Food Wastage Reduction through Donation

DAFFODIL INTERNATIONAL UNIVERSITY
DHAKA, BANGLADESH

DECEMBER, 2019

Food Wastage Reduction through Donation

BY

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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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I

APPROVAL

This Project titled **"Food Wastage Reduction Through Donation"**, submitted by Md. Anik **ID:** 161-15-666 & Rozin Hasan **ID**:161-15-731 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 (BSc) and approved as to its style and contents. The presentation has been held on 10th December, 2019.

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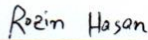Jahangirnagar University

DECLARATION

We hereby declare that, this project has been done by us under **Mohammad Monirul Islam**, **Senior lecturer**, **Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ACKNOWLEDGEMENT

At the start, I express our heartiest thanks and thankfulness to Almighty Allah for the divine blessing make me possible to complete the final year project successfully. I am really thankful and wish intense my liability to **Mohammad Monirul Islam, Senior Lecturer, Department of CSE Daffodil International University, Dhaka**. To provide among us rich knowledge & acute interest of our supervisor in the field of "Mobile Application Development" to carry out this project. His endless patience, academic advice, continual boost, stable and active supervising, constructive criticism, valuable advice, reading a lot inferior draft and correcting them at all stage have made it workable to accomplished this project.

I would like to conduct my heartiest gratitude to all faculty members and the staff of CSE department of Daffodil International University-UC.

At last, I must acknowledge with due respect the faithful support and patients of my parents.

ABSTRACT

Across the entire world, food wastage is a massive issue and it poses an immense challenge to food security, economy and environmental sustainability. This report is intended as a guideline for all the people who wishes to sample our project and create a similar application to reduce food wastage. Studies indicate that it is around 35 percent of all food internationally. This adds up to 1.53 billion tons every year. It strongly contributes to the worsening of climate day by day. And it is bearing heavy toll on the earth. When food decays it releases methane gas which is a green house gas. It affects food supply chains by lowering income for food producers, increasing costs for consumers, resulting in reduced food access. This report has all the essential elements required to complete this project. It also includes proper indexing along with page numbers for easier navigation through the report.

The System has two sectors, Donators and Recipients.

CONTENTS   **PAGE NO**

CONTENTS   PAGE NO

CONTENTS	PAGE NO

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Introduction

So much excess food is wasted every day in hundreds of community events and restaurants.

The people in Bangladesh are wasting about 9.5% of the total procured food, a study says. Of the total wastage, 4% is being made during preparation stage, 2.4% during serving, and another 3.1% from the plates.

Internationally, it is estimated that the wastage is 35 per cent or 1.53 billion tons of the total yearly food production.

Of the total household food loss, 7 percent is wasted at preparation stage, 2.5 percent during service stage and finally plate wastage is around 1.1 per cent which is due to lack of knowledge and awareness among the people.

1.2 Motivation

The motivation of our project comes from wanting to reduce food wastage. We understand we can't stop people from wasting food. Even if there was a worldwide outcry and an online movement to aware people to stop people from wasting food, it still will not stop people from wasting food. We decided to implement our programming skills in such a way that it can help reduce food wastage. And that's when we came upon a charity who collected food from different restaurants or community center and gave them to people who can't afford food. We wanted to connect the kind hearted people with these charitable foundations in order to reduce food wastage. We combined our knowledge of computer science and made an online platform to connect these people and hopefully made a bridge to give food to the people in need.

1.3 Objectives

Our objective behind this project is simple. There are many charitable foundations doing selfless work for the people who are less fortunate than others. Our app is a bridge between these charitable foundation workers and the people who are kind enough to give the food away to the needy people rather than wasting it. That is our only and main objective. just raising awareness about wasting food won't do anything. We have to make a way to reduce the wastage also. And this is us, trying to make that path.

1.4 Expected Outcome

Through our implementation of the android application, we created a platform to work to accomplish the following expected outcomes:

- Make it easy to connect a food donator to a food receiver and potentially donate the food to the needy
- The built-in messaging system between donor and recipient will hopefully make the connection more real times and avoid confusions.
- Built in address line system will make the recipient find the donor address more easily
- Reduce food wastage and hopefully give food to the mouth of the needy.

1.5 Report Layout

Here is the report data format that used to make this report on Food wastage reduction system

- All topics are divided with some paragraph thus it can be easy to understand.
- Figures and images are used to get the topics content more easily.
- Required font and size is used to organize all the contents of the report.
- Specific margins and spaces are used to format the content.
- Bullet points are used to describe the content value more exact.
- Required format and menus are used to acquire all the contents a lot of easily.

1.6 Summary

Humans will be no different than animals without sympathy and kindness and the ability to make decisions depending on the situation. People sometimes don't get the chance to express their kindness for the lack of opportunities. Not all people are so fortunate and are not born with silver spoon in their mouth. They depend on the kindness of other people to live. Our goal was to become a part of something big and create a small platform to connect these people to each other and hopefully keep people believing that there are still good people in the world and make each day a little bit later by helping others in need or being helped by others.

CHAPTER 2

BACKGROUND

2.1 Introduction

In the world which is skyrocketing towards development and tidal wave of new technology is Claiming the whole world, food wastage still remains a massive problem. And there are no signs of it stopping anytime soon. Many of the world leaders play blind and deaf to the news of food wastage. This is such a major problem in the world. Because there are millions of people who go to bed hungry, wake up in the morning hungry. They don't have food. And there are others who have so many foods and they decide to waste it and throw it away. This project is targeted towards these people. People have kindness in their heart. Sometimes they can't show it because of lack of opportunity or they don't want to be the first one to take a step. They get afraid of what's the people going to say. Our project is for these people. No need to feel afraid. We have taken the first step. Now it's the kindness in people's heart which will help us reduce wastage and help people form a bond through their actions.

2.2.1 Development platform Introduction

We chose android platform as our platform since android is the most available and used platform in the entire world. It is basically used by almost everyone. If you have a mobile phone, it is more than likely to be operating on android OS. So, developing an android application is the easiest way to reach billions of people and for free

2.2.2 Database Platform

A database is a coordinated collection of data. The data is usually organized to model aspects of reality during a method that supports processes requiring info, for example, creating a national ID card or applying for a driver license or trying to find a hotel to stay etc. Database management systems are computer software applications which can interact with the user, even with other applications and the database itself can analyze and store data. The all-purpose software is meant to permit the definition, creation, querying, update, and administration of databases.

2.2.3 Parse Server Introduction

The open source Parse-Server is solution that one host oneself as if it was any other web application. One can host your own instance of Parse-Server on platforms like AWS, Heroku, etc. There are lots of benefits including being able to use many more adapters as well as performance improvements. Several new features are being added to the open source version that is not supported in the Facebook hosted solution.

By default, Parse-Server uses MongoDB as database store as default, just like a Rails Application would use PostgreSQL as a database store. Latest Parse-Server can also use PostgreSQL as a database store.

2.2.4 Mongo DB database system features

MongoDB is a cross-platform database program which is oriented document-wise. It is classified as a NoSQL database program; MongoDB uses schema to bind JSON-like documents

2.3 Challenges

Although our project is based on an android application and it is the most used platform in the entire world, we still have some obstacles ahead of us-

- Publishing and getting it started as a brand new and unique application
- Currently exclusive to android users

2.4 Feasibility Study

Feasibility study is the assessment of the practical operation of a proposed project. feasibility study aims to solve the mystery behind the project and tries to find out the strengths and weakness of the project, opportunities and threats present in the real time environment, the resources needed to carry through to reach the final prospects for success. In simple words, two criteria to judge feasibility are expense required and the value. Well-designed feasibility study provides a historical background of a project, a description of the service, accounting statements and the marketing research, financial data, legal requirements. Feasibility study evaluates the project's potential for success. It must therefore be constructed with an objective, unbiased approach to provide information by which decisions can be made.

This study has a massive impact on any development process. Because it causes analysis of different aspects like cost necessary for developing and executing the trial and the time necessary for each period of the system. If the necessary criteria are not researched properly, it can result in a lethal error and the system would turn out to be a total failure. That's why this study is so important when developing a system.

- **Technical feasibility**
  - The study is based on a rough model of a design of system requirements, it is implemented to determine if the developer has the proper expertise to handle completion of the project.

- **Legal feasibility**
    - It determines whether the proposed system conflicts with legal requirements, a data processing system must comply with the local data protection regulations and if the proposed venture is acceptable in accordance to the laws of the land.
- **Time feasibility**
    - A time feasibility study will look into the period in which the project is going to run its completion. The project will be considered a fail if it takes too long to be completed. Generally, this means estimating how long the system will take to develop, and if it's possible to be developed in a given time period using some methods. Time feasibility is a measure of how reasonable the project timetable is. With our technical expertise, are the project deadlines reachable? Some projects are initiated with specific deadlines. It is necessary to determine whether the project can be completed within the given time.

2.6 Focusing of the Project

The system is accomplished under android application system and connection with database. This paper initially discusses the structure of the background as well as the frontend. Then describes the development platform and database technology and the advantages and opportunities of each, followed by more detailed system requirements analysis, design, and implementation. End system to accomplish the data input, output, and statistics and make process easy and reliable. Donator and Recipient are making effective decisions through real time communication in the database.

CHAPTER 3

REQUIREMENT AND SPECIFICATION

3.1 Introduction

Here in this part we talked about requirement analysis. Requirement analysis is most significant section because it indicates how requirement are interacted about the application. We discussed here about however requirement we are fulfilling more than efficiently to perfectly complete this project. We discuss here about requirement collection and so analysis procedure. We also discuss here around this project use-case model and some to logical data model and design specification.

3.2 Hardware Requirements:

- Processor Speed: at least 2.5GHZ
- RAM: at least 8 GB RAM
- Hard Disk: 2 GB hard disk or above
- Processor: Dual core

3.3 Software Requirements:

In our system we just use some technology to develop.

Those are:

- Android Studio.
- Programming language – Java

3.4 UML Diagram

From this chapter we will discuss regarding UML diagram. On that point are many types of UML diagram. We intend to discuss a pair of them. By using what we will discuss the entire program.

3.4.1 Use Case Diagram

Use case diagram represent all the actor whose are related to the system and then show them how they can participate to the system. Figure-3.4 is the use case diagram of our system.
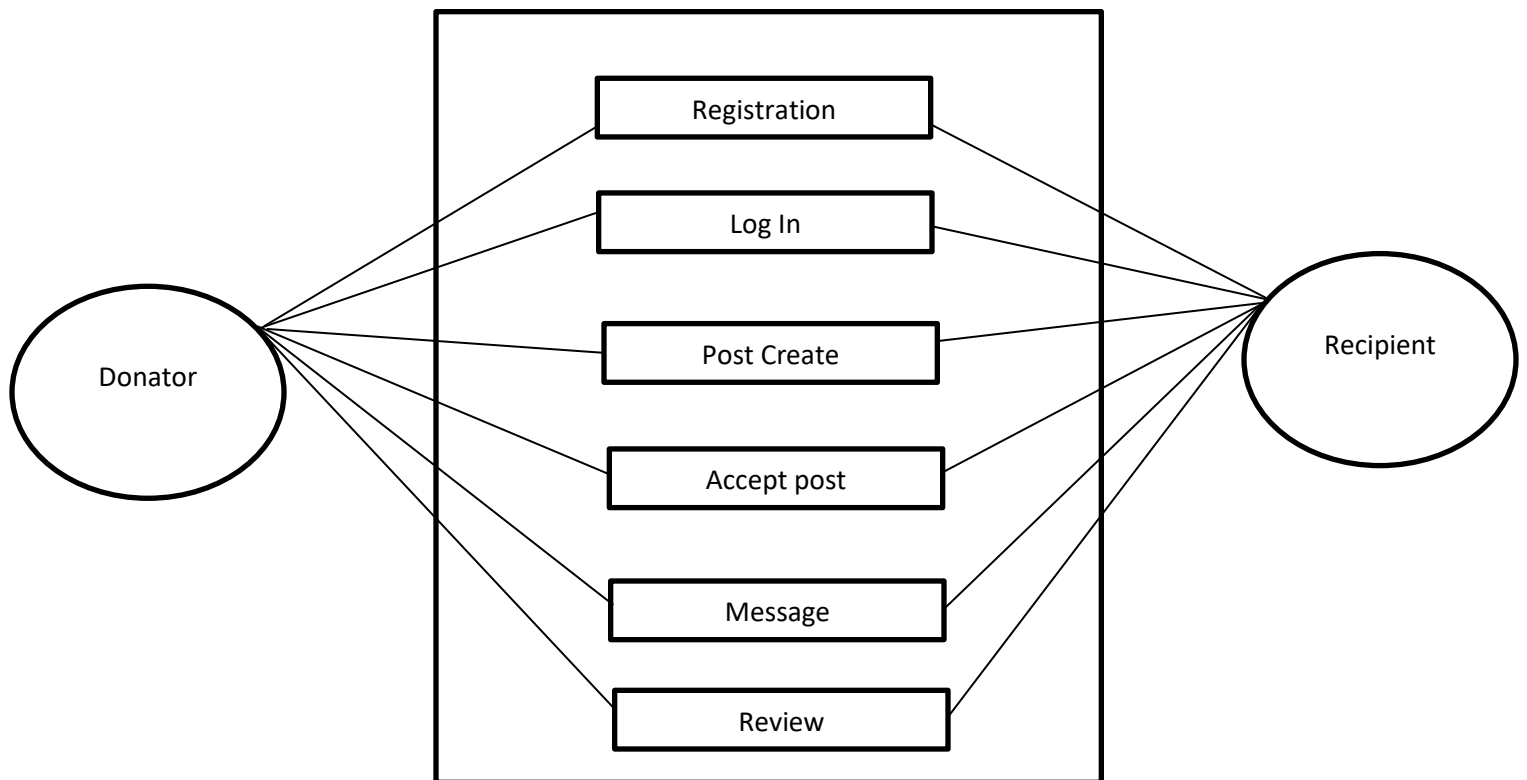
Figure 3.4.1: use case for Food donation system

3.4.2 Description of Use Case Model

Actors: The Actors of the system are Donator and Recipient.

Use cases: We have explained a set of use cases based upon the functionalities and goals of the application.

Registration: This use case explains actions required to register into the application.

Login: This use case explains a set of actions required for user login into the application.

Post create: This use case explains a set of actions for a user to create a post

Accept post: This use case explains a set of actions required for a recipient to accept a post from a donor

Messaging: This use case explains a set of actions required for donor and recipient to communicate with each other.

Review: This use case explains a set of actions required for a recipient to give a review about the donor he interacted with.

Now we are going to show our Data flow diagram in figure-3.5. The whole system has two main actors: donor and recipient. First, every donor or recipient will have to log in/register in the application as a user. When user is going to log in into the system there is two situations. They can either create a post as a donor or wait for another user to post and they can then accept it if they want. After accepting the post, only that user and donor have the option to message each other. After messaging, the recipient then has the option to give a review to the donor.
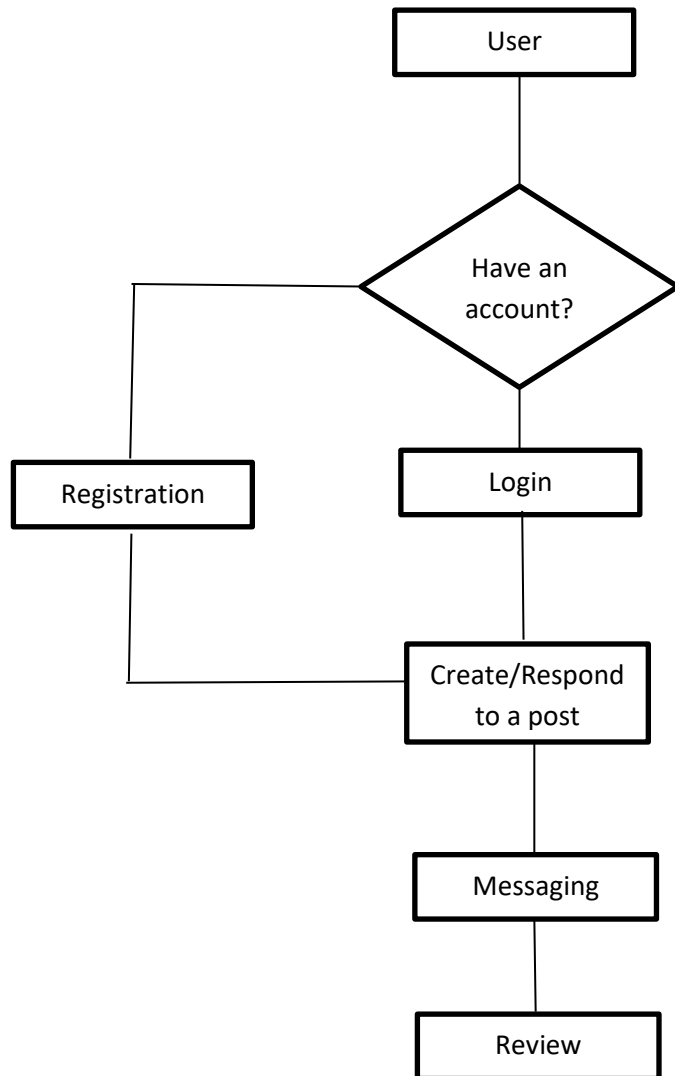
3.5 Data Flow Diagram

```
                        ┌──────────────┐
                        │     User     │
                        └──────┬───────┘
                               │
                               ◇
                          ╱         ╲
                        ╱   Have an   ╲
                       ╲   account?   ╱
                        ╲           ╱
              ┌──────────────┘    │
              │                   │
    ┌──────────────┐      ┌──────────────┐
    │ Registration │      │    Login     │
    └──────┬───────┘      └──────┬───────┘
           │                     │
           │              ┌──────────────┐
           └──────────────│Create/Respond│
                          │  to a post   │
                          └──────┬───────┘
                                 │
                          ┌──────────────┐
                          │  Messaging   │
                          └──────┬───────┘
                                 │
                          ┌──────────────┐
                          │    Review    │
                          └──────────────┘
```

Figure 3.5: Data Flow Diagram

3.6 Design Requirements

To develop this project, we need to do some designs to make this system easier and more reliable to user. So, this has two types of design and they are frontend and backend.

To do the frontend design we need to sketch the layouts into paper first. Then make the icon of the application and associate design in the android application to make it one of a kind. Then we need to design the project as the documentation requirements and finish coding.

Now for the backend design we need to know about android studio and the knowledge on java programming and associating it with online database. For backend coding we used the object-oriented coding pattern. Then find the file structure for the code repository. Thus, we get our all the requirement on backend design.

So that's the entire design requirement that needed in this project.

3.7 Summary

In this chapter we discussed about the full project using use case diagram and data flow chart. We also described them elaborately.

CHAPTER 4

Design Specification

4.2 Design (Frontend and Backend)

Back-end design is the design of the Back side of our system that can be viewed by Dashboard of Admin Panel and Employee Dashboard.

4.2.1 Registration page

This figure 4.2.1 shows the user login page of the system.
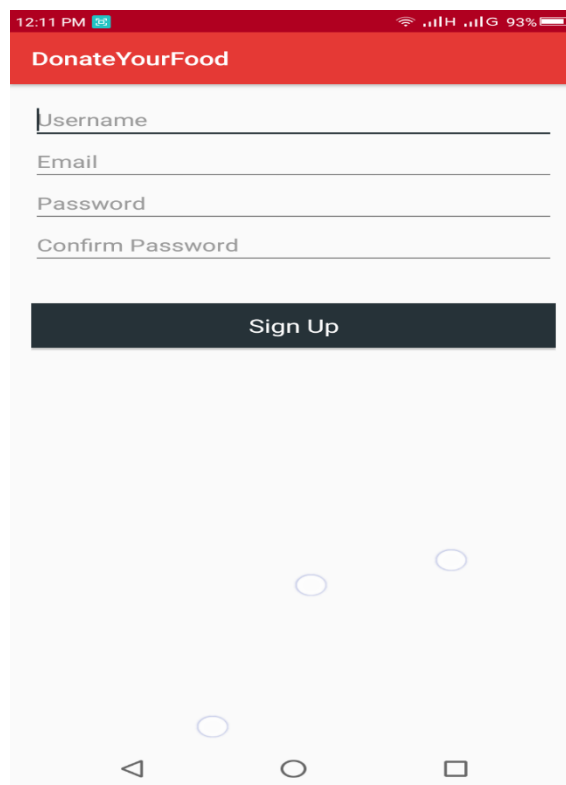
Figure 4.2.1 User Registration Page

4.2.2 User registration page (Backend):

objectId String	emailVerified Boole...	ACL ACL	updatedAt Date	authData Object	status String	username St
4IQDhisn88	(undefined)	Public Read, 4IQDh...	6 Nov 2019 at 13:0...	(undefined)	(undefined)	ak
yyEKBMuPiV	(undefined)	Public Read, yyEKB...	20 Oct 2019 at 08:...	(undefined)	(undefined)	smanik
TOkKlD2ZJd	(undefined)	Public Read, TOkKl...	20 Oct 2019 at 08:...	(undefined)	(undefined)	rozin_hasan
o7EwJhXrdW	(undefined)	Public Read, o7EwJ...	20 Oct 2019 at 07:...	(undefined)	(undefined)	Akash
WoCvfSpKjR	(undefined)	Public Read, WoCvf...	20 Oct 2019 at 02:...	(undefined)	(undefined)	s_m_anik
0QyHT12ib9	(undefined)	Public Read, 0QyHT...	19 Oct 2019 at 19:...	(undefined)	(undefined)	apptest
a1XVsRJQGP	(undefined)	Public Read, a1XVs...	18 Oct 2019 at 17:...	(undefined)	(undefined)	Rozin
7rGB46iNny	(undefined)	Public Read, 7rGB4...	18 Oct 2019 at 17:...	(undefined)	(undefined)	mdanik

username String	createdAt Date	password String	email String
ak	6 Nov 2019 at 13:0...	(hidden)	ak@test.com
smanik	20 Oct 2019 at 08:...	(hidden)	muhammadanik29@gma...
rozin_hasan	20 Oct 2019 at 08:...	(hidden)	rozinhasan465@gmai...
Akash	20 Oct 2019 at 07:...	(hidden)	akash@gmail.com
s_m_anik	20 Oct 2019 at 02:...	(hidden)	anik-15-666@diu.ed...
apptest	19 Oct 2019 at 19:...	(hidden)	apptest@gmail.com
Rozin	18 Oct 2019 at 17:...	(hidden)	rozinhasan@gmail.c...
mdanik	18 Oct 2019 at 17:...	(hidden)	mdanik@gmail.com

Figure 4.2.2 Backend of user Registration Page

4.2.3 User Log In page:

This figure 4.2.2 given shows the user log In page of the app.
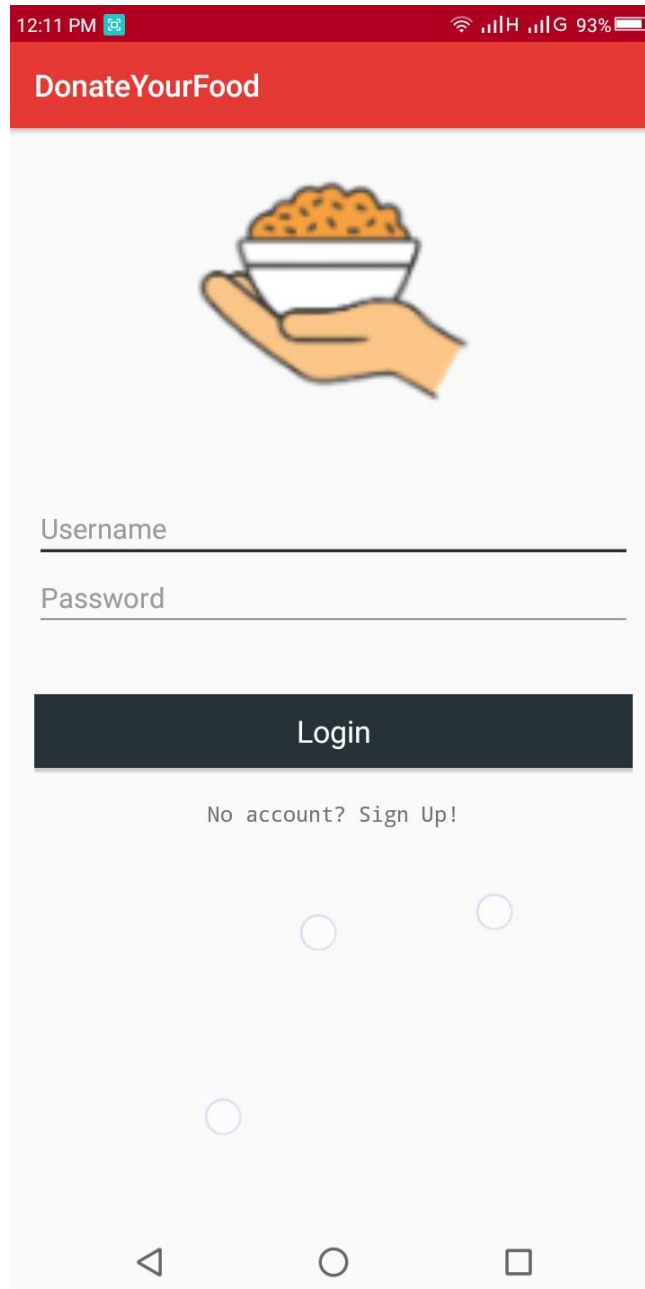
Figure 4.2.3 Backend of user Log in Page

4.2.4 User Log In page (Backend):

This figure 4.2.4 given shows the backend of the user log in page of the app.

objectId String	emailVerified Boole...	ACL ACL	updatedAt Date	authData Object	status String	username St
4IQDhisn88	(undefined)	Public Read, 4IQDh...	6 Nov 2019 at 13:0...	(undefined)	(undefined)	ak
yyEKBMuPiV	(undefined)	Public Read, yyEKB...	20 Oct 2019 at 08:...	(undefined)	(undefined)	smanik
TOkKlD2ZJd	(undefined)	Public Read, TOkKl...	20 Oct 2019 at 08:...	(undefined)	(undefined)	rozin_hasan
o7EwJhXrdW	(undefined)	Public Read, o7EwJ...	20 Oct 2019 at 07:...	(undefined)	(undefined)	Akash
WoCvfSpKjR	(undefined)	Public Read, WoCvf...	20 Oct 2019 at 02:...	(undefined)	(undefined)	s_m_anik
0QyHT12ib9	(undefined)	Public Read, 0QyHT...	19 Oct 2019 at 19:...	(undefined)	(undefined)	apptest
a1XVsRJQGP	(undefined)	Public Read, a1XVs...	18 Oct 2019 at 17:...	(undefined)	(undefined)	Rozin
7rGB46iNny	(undefined)	Public Read, 7rGB4...	18 Oct 2019 at 17:...	(undefined)	(undefined)	mdanik

Figure 4.2.4 Backend of user Log in Page

4.2.5 App Interface:
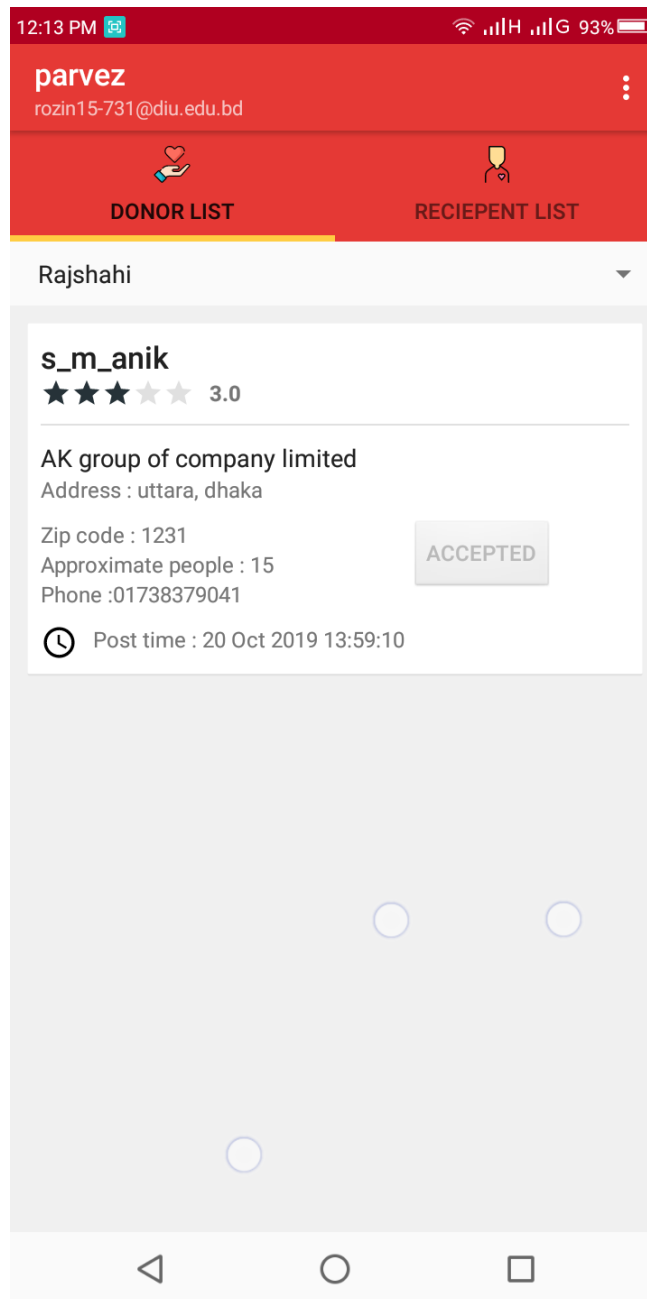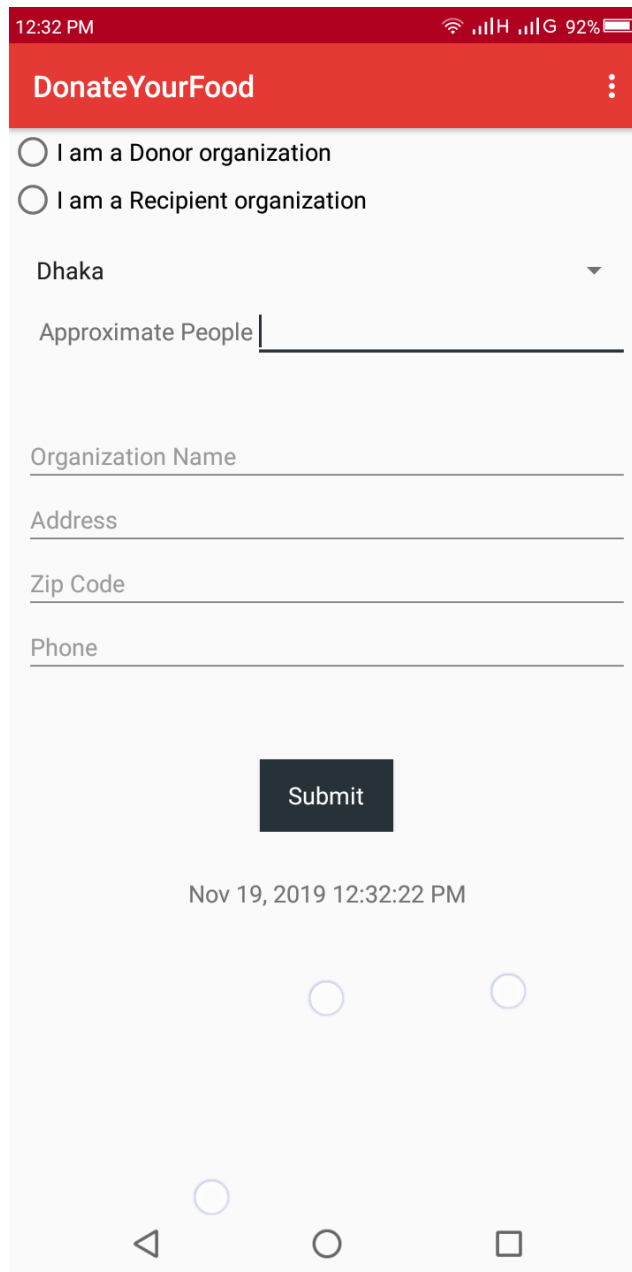
Figure 4.2.5 Application Interface

4.2.6 Create food post:

Figure 4.2.6 Food post creation page

4.2.7 Create food post (Backend):

objectId String	uName String	acceptedId String	ACL ACL	city String	name String	dorR S
GMMsAROCh1	s_m_anik	a1XVsRJQGP	Public Read + Write	Rajshahi	AK group of compan…	donor

dorR String	numofpeople String	postdate String	zipcode String	phone String	updatedAt Date
donor	15	20 Oct 2019 13:59:…	1231	01738379041	20 Oct 2019 at 08:…

full String	uid String	status String	address String	ratings Number	createdAt Date
AK group of compan…	WoCvfSpKjR	1	uttara, dhaka	3	20 Oct 2019 at 07:…

Figure 4.2.7 Backend of food post creation page

4.2.8 Push Notification:
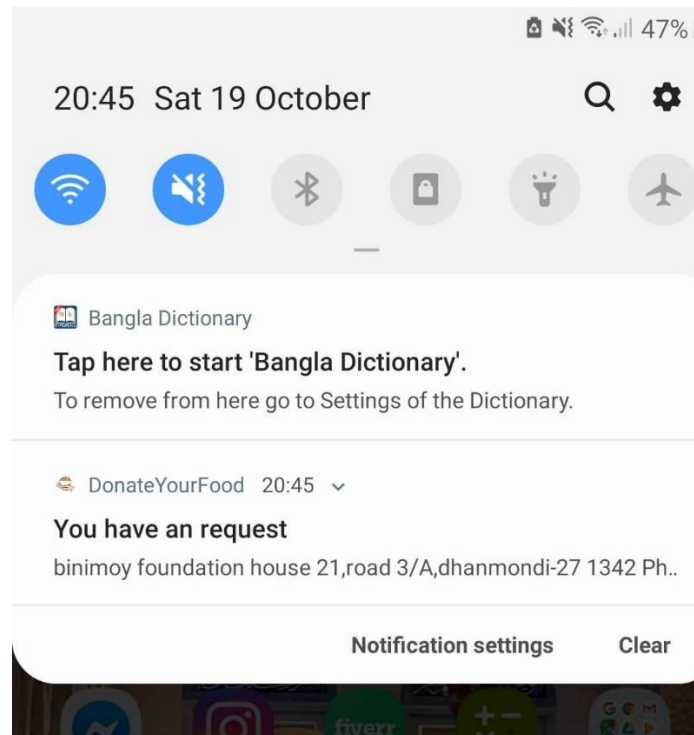
Figure 4.2.8 Push notification page

4.2.9 Push Notification (Backend)

Figure 4.2.9 Backend of push notification

4.2.10 Messaging:
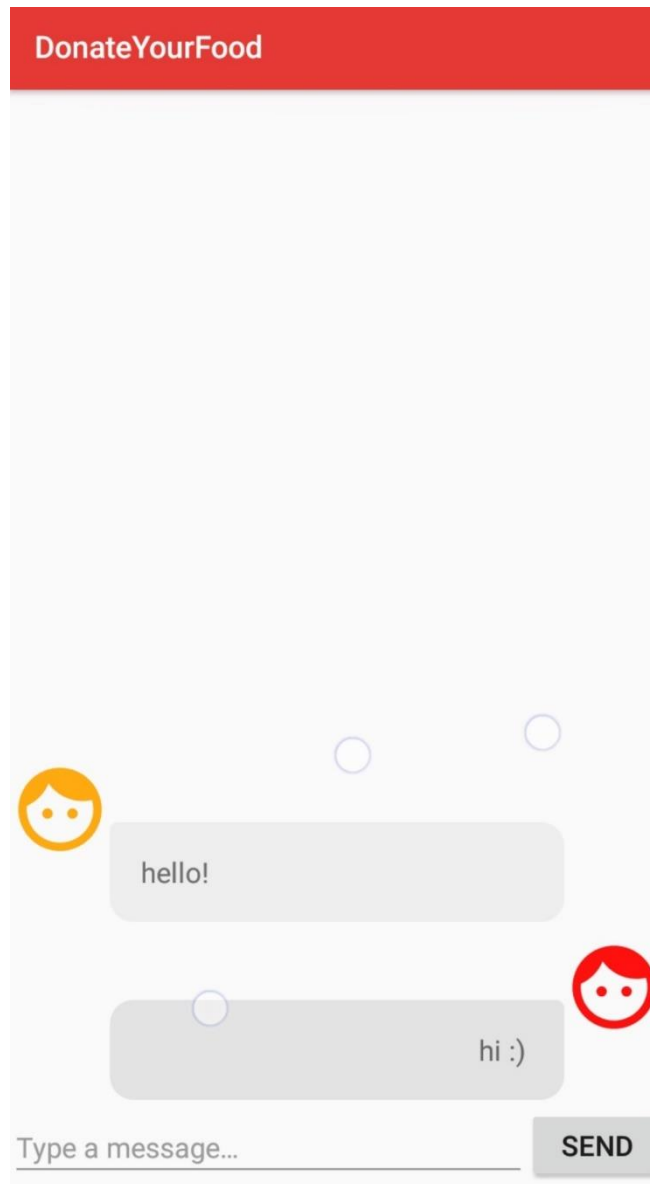
Figure 4.2.10 Messaging page

4.2.11 Messaging (Backend)

| objectId String	body String	userId String	message String	ACL ACL	updatedAt Date	sender Str
kyTwem4VTi	hi :)	a1XVsRJQGP	hi :)	Public Read + Write	19 Oct 2019 at 11:…	Rozin
imSqgcEosY	hello!	7rGB46iNny	hello!	Public Read + Write	19 Oct 2019 at 11:…	mdanik

CLASS | 22 OBJECTS · PUBLIC READ AND WRITE ENABLED
Message API Reference Video Tutorial

objectId String	body String	userId String	message String	ACL ACL	updatedAt Date	sender
IZSPHKCdPZ	hi	TOkKlD2ZJd	hi	Public Read + Write	20 Oct 2019 at 09:…	rozin_l
0dBdaZuk24	hello shayla	yyEKBMuPiV	hello shayla	Public Read + Write	20 Oct 2019 at 09:…	smanik
GGVMGrhjz3	hello	yyEKBMuPiV	hello	Public Read + Write	20 Oct 2019 at 09:…	smanik
2UJCOqC0Um	call me my num	yyEKBMuPiV	call me my num	Public Read + Write	20 Oct 2019 at 08:…	smanik
PX2iBghCJH	ok	yyEKBMuPiV	ok	Public Read + Write	20 Oct 2019 at 08:…	smanik
RyR77tjUOv	i would like to co…	TOkKlD2ZJd	i would like to co…	Public Read + Write	20 Oct 2019 at 08:…	rozin_l
dOyscOEWAq	hi	yyEKBMuPiV	hi	Public Read + Write	20 Oct 2019 at 08:…	smanik
zradoYRG61	hello	TOkKlD2ZJd	hello	Public Read + Write	20 Oct 2019 at 08:…	rozin_l

sender String	reciever String	createdAt Date	chatroomName String
rozin_hasan	yyEKBMuPiV	20 Oct 2019 at 09:…	rozin_hasanyyEKBMu…
smanik	TOkKlD2ZJd	20 Oct 2019 at 09:…	smanikTOkKlD2ZJdWT…
smanik	a1XVsRJQGP	20 Oct 2019 at 09:…	smanika1XVsRJQGPGt…
smanik	TOkKlD2ZJd	20 Oct 2019 at 08:…	smanikTOkKlD2ZJdQQ…
smanik	TOkKlD2ZJd	20 Oct 2019 at 08:…	smanikTOkKlD2ZJdQQ…
rozin_hasan	yyEKBMuPiV	20 Oct 2019 at 08:…	rozin_hasanyyEKBMu…
smanik	TOkKlD2ZJd	20 Oct 2019 at 08:…	smanikTOkKlD2ZJdQQ…
rozin_hasan	yyEKBMuPiV	20 Oct 2019 at 08:…	rozin_hasanyyEKBMu…
s_m_anik	a1XVsRJQGP	20 Oct 2019 at 08:…	s_m_anika1XVsRJQGP…
s_m_anik	a1XVsRJQGP	20 Oct 2019 at 07:…	s_m_anika1XVsRJQGP…

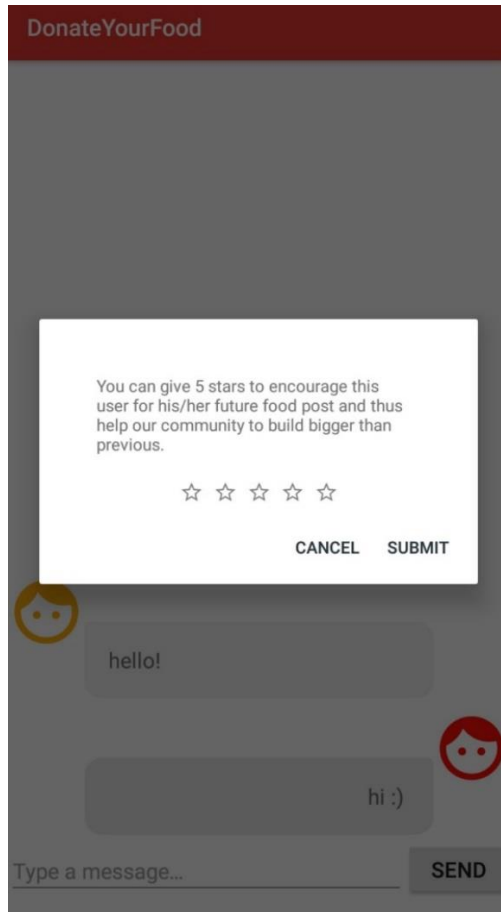Figure 4.2.11 Backend of Messaging operation

4.2.12 Review:
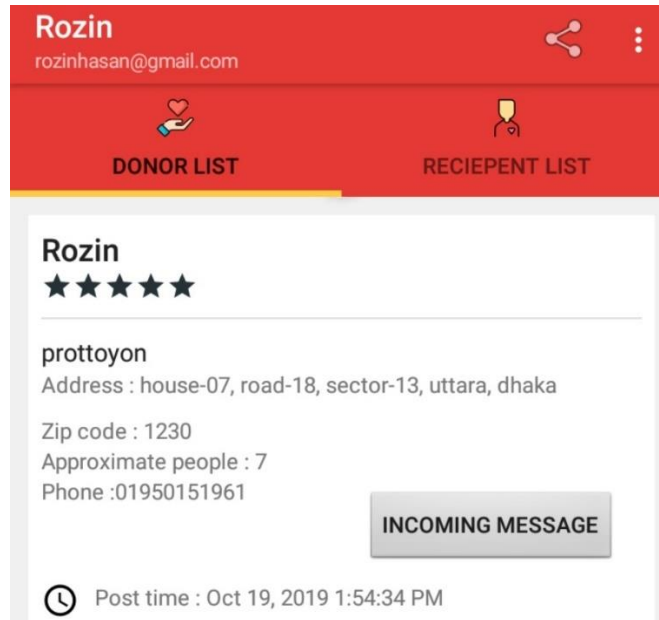
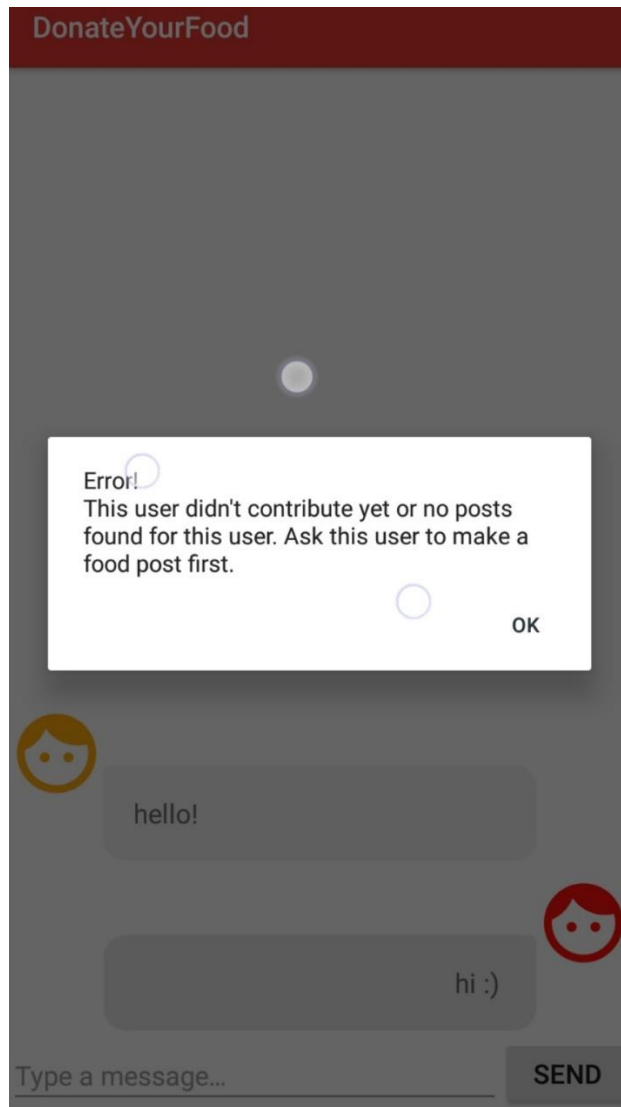Figure 4.2.12 Review operation

4.2.13 Review (Exception):

Figure 4.2.13 Review operation (Exception)

4.2.14 Review (Backend):

objectId String	fivestar Number	userId String	ACL ACL	updatedAt Date	threestar Number	userna
pU2A5X4Y9g	0	4IQDhisn88	Public Read + Write	6 Nov 2019 at 13:0…	0	ak
KXy7qTXV6H	1	yyEKBMuPiV	Public Read + Write	20 Oct 2019 at 08:…	0	smanik
uVJdceFMKb	0	TOkKlD2ZJd	Public Read + Write	20 Oct 2019 at 08:…	0	rozin_I
BfI5677AB2	0	o7EwJhXrdW	Public Read + Write	20 Oct 2019 at 07:…	0	Akash
IfRgfcD3vx	3	WoCvfSpKjR	Public Read + Write	20 Oct 2019 at 08:…	0	s_m_an
ADS41V7mEY	1	0QyHT12ib9	Public Read + Write	20 Oct 2019 at 07:…	0	apptes
JT4vcIIaMv	8	a1XVsRJQGP	Public Read + Write	20 Oct 2019 at 08:…	1	Rozin
fGz1LsHxVa	4	7rGB46iNny	Public Read + Write	20 Oct 2019 at 06:…	1	mdanik

fourstar Number	onestar Number	numOfRatings Number	createdAt Date	email String	twostar Number
0	0	0	6 Nov 2019 at 13:0…	ak@test.com	0
0	0	1	20 Oct 2019 at 08:…	muhammadanik29@gma…	0
1	0	1	20 Oct 2019 at 08:…	rozinhasan465@gmai…	0
0	0	0	20 Oct 2019 at 07:…	akash@gmail.com	0
0	1	5	20 Oct 2019 at 02:…	anik-15-666@diu.ed…	1
1	1	3	19 Oct 2019 at 19:…	apptest@gmail.com	0
2	1	14	18 Oct 2019 at 17:…	rozinhasan@gmail.c…	2
0	0	5	18 Oct 2019 at 17:…	mdanik@gmail.com	0

Figure 4.2.14 Backend of review operation

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Introduction

In this chapter we will discuss how to implement this project. Our project is an android based project and it will include only back-end implementation. All the implementation will be shown with their own respective figures.

5.2 Implementation of database

This figure 5.2 shows the dashboard of our database for this project.
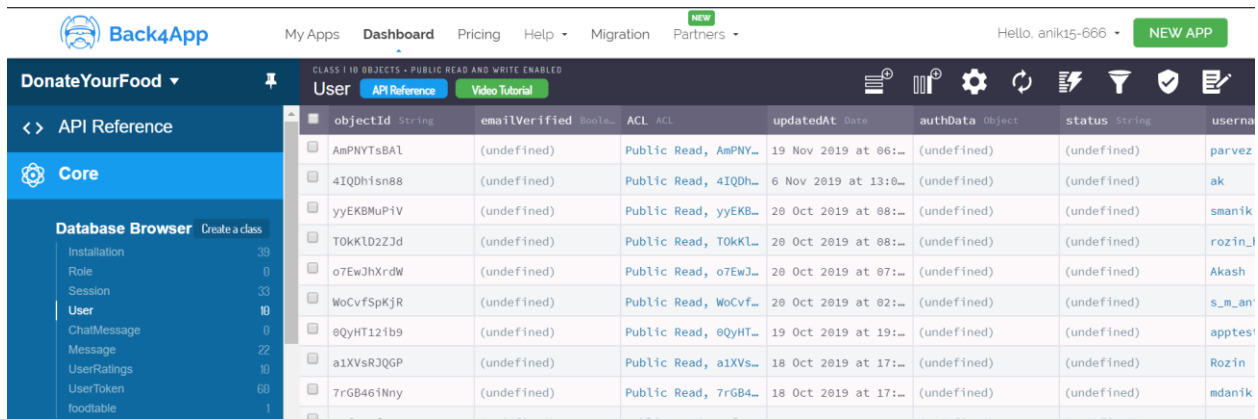
Figure 5.2: Database Connection

5.3 Implementation of Backend Design

Our application is internet based entirely. So that there are several workings with the front quit layout. So, for our application we have used Java programming and Kotlin and used parse server.

5.4 Testing Implementation

This is an android platform-based project that's why implementation testing is very important for this system before publishing the application. Because it will measure the bug and performance issues in different mobile devices and we can get the knowledge of the applications input and output. On the other hand, a test can give the feedback that how much time it can carry off to run

and can give accurate performance. There are so many tests that can be done and very essential for android application. For our application, we have done all the essential testing needed. They are given below:

5.4.1 Unit Testing

Unit testing is applied for when the coding is implementing then the developer checked for their own coding errors and spelling errors. So, in our case we have checked when we coding and tried to find out the initial errors. It happens when we are coding and during the initial testing of the application.

5.4.2 Integration Testing

We have used all the back-end code properly and triple checked them. We have checked if any file is broken or not. We then checked that all the user interface works smoothly and without bug or not.

5.4.3 Functional Testing

All the functions we have been chosen for our application initially have been properly tested and implemented accurately. We have tested all the necessary functions and removed any function that is not essential to building our project. The functions have been tested individually. Since the functions are the backbone of our project, we have taken extra time to check the properly and methodically. Any function that doesn't belong or have not been tested properly will cause the system to fail at some step of the implementation.

5.4.4 System Testing

System testing checks that if the application is working on other system environment. As our application is based on android platform, we have checked different android versions on our android studio and successfully implemented our project on each one of them.

5.4.5 Usability Testing

The usability testing measures the user interaction and how friendly the UI is. With this in mind, we have made our application with as simple a User Interface as possible.

5.5 Test Result

We tested our application on different versions of android platform since our project is exclusively for android users. We wanted to make sure none of the android versions return an error when running our application. The results are given below:

5.5.1 Unit Testing Result

The full project is established on Java and Kotlin. There are massive lines codes implemented in this project. When working with codes in such quantity, it is very easy to have a few mistakes along the way. To find out what errors were infecting our code we did unit testing. And after doing the test we got some error in our coding and fixed those errors. That ensured a bug free application of our project. And that was the success of our unit testing. If we didn't implement our unit testing, our application would have full of bugs and errors and would be the prey of constant system failure.

5.5.2 Integration Testing Result

Integration testing is the test of if the frontend design and backend code are running properly and without errors. It is basically the test of the full project with finalized design and code. This test checks if the finalized application is running without error. And we found couple of errors in our test and fixed it as soon as possible. Then we ran the test again and found no errors.

5.5.3 Functional Testing Result

A very important test we did was functional testing. If we have a good back-end design but we have error in our functional operation, then the coding is completely useless. Functional testing is the way to determine if every function is working properly or not. During this test we got some troubles adding new users in the database even when the information was properly submitted through the app and account created message was shown. We also had a problem of sorting the

food post according to area and review system for that area. There was error in implementing our logic. We fixed them immediately. There was another error in our application that caused our app to crash when the donor started chatting to the recipient where the post was created with a location from outside Dhaka. We found out the error in our code and fixed it. That's how we have accomplished our functional testing.

5.5.4 System Testing Result

It is extremely important to implement all the tests above to ensure a smooth and bug free application run. Android is the most used platform worldwide, but there are many versions of android. And also, not every same device uses the same android version. So, there are many facts that can cause this application to fail and fail to satisfy the user. That's why these testing are so important while doing any kinds of projects and almost impossible to succeed without these tests. After testing what we have assured that our application has successfully run on different versions of android. And there was no error found.

5.6 Summary

We accomplished some important implementation and testing in this chapter. We learnt about implementation of database in Android studio and learnt about parse server. We tested the implementation of server and database in android application. To maximize the security of our application we implemented different types of tests which are very important for our project. We also showed the result and discussed it.

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Limitations

In conclusion we just have to say about our project that is, our project is based on android platform and it is about food donation. Meaning if someone has any food to spare, they can create a post about it in our application and the people who actually need it or can deliver it to the people who need it can't contact that person for proper food distribution and thus reduce food wastage. We were thinking of food wastage amongst ourselves for many days. Then decided to implement what we learnt in our beloved university into action and after many trial and error we were finally able to make it into reality. We tried to make the project as simple as possible for users and tried to make the UI very user friendly. We think this application will be very helpful for people everywhere.

Although our project is based on an android application and it is the most used platform in the entire world, we still have some obstacles ahead of us-

- Publishing and getting it started as a brand new and unique application
- Currently exclusive only to android users

6.2 Scope for Further Development

Our project has many options for further development. At the moment, our application is exclusive to android platform. Even though android is the most used platform in the world, it is not the only platform. Many people use iOS. We can also open a branch of our project to iOS users and make the application available for them also. Another future opportunity is that, our application was created with only our country Bangladesh in mind. But food is not wasted in Bangladesh only. People waste food all over the world. We can further expand our application worldwide for a wider reach.

Related work:

i. Food Connect:

(https://play.google.com/store/apps/details?id=com.foodconnect.app&fbclid=IwAR04_RrioCfQjVha H7AsoWYG8XOPStkYShcaQfFttb4RfhKvR2Q258l_PAU)

ii. Share the Meal: Donate to Charity and Solve Hunger:

(https://play.google.com/store/apps/details?id=org.sharethemeal.app&fbclid=IwAR0QSFN4IFW9no8 YlRZKmA7besFVsUN1wLoO4r_0TBVlLpBb6iLm_O2uVq8)

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(https://developer.android.com/studio/?gclid=EAIaIQobChMIj9X9mfT15QIV2gorCh10iQFKEAAYASAAEgISYPD_BwE) [last accessed on 12-11-2018 at 10:00am].

2.Back4app available at: (https://www.back4app.com/)[last accessed on 19-11-2019 at 04:00pm].

3.Setting up log In and registration using parse server available at: (https://www.back4app.com/docs/android/user-registration-email-verification) [last accessed on 04-04-2019 at 06:30pm].

4.Push notification using parse server available at: (https://www.back4app.com/docs/android/push-notifications/parse-server-push-notifications) [last accessed on 23-04-2019 at 03:00pm]

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