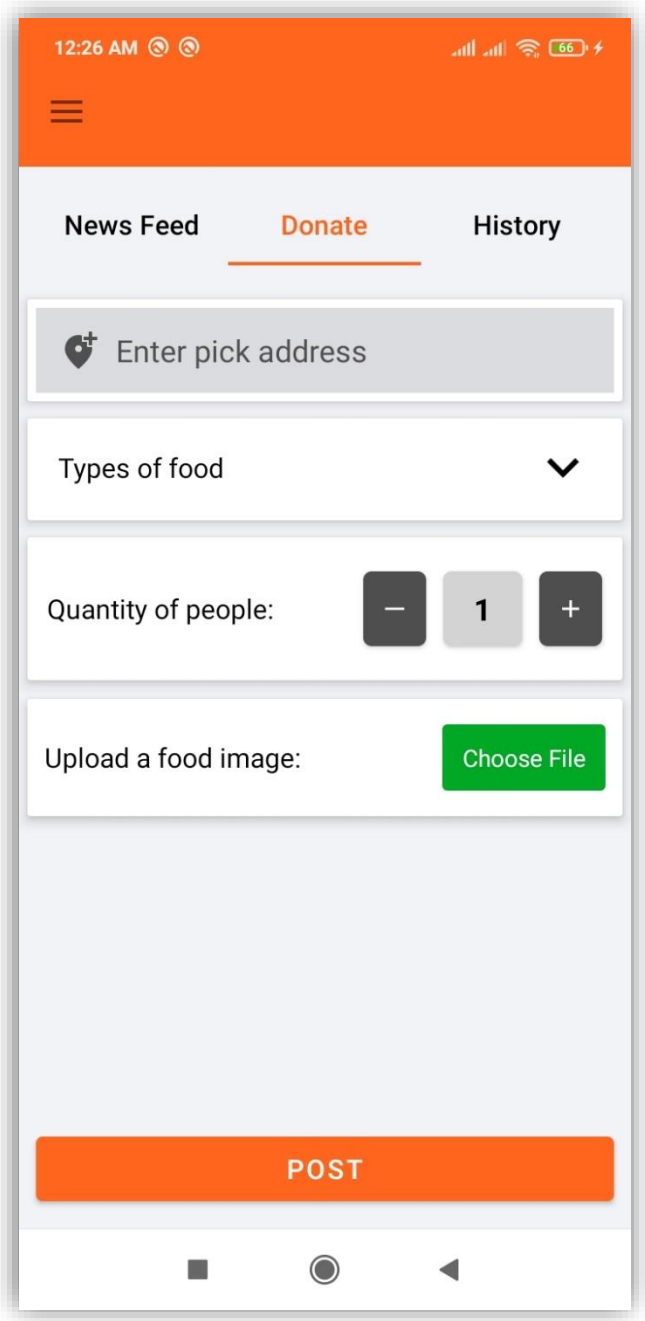

Figure 5.2.5 Create Donation Post

Food Types in Donation Post

Donors can select food types during creating a donation post.

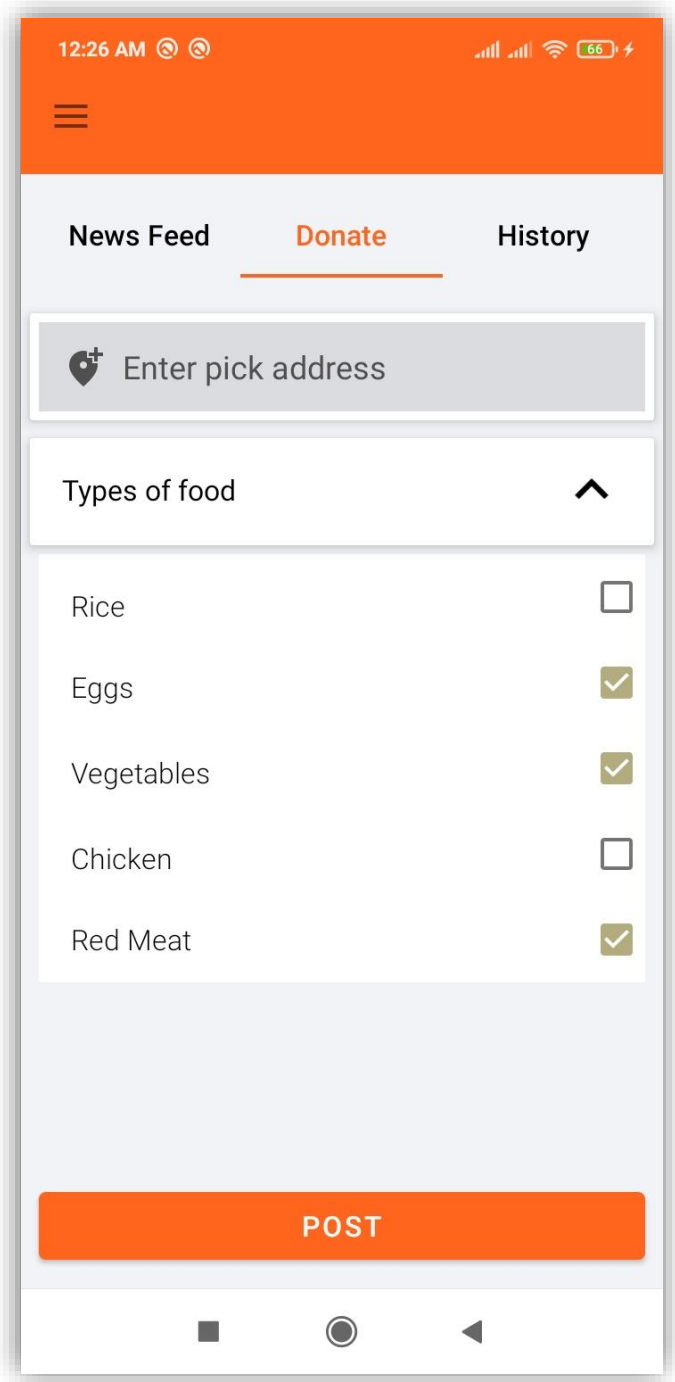

Figure 5.2.6: Food Types

Pending Post (Donor End)

Post description of pending post in donor end app.

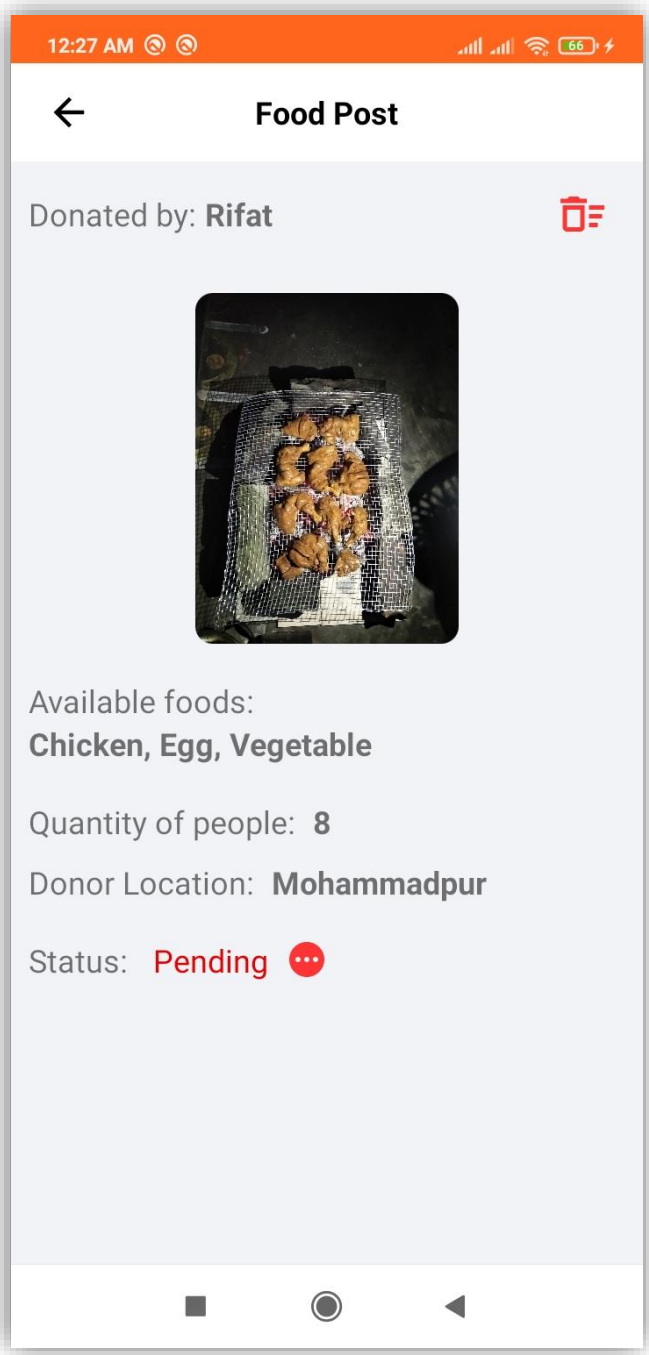

Figure 5.2.7: Pending Post (Donor End)

Pending Post (Agent End)

Post description of pending post in agent end app.

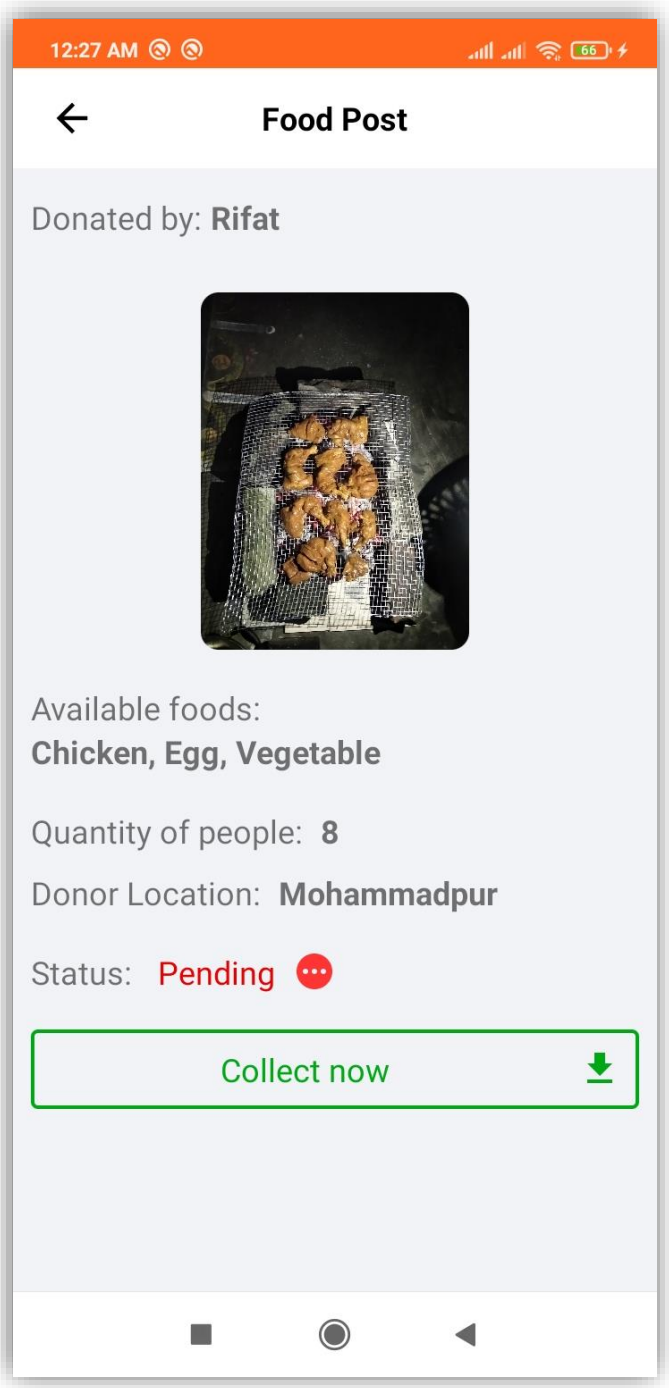

Figure 5.2.8: Pending Post (Agent End)

Continued…

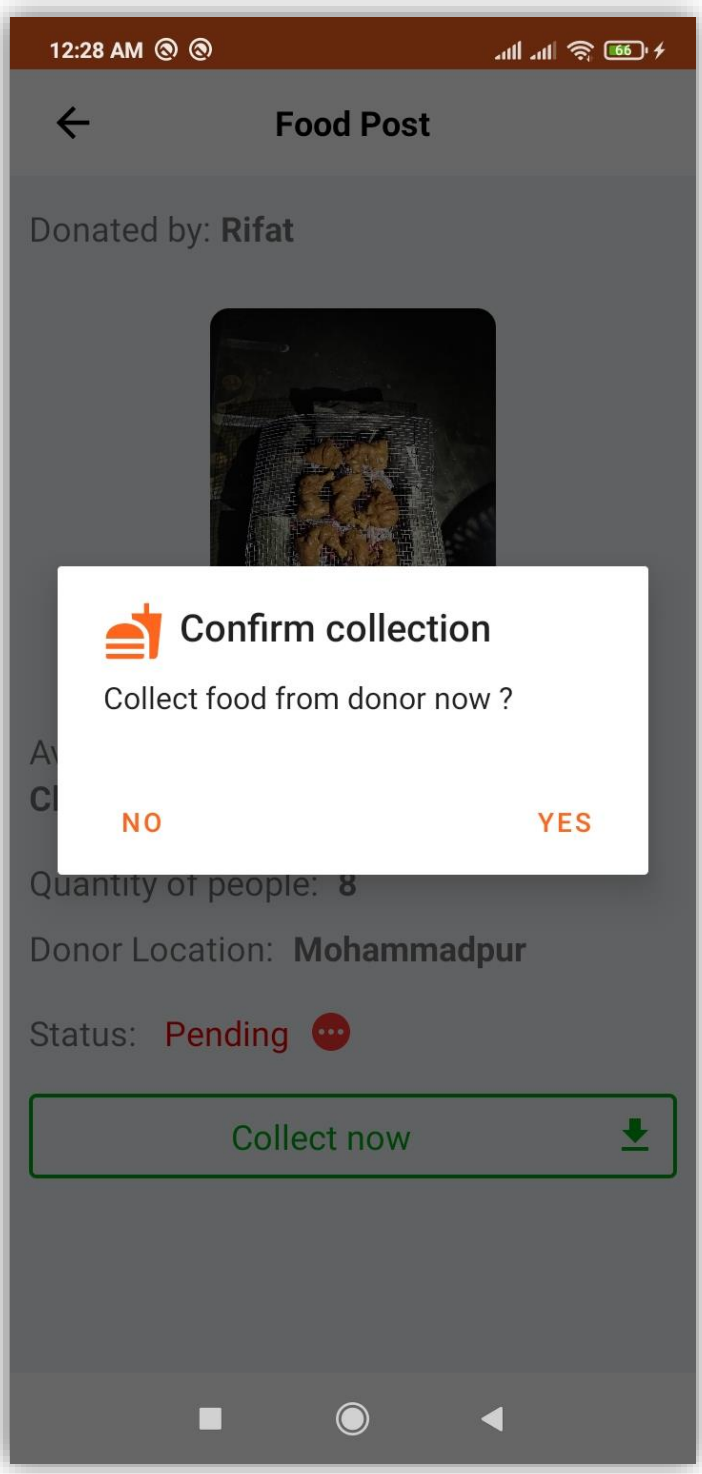

Figure 5.2.9: Food collection process by agent in post description page.

Continued…

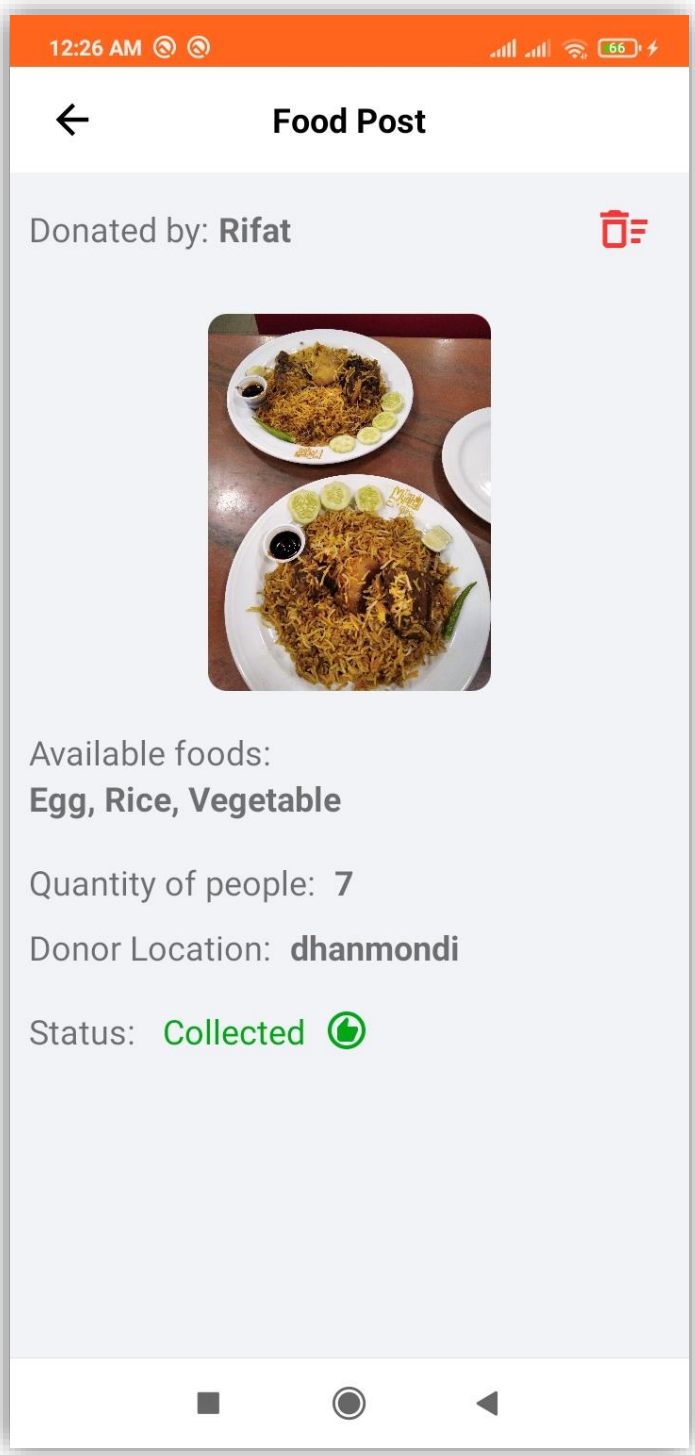

Figure 5.2.10: Food collection completed by agent in post description page.

Collected food list in history

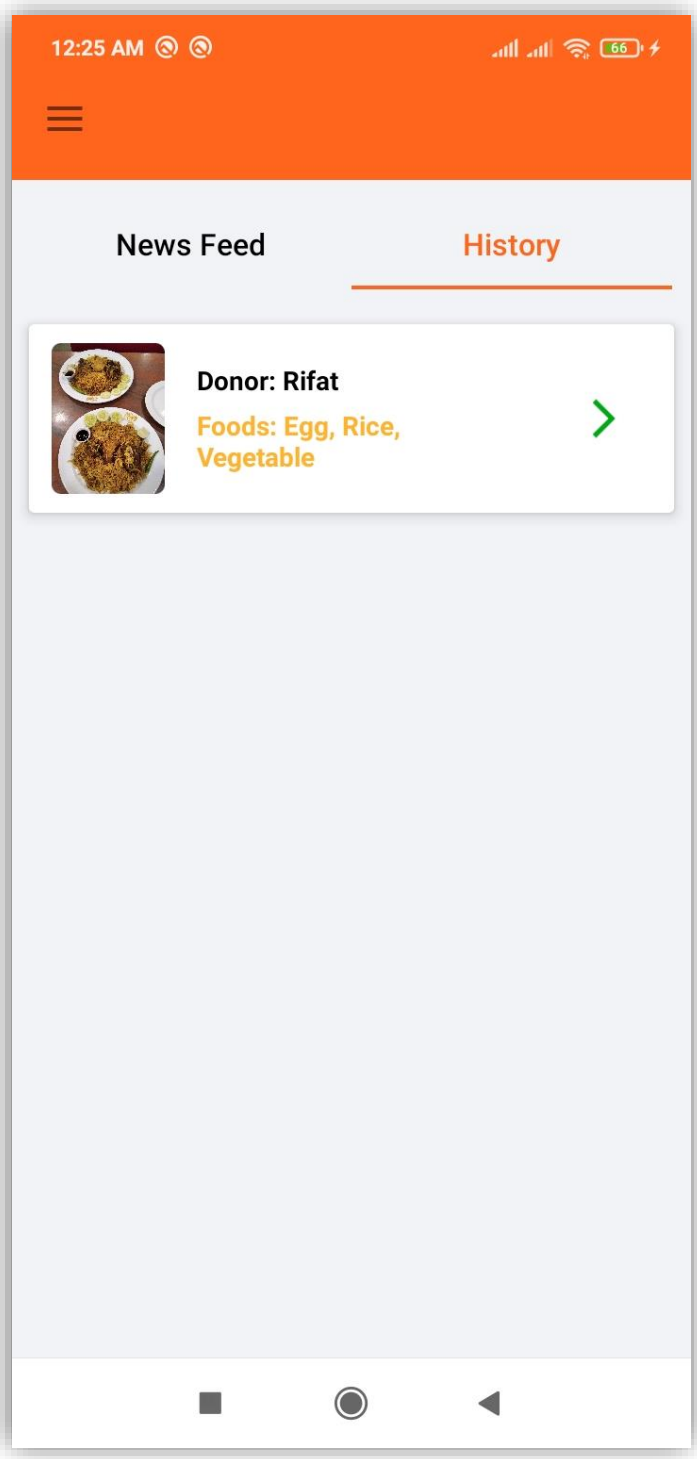

Figure 5.2.11: Collected Food

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User Profile

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

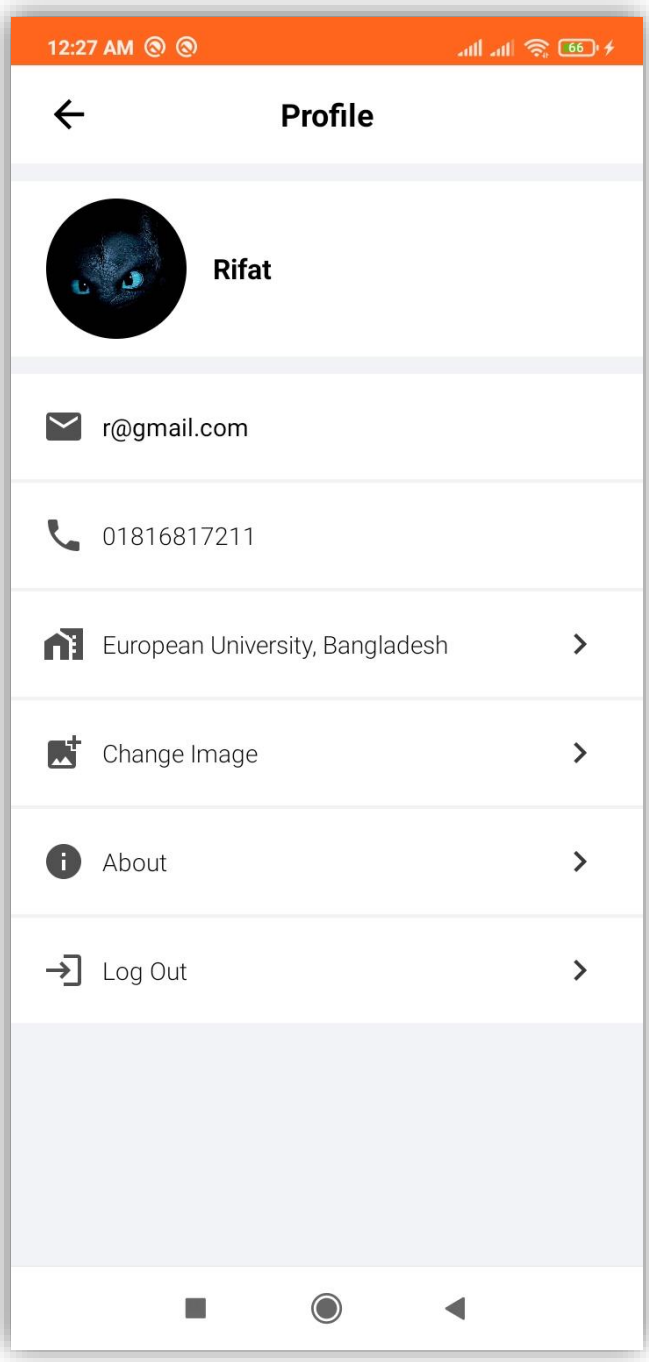

Figure 5.2.12: User Profile

About

About application and developers.

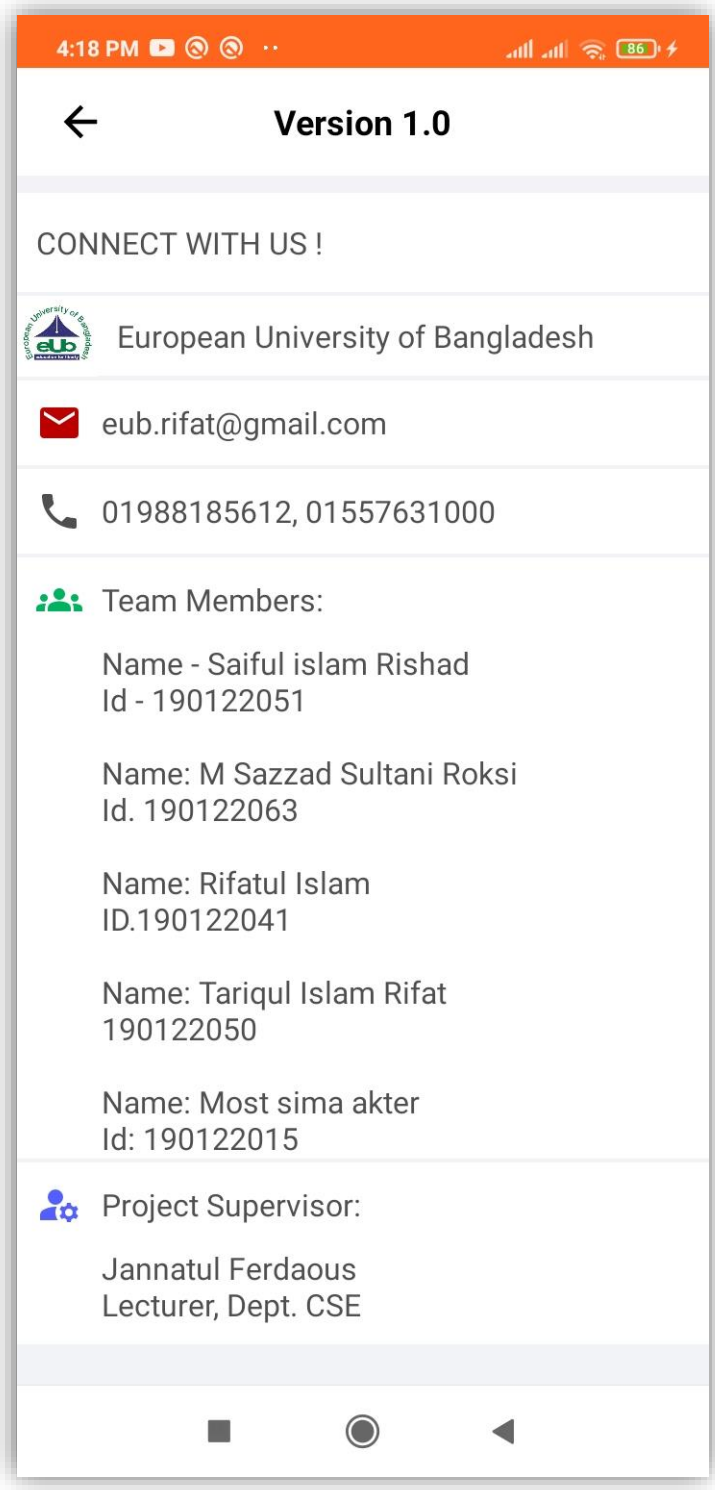

Figure 5.2.13: About

CHAPTER 6

Impact on Society, Environment and Sustainability

6.1 Impact on Society

This application will be beneficial for people of all occupations and ages. Users can perform a role to help poor and foodless people of this society through this application.

6.2 Limitation

No application is perfect. Every system has some limitations. The limitations of our project are written below:

- Realtime Database Management.
- Ensure Fresh Food collection.

6.3 Obstacles & Achievements

During the development of the application, we have faced a lot of obstacles and successfully overcame most of them. Some of the obstacles were:

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

Finally, after developing the project, we have successfully achieved:

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

CHAPTER 7

Conclusion and Future Scope

7.1 Discussion and Conclusion

The objective of this project was to implement approaches to waste management in the foodservice industry with the aim to identify innovations and to discuss their implications for food waste management. A key finding is that many companies are not actively innovating in the waste domain. They are however increasingly aware of the economic and social importance of food waste management. On the downside, the foodservice industry is not leading the way when it comes to innovation. As the study shows, there are only a few low- or zero-waste restaurants, a few chefs who are creating meals with 29 food scraps. This application consequently provides agents to deliver food to poor, approach to waste issues pertaining to food service firms.

This lack of clear, common definitions and consistency across studies might be one of the reasons for which the foodservice sector lags behind other industries when it comes to food waste management. It also calls for tools and concepts to design the innovative practices supporting effective waste management systems. Future development may address such tools and concepts, as well as different types of innovations and sources of co-operation between agents and traditional food service organizations.

7.2 Scope for Further Developments

Due to limitation of time, knowledge and experience, we couldn’t develop some features of our project. In future, we want to develop those features one by one. Those features are:

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

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