BLOOD BANK A MOBILE APPLICATION

BY

SADIA TAPOSI
ID: 172-15-9756

AND

SULTANUL ARIFIN
ID: 171-15-9176

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

Supervised By

Ms. Afsara Tasneem Misha (ATM)
Lecturer
Department of CSE
Daffodil International University

Co-Supervised By

Mr. Abdus Sattar
Assistant Professor
Department of CSE
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Project titled **Blood Bank mobile application,** submitted by Sultanul Arifin and Sadia Taposi, ID No: 171-15-9176 and 172-15-9756 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 2nd, June 2021

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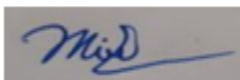
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Department of Computer Science and Engineering

Faculty of Science & Information Technology

Daffodil International University

External Examiner

Dr. Md Arshad Ali

Associate Professor

Department of Computer Science and Engineering

Hajee Mohammad Danesh Science and Technology University

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Ms. Afsara Tasneem Misha, 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.
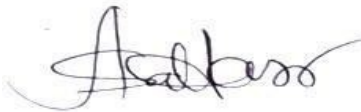
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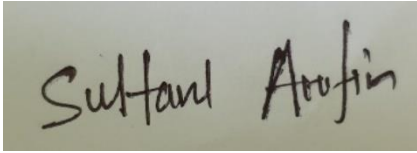Lecturer
Department of CSE
Daffodil International University

Co-Supervised by:

Mr. Abdus Sattar
Assistant professor
Department of CSE
Daffodil International University

Submitted by:

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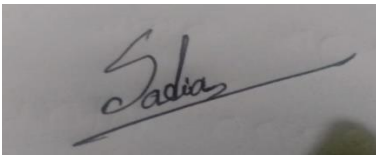
Sultanul Arifin
ID: 172-15-9176
Department of CSE
Daffodil International University

_____

Sadia Taposi
ID: 172-15-9756
Department of CSE
Daffodil International University

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ABSTRACT

Every day many lives are being saved by blood donation. By blood transfusion, it can give one new energy to spend time with family and friends. Blood cannot be manufactured by any means it can only come as a gift from another person. One is allowed 6 pints of blood for donation. With one pint of blood, it can save up to 33 lives. The number of blood donors is very less in our country compared with other countries. Mobile applications can play an important role in increasing awareness about the novel profession like Blood Donation (BD). This paper will describe the features and functionality of the BD application. Anyone who wants to donate blood can do that by only registered in the application. The receiver can see all the information of the donors and can easily communicate with the donor. Once the app user enters the blood group which he/she needed it will automatically show the donor nearby and send an alert message to the donor. First, it will show the results of the donor that are at the top of the queue list if somehow it fails to contact the first donor, then it will automatically search for the next donor who is present in the queue. After donating blood, the app will automatically remove the information of the donor for the next three months.

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Chapter 1

INTRODUCTION

1.1 Introduction

E-Health is a new perspective for global health which aims to deliver health care service to all classes of people. Different types of e-health solutions are offering various content for health. Personal health records (PHRs), emergency health care information, home nursing, electronic medical records (EMR), and health monitoring systems are some of them. One of the e-health components is m-health which provides health support by mobile device. The development of smartphones and tablets has had an impact on the rapid growth in the field of m-health [1].

One of the most valuable contributions that an individual can make is Blood donation (BD). Blood donation (BD) is seen as a noble act as it helps save precious human lives [1]. Around 108 million blood donations take place every year according to the World Health Organization (WHO),. It includes voluntary unpaid, family/replacement, and paid types of blood donors. Blood donating applications are very much useful for people in the case of emergencies when it is necessary to identify blood donors. This type of apps can help to save lives or help volunteers keep records of their blood donation activities. BD apps can provide insight into and useful information about BD types and processes [1].

In this paper, we have designed a blood donation application, which will record all the information of blood donors and blood banks. Make the direct communication between the donor and the receiver this application plays a vital role. Anyone who wants to donate blood can easily register for this application. The application will record all the information of the donor. Like the name, contact number, address, blood group, types of blood donation(paid/unpaid). The receiver can see all the information of the donor and can easily contact the nearest donors. We have built this application for both the mobile OS, Android,

and macOS. The UI is so simple that each type of person can use it easily. Also, this is a free application so anyone can easily download it and install it on their device.

1.2 Motivation:

The main purpose of a secure online blood bank the system needs to be simplified and the process is automated Finding blood in case of emergency and maintenance Blood donor, recipient, blood donation records Safe, secure bank programs and blood stocks Method. Assist in the management of blood donors Share records, plans, and one more piece of information Secure, secure, and convenient way to use databases Protection. Allowing the donor quick and timely access Record. Easy registration facility and the goal is to encourage participation in any upcoming event More volunteers to take part in such activities. The Current grant camp locations will be available to Users in different areas. There are several reasons behind this Project implementation; Using the manual system Blood bank management is time-dependent and there is a risk of error, not lack of data protection Central database used to keep records of donors It is an insecure way to store and store personal information the percentage of accuracy is lower in manual systems than in digitized systems. Another reason for implementation is to provide authentic and authorized features Current systems where personal and confidential data can Only view by authorized users. To make an offer Web-based application where blood donors can register So remove them to donate Existing system problem errors i.e., database Insecurity

1.3 The rationale of the Study:

We provide an effective model for direct contact between the donor and the blood recipient in this project. The number of projects and programs in this field is small, and the android application has proposed several tactics.

Here, a much more functional and user-friendly interface has described. Most of the application is not that much user friendly and the information is also not that useful. Such

applications need some development to make those more user-friendly and also make the communication between the donor and the recipient more effective way.

1.4 Expected Outcome:

Our main contributions include,

1.Many in need of blood would have no trouble finding a donor.

2.There would be a time saver.

3.The public will be informed about the local blood bank.

4.It would be easier to locate the particular individual if you have their blood group and phone number.

5.It will be determined if the chosen individual can donate blood to receive a blood donor alert.

6.All was made via the blog, including the structure of blood molecules and blood, everything made of blood can be unknown

1.5 Report Layout:

In this chapter, we looked at the introduction, which included the platform for the Blood Donation application, motivation, the study's reasoning, and the project's results. The report layout is then followed.

The backdrop of our project will be discussed in Chapter 2.

The project's requirement specification will be discussed in Chapter 3.

The design specification will be discussed in Chapter 4.

We'll talk about implementation and testing in Chapter 5.

We'll talk about the influence on society, the environment, and sustainability in Chapter 6.

The conclusion and future scope will be discussed in Chapter 7.

Chapter 2

Background

2.1 Terminology

An Android Application for Volunteer Blood Donor, An Android Based Blood Bank Information Retrieval System, Lifesaver E-Blood Donation App, Android Blood Bank, Smart Blood Bank, Blood Bank Management system, Blood Bank And Donor Management System

2.2 Related Works

Prof. Snigdha et al. suggested an application for blood donors in their paper "Android blood bank." [2] The donor can use GPS (Global Positioning System) in that app to find the exact direction (Program). Blood donors' information will be kept confidential. data in confidence. Only the administrator has access to sensitive data. PHP, MY SQL, and Android are examples of methodologies they use.

WHO defines "blood donors" as "donors of whole blood, red cells, platelets, plasma, and other blood components who donate whole blood and/or participate in a blood donation program." [3]Blood transfusion services (BTS) are responsible for only collecting blood from needy donors. Any infection has a very minimal possibility of spreading. [3]To assure the safety and sufficiency of the blood supply, a systematic approach for evaluating the fitness of donors is essential. This protocol is also essential to ensure that the health of transfusion recipients and blood donors is protected. [1] Donors who are a good match are not eliminated too soon. Blood donation apps will assist blood donors in determining how, when, and where to donate blood, saving them time and safeguarding them from any irritation or harm that may occur during the operation.

A maximum of 420 people (43.6 percent of the total) had donated via apheresis, with 30.2 percent of people donating both WB and apheresis products. Slightly more than, Just WB was donated by half of the people (56.4 percent, or 544). [4]

Sultan Turhan presented an Android application for volunteer blood donors, with the primary goal of notifying participants on a regular basis. Rh++ is a cutting-edge data management system with a donor site. This strives to maintain network control over blood donation and supply. [4]

According to M.R. Alony, India collects 7.5 tons of blood in the article "A New Concept of Blood Management System Using Javed Akhtar's "Cloud Computing for Rural Areas." [6]

A total of 2% of blood is discarded each year, amounting to millions of units. If we subtract 2% of the total, there are a variety of factors. Blood that is no longer available (whole blood or red blood cells) is discarded. [7]

2.3 Comparative Analysis

According to the overall analysis, "blood is an imperative need for every person." If a patient requires blood in an emergency, the doctors can search in a blood bank or a hospital. If blood isn't available, we'll make do with what we have. This type of software can be used [4]. In this case, the people who are interested in donating blood should fill out a registration form. In the event of an emergency, the patient will not be able to receive blood at that time.

2.4 Scope of the Problem

In this analysis, the researchers found that the system's creator neglected to provide functions for checking the availability of blood bags and checking the shelf life or expiration of blood bags or items. As a result, the researchers will incorporate these into their established framework to improve blood transfusion protection.

There were also some issues with the previous system, such as

1.Intensely time-consuming

2.Higher officials have no clear responsibilities.

3. There is a lack of data security.

4.There is a need for more data consistency.

5.requires a lot of pair work.

6.More manpower is needed.

7.Calculations must be done by hand.

2.5 Challenges

We must overcome all limitations to solve the previous problem, such as

1.The amount of time that must be allotted.

2.More efficient operation

3.Required processing time in minutes.

4.Efficient grater

5.Data security.

6. Verify the accuracy of the information.

7.Reduce the amount of data that needs to be manually entered.

8.appropriate supervision by higher authorities.

9.Add more features to make it user-friendly.

CHAPTER 3

Requirement Specification

3.1 Business Process Modeling

The empirical representation of an organization's business processes, or just an example of them is known as business process modeling (or process modeling). Method modeling is an essential part of efficient enterprise process control.

Process simulation software provides an empirical representation of an organization's as-is processes and compares them with to-be processes for improving performance.

It's one of the most crucial aspects of any project. At first, we design our business process model in pen and paper. After that, we have used Business Process Modeling Software to represent our process digitally. Our model figure has given below:
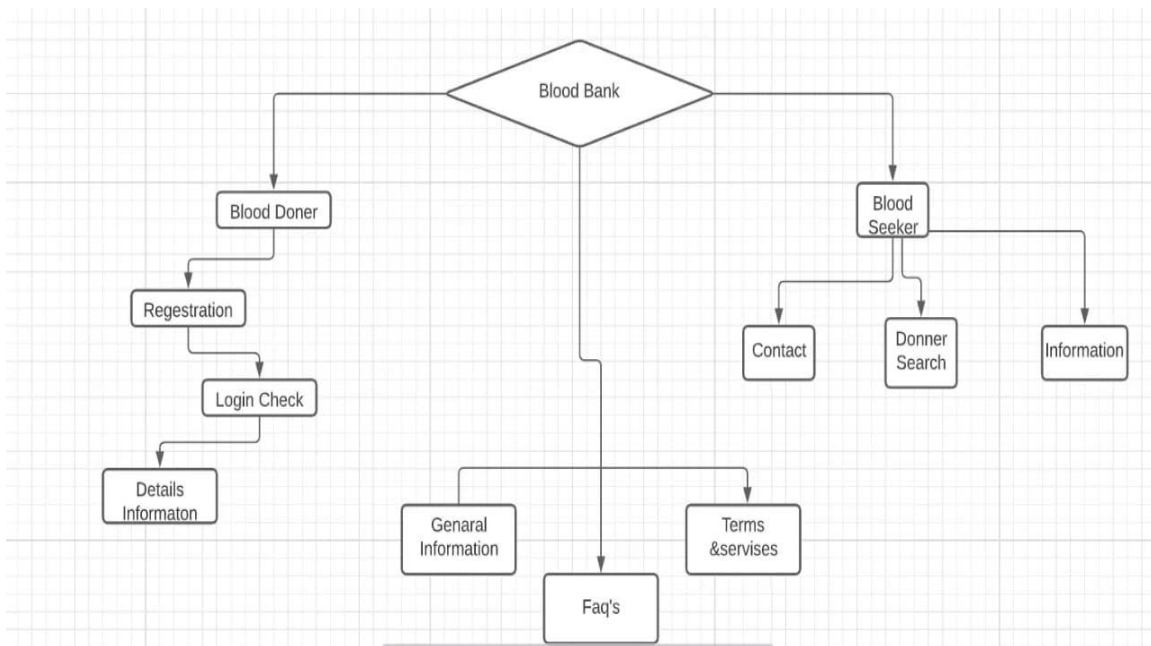

Figure 3.1: Workflow diagram

3.2 Requirement Collection and Analysis

Plan specifications are critical to completing the project on schedule and under budget constraints.

It is critical to fully comprehend the conditions of any initiative you are about to pursue. There have been many too many programs that have stalled due to a lack of well-defined criteria. Projects are at risk where conditions are unclear; they can fail to achieve the expected and required outcome.

The Requirements of our development project have given below:

1. We have checked all the previous existing applications.
2. Then we have designed our business process model.
3. Then set the behavior of our project.
4. Then, for the service to be successful, set the necessary environmental requirements or attributes.
5. Then decide what actions, procedures, or other specifications the project must satisfy.

3.3 Use Case Modeling and Description

A use case is just a list of all the numerous ways a consumer must engage with a gadget. These "cases" are similar to device requests, and use cases explain how the system responds to such requests. Usage cases, in other words, define the interaction between a device and its users, often known as actors. Use cases may refer to facilities, computers, or business processes, even though the process is typically automated (such as an Order system).

The usage case model for our project is as follows:

1. At first, the user needs to install the application on their own device.
2. After installing, the application will ask to give their phone number.
3. The user must press the proceed button after entering the number.

4. An OTP will send to that number, and the user will log in to the program after entering the OTP.

5. If the user wants to become a donor, then he needs to fill in some information.

6. If anyone wants to make a request for the blood, he can easily do the by going to the Request tab and can search for the blood that he wants. He will find the contact information of the donor.

7. The user can also see the blood bank information.

3.4 Logical Data Model

The method of constructing a simulation for data to be stored in a database is known as data modeling. This data model is a mathematical description of data objects, their relationships, and the laws that govern them. Computer modeling aids in the digital interpretation of data while also enforcing industry laws, legal compliances, and government policy. Data models guarantee data quality by maintaining accuracy in naming conventions, default values, semantics, and protection.

The process of the logical data model of our project are as follows:

1. First, the system will collect the information from the donors.

2. It will then be stored in the SQL server.

3. If someone sends a request for blood then it will show all the match information of his search.

4. The donor's details are then conveniently obtained by the recipient.

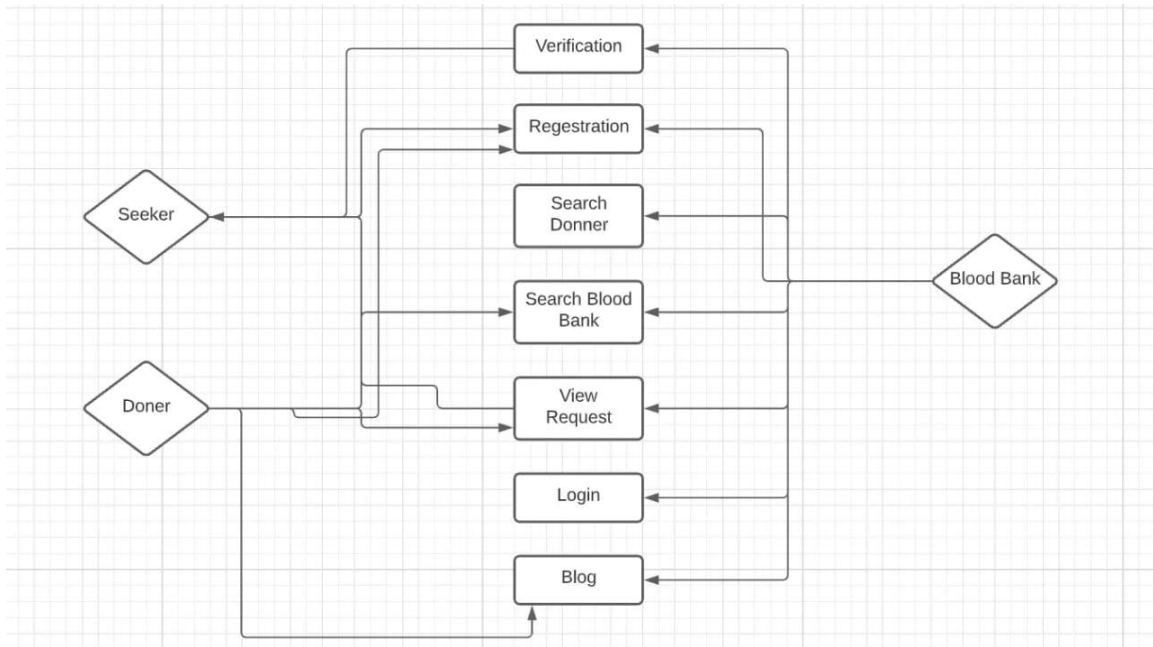The diagram of this process has given below:

Figure 3.2: Dataflow diagram

3.5 Design Requirement

Your design specs will differ from those of others because they will pertain to your individual issue statement and the device, method, or experience that you are building.

The design requirement of our project is:

1. Can able to store information of ten thousand users.
2. Sending OTP in a few seconds.
3. The time it takes for an application to load should be minimal.
4. Only showing the name, address, and contact information of the donor for a user search result.

Chapter 4

Design Specification

4.1 Front-end Design

Everything that a user encounters on a smartphone app, including the interface, is referred to as the front end. Making a full mobile application, the mobile app development process requires collaboration between front-end and back-end developers. Native and hybrid front-end architecture are the two most common varieties. Native front-end development is usually optimized for the iOS or Android architectures, while hybrid front-end development uses both and is compatible with a variety of operating systems.

In our project, we have used Native front-end architecture. When a user opens this application, the system will show him the home interface. It is mainly the blood bank details page. Here one can easily find all the contact information of the blood banks. And also, search for the nearest blood banks.
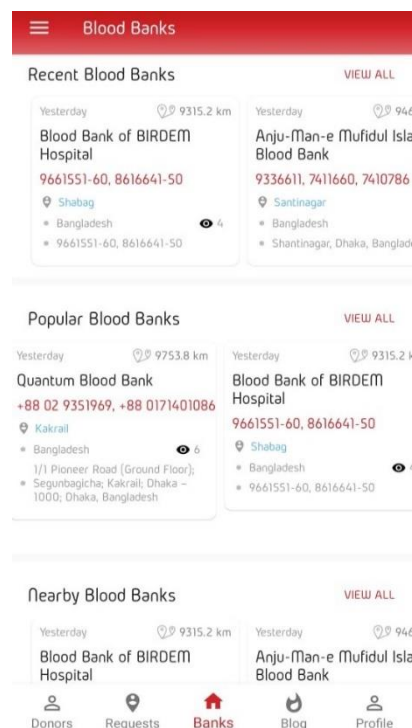
Figure 4.1: Design of Blood Bank Page

There will be five important menus of this application. These are:

1.Home

2.Donor Information

3.Request Blood

4.Blogs

and

5.Profile

Now let's describe these menus. We have already talked about the "Home" interface, now moving on to the "Donor Information" interface. The user can find donor information such as name, age, blood type, address, email, and phone number on this page. Using these users can easily communicate with the donor. Here the user can also search for a specific blood group. He can also become a donor or add a new donor by clicking the add donor button. Adding a donor is an easy process. To do that user needs to fill in all his basic information like names, blood group, date of birth, present address, phone number, and the last date of his donation and press the submit button.
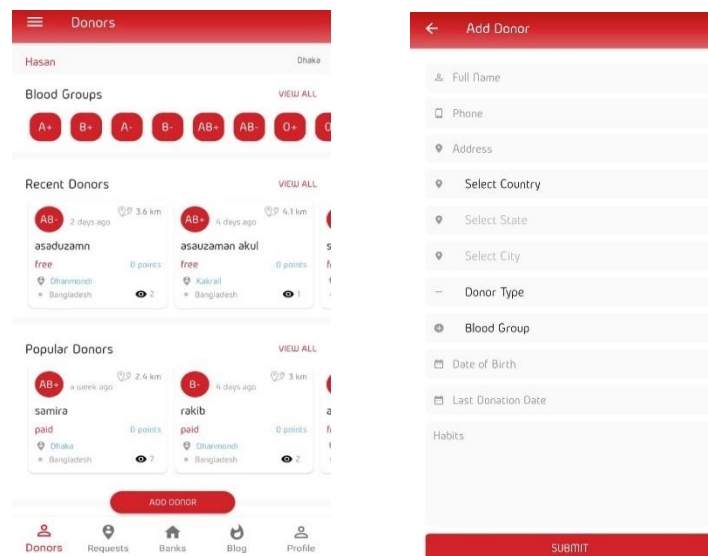
Figure 4.2: Design of Donors Page

Let's move on to the "Request Blood" menu. Here if the user needs any blood, he can put his request. For blood requests, the user needs to fill up some information. His name, contact information, the hospital name that he has admitted to, the required blood group, and the total number of blood bags he needs. The user can also see the other users request for blood in this page.

Figure 4.3: Design of Request Page

The posts of other users are in the "Blog" menu, and the user can also add his or her own.
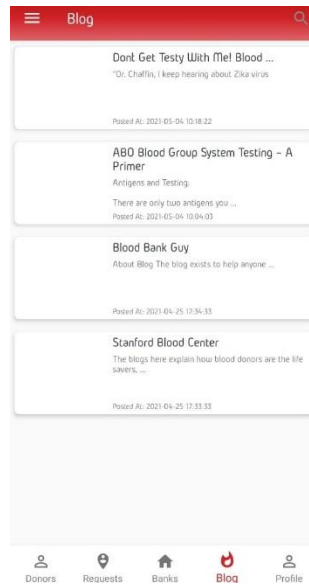

Figure 4.4: Design od Blog Page

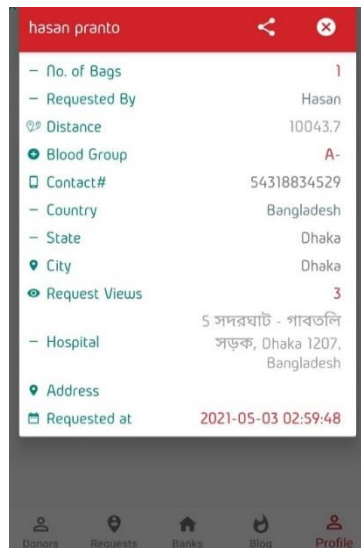The user can insert all of his information and adjust this basic information in the "Profile" option.

Figure 4.5: Design of Profile Information Page

4.2 Back-end Design

The back-end is the most significant part of an application. If the back-end isn't working correctly, the whole system will fail. In the back-end, it stores all the data of the application. It's building communication between the user and the system owner. The program will consider as useless if any of the users' data is not correctly processed. So, for building a better application, a back-end design is a must.

Let's talk about the design process of our back-end. The server will first deliver a one-time password (OTP) to the given phone number to log in. When a user inserts his contact number, an OTP message will send to that number. The OPT will send within 30 seconds.

The application will be connected to Firebase to send OTP. Firebase authentication system will make the whole login process much easier. When one user sends a request for OPT, one random OTP will be sent to that number. Using that OTP user will log in to the application.

We'll move on to the data storage section. The user will send data to the server from the front end, and the server will store the data. Using the MySQL query language, the data's will be store in the table. There will be some tables with different columns. The inserted data from the users will store in those tables. The administrator has access to all of the data and can make changes. The administrator can update, remove, or add new data to the server. The admin can set the information for the user end, and only that fixed information will visible to the users.

Designing the back-end console we are going to use PHP language. There will be different sections like Blood Donors, Blood Requests, Blood Banks, App Users, Blogs, Contacts/Calls. In those sections, only the relevant information will save. The admin can easily access those data.
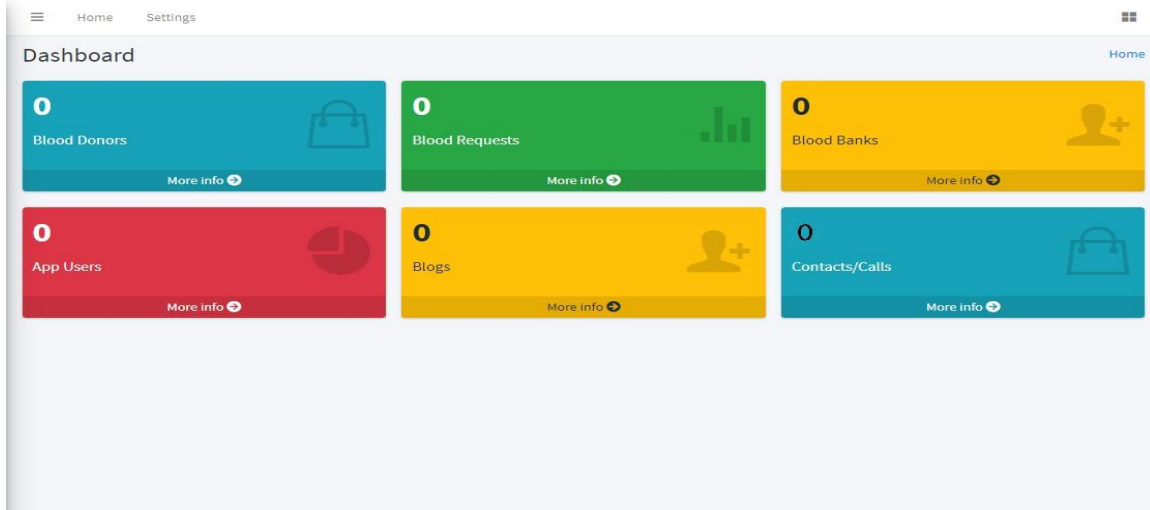

Figure 4.6: Dashboard

In the blood donor information part, all the data of the donors will be store. Like the name, mobile number, city, state, country, blood group, and type of blood donation.
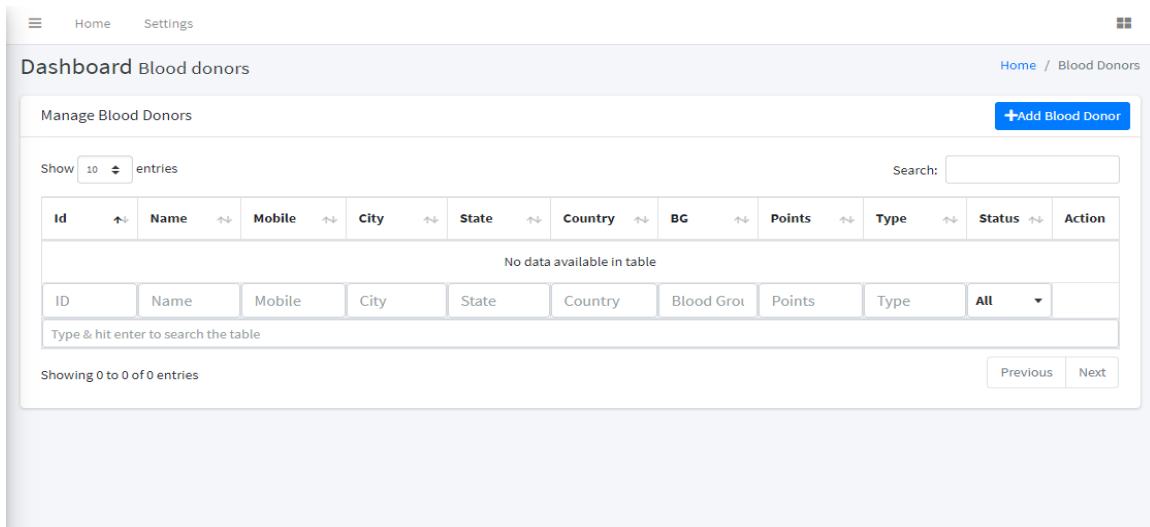

Figure 4.7: Dashboard of Blood Donors

In the blood request, all the information of the request will store. Like the receiver's name, phone number, blood group, the total number of blood bags required, address, and hospital name.

Figure 4.8: Dashboard of Blood Request

The blood bank information will save in the blood bank section. Like the name of the blood banks, city, state, country, and the contact number.
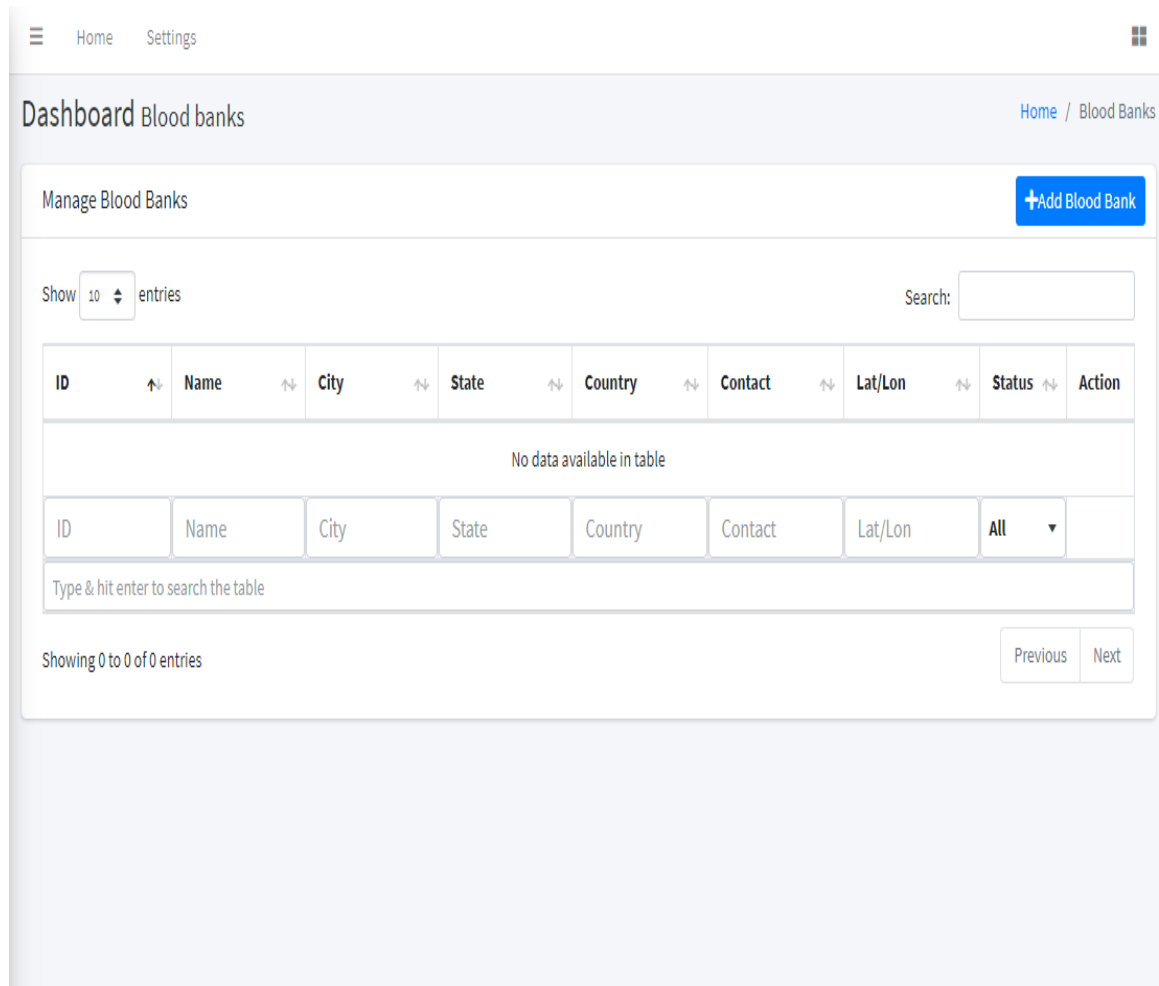

Figure 4.9: Dashboard of Blood Banks

The number of app users and their data will save in the app user section. Like the name of the user, mobile number, city, state, country, blood group type, date of birth, etc.
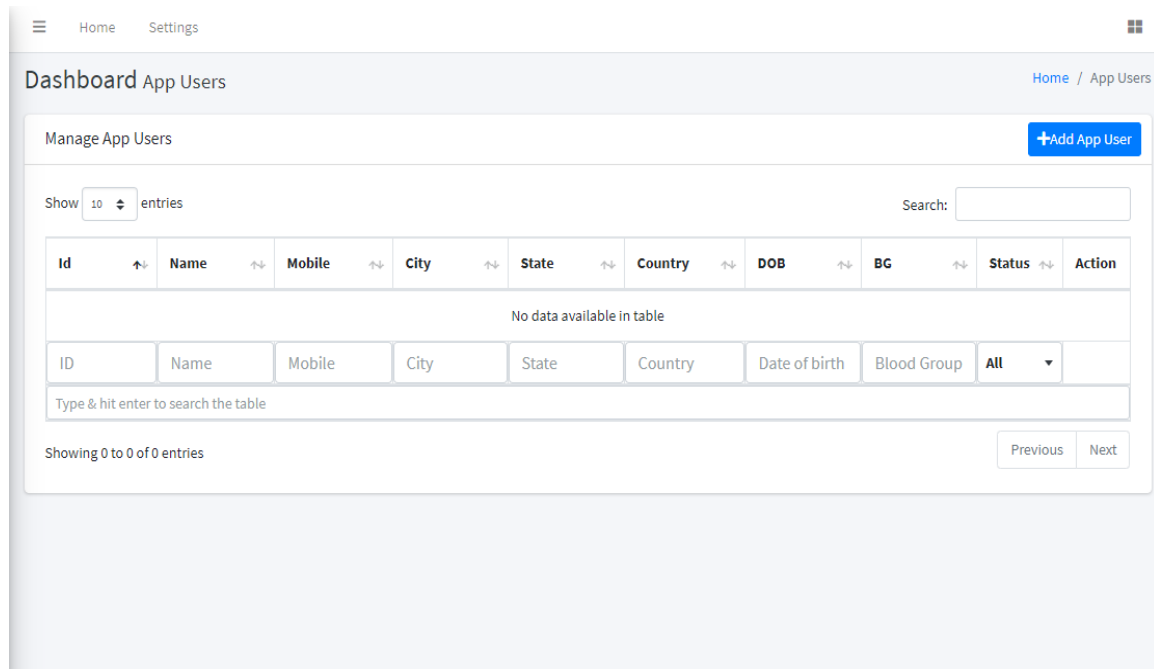

Figure 4.10: App Users Dashboard

There will be another part for notification. Using this portion, the administrator may send an essential notification to all users.
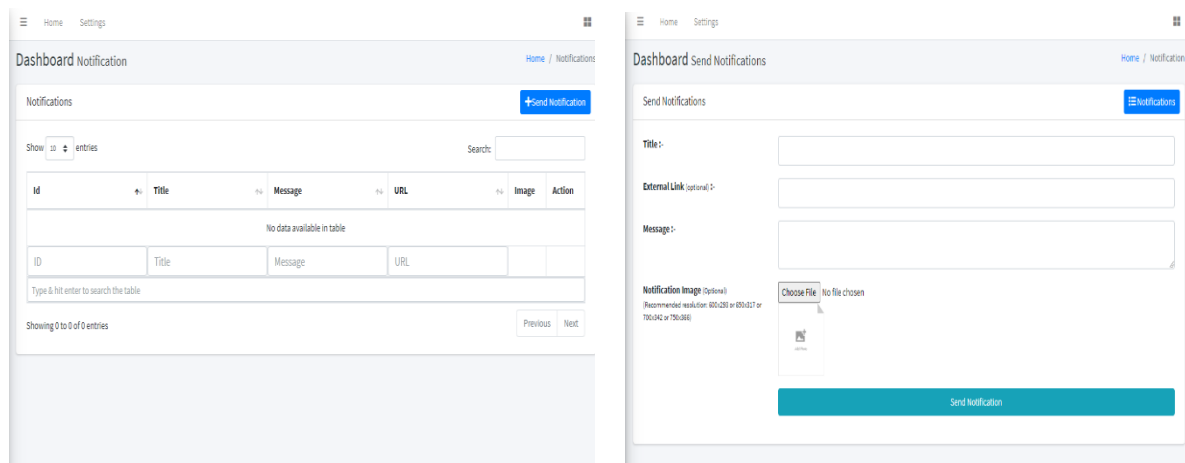

Figure 4.11: Notification Panel

4.3 Interaction Design and User Experience (UX)

If a system's operation procedure becomes complicated, a significant number of people will be unsatisfied in using it. They don't feel the interest to use that app. So, the interaction design and the User experience design become an important part to make a system more user-friendly. In this part, we are going to discuss the Interaction Design and User Experience (UX) of our application.

The firebase authentication One-time password will be provided to the specified phone number for the user's information protection. The user can access all the tabs that are visible from the user's end. Can see all the information of the donor and the blood banks. And also, can search for the specific blood group. By inserting some details, the user can become a donor and send a blood request by filling out the blood request information form. The user can also make changes to his or her data. With a single touch, the user can move from one tab to the next. On any device, the application will run flawlessly. The program will be under 500MB in size. For significant notifications, the user can use the reminder option. Users can also turn off the notification on their own. The user interface will be really easy to use.

The application interface will be so simple that anyone above the age of 15 will be able to use it.

4.4 Implementation Requirements

For the implementation of the application the requirements are given below:

1.Computer (Desktop or Laptop)

2. 64-bit system

3. Minimum 8 GB RAM

4. 5 GB free space

5. Android SDK (Software Development Kit)

6.Android Studio

7.Java programming language

8.MySQL Database

9. PHP

10.Firebase Connection

To construct the whole application, these are the main important requirements. These all are needed for building this application.

Chapter 5

Implementation and Testing

5.1 Implementation of Database

Here we have used MySQL database service for accessing the data remotely. The database has connected with the application through the link of the server. So that, If the admin adds some new information, it will be visible from the user end. When the user inserts his or her information, using the MySQL query language the data will be store in the database. We were able to connect to the database and the application considerably more quickly thanks to this database service.

5.2 Implementation of Front-end Design

Implementing the front end, we have used the android studio for design and java programming language. At first for the login, we put two numbers text box, one for the phone number and the other for the OTP. And two buttons, one is for applying for OTP, and the other one is for the sign-in.
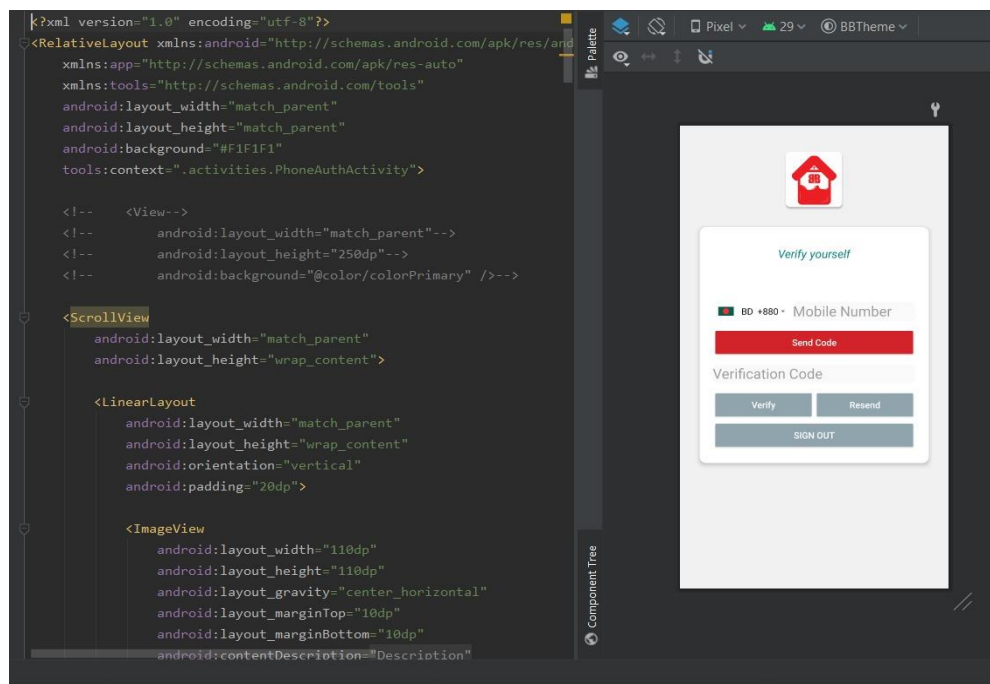

Figure 5.1: Login Panel

For inserting user's information, there have nine text boxes and one button. They are the user's full name, phone number, address, country, state, city, date of birth, and password. These are the editable boxes when the user inserts that information and the submit button those data will be store in the database. The add donor option and the request blood options are also similar to this one.
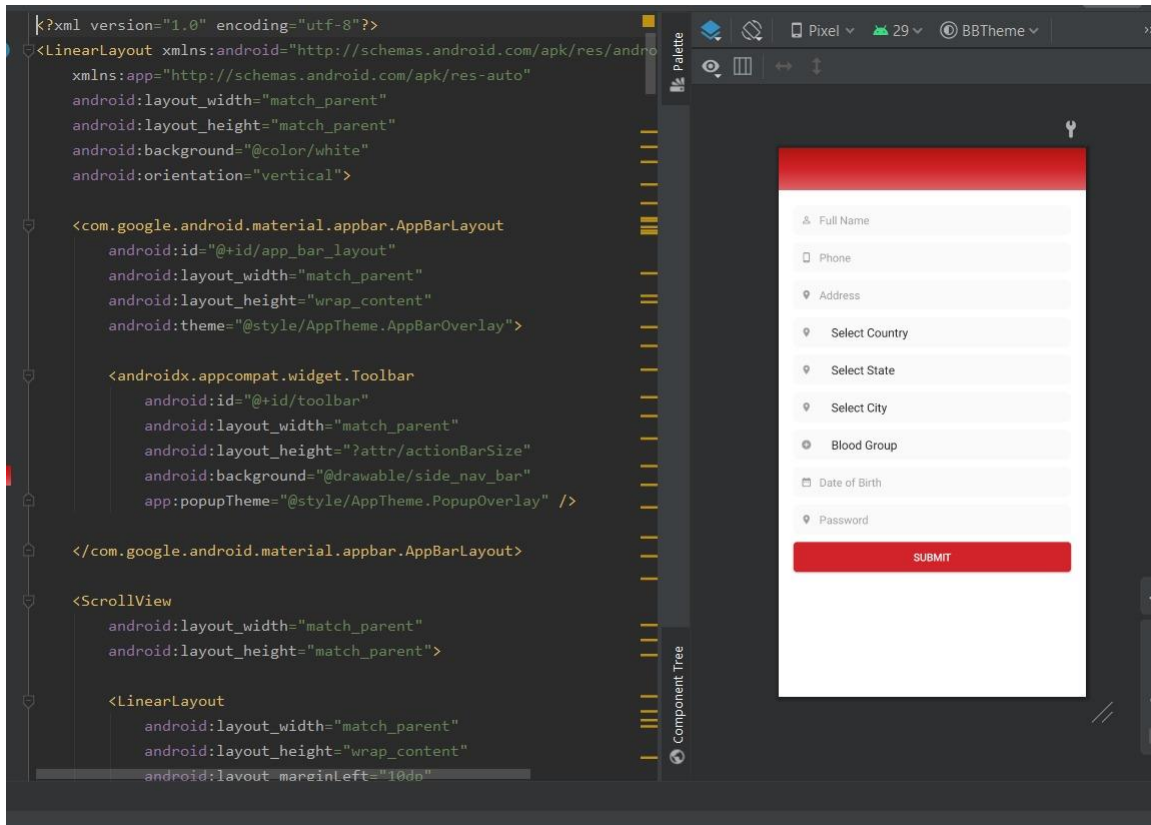

Figure 5.2: Profile Panel

Implementation of the filtering option, the user can choose the type of blood by pressing one of the three buttons like all type, paid blood type, or free blood type. The user can also make the filter by checking the mark to his adding donor only. There is more other option for searching like distance, selecting the necessary blood group. Can also sort it by country, state, and city.
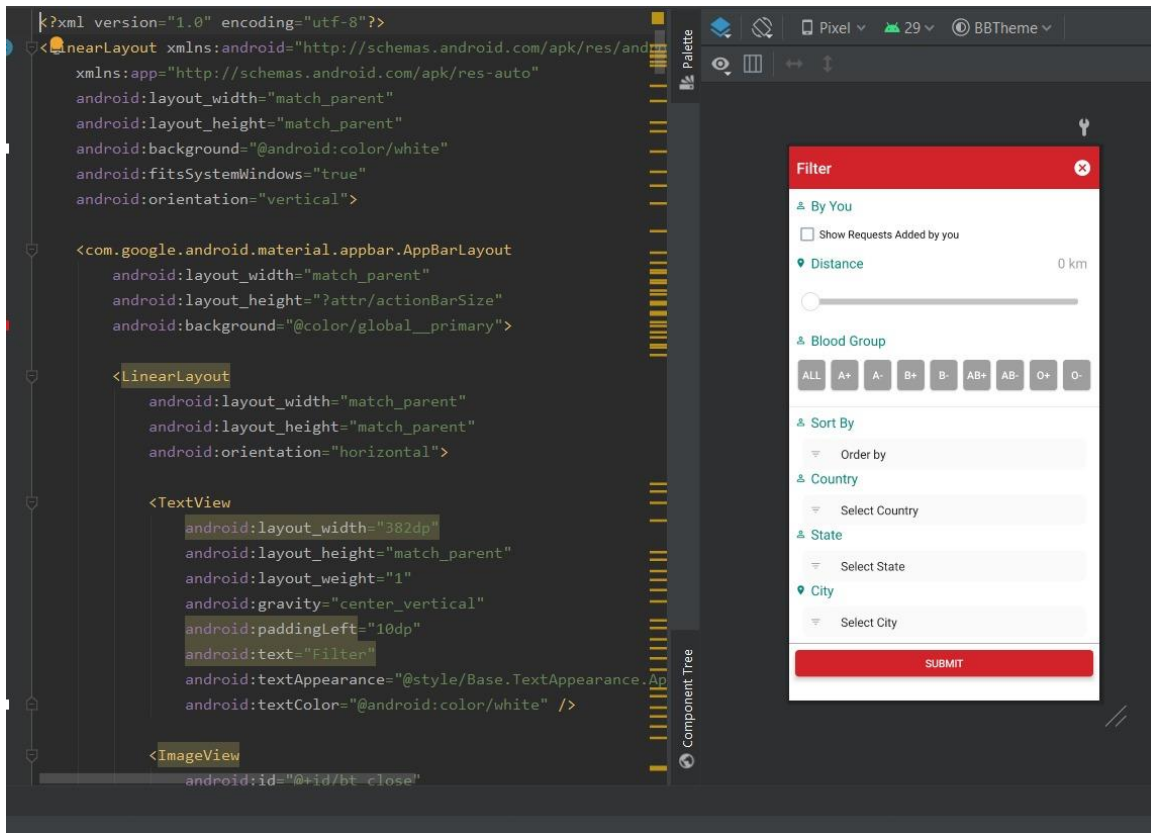
Figure 5.3: Filter Panel

5.3 Testing Implementation

When the user fills the registration form his information will be store in the database as an app user. The admin can see all his or her information. The admin has all the access to that information. The admin can change the data, delete or remove the user from the app. After inserting the data from the user end it will be store in the database within a second.
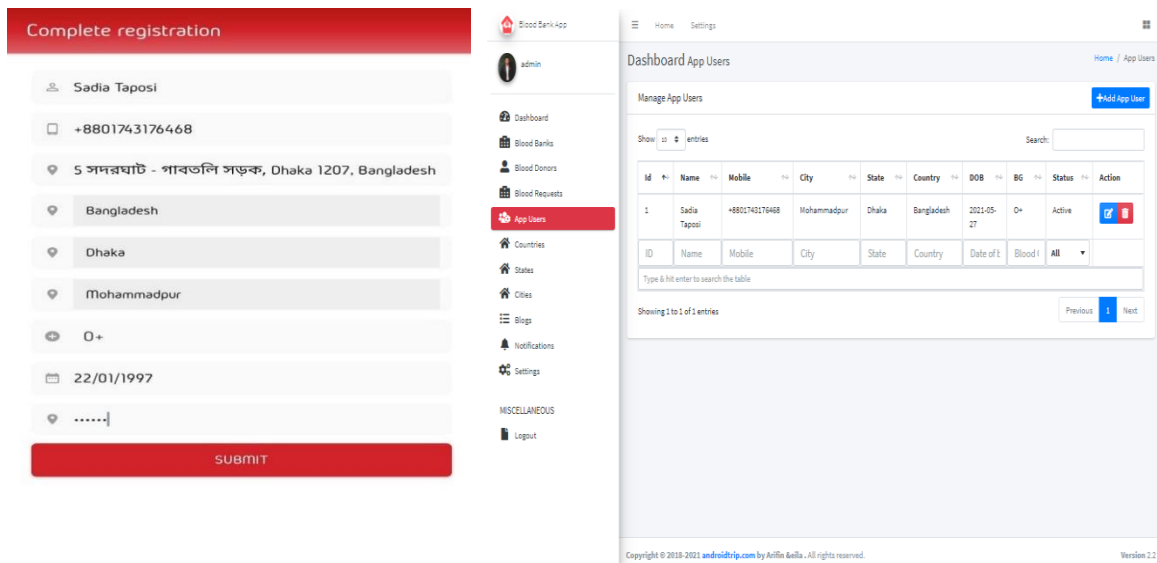
Figure 5.4: Implementation of Registration

The admin can add donors to the application. Users can also add donors. When the user fills the donor information from all the donor information will be store in the donor database.
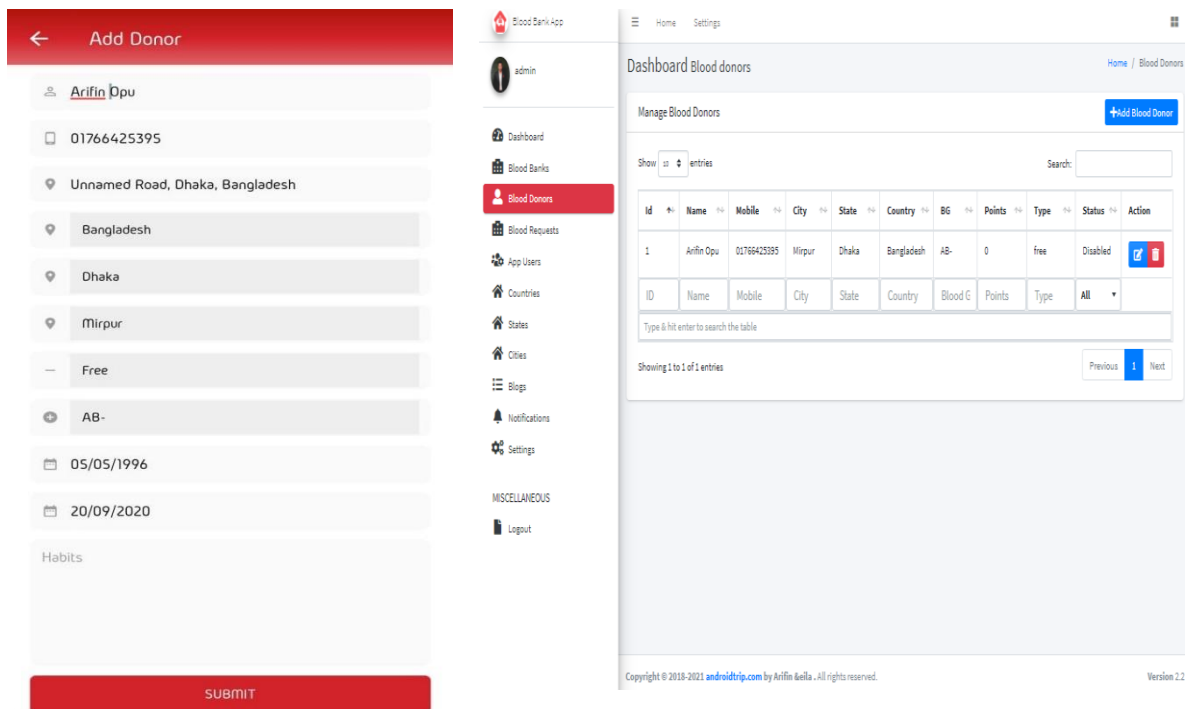

Figure 5.5: Inserting Blood Donor

The user can also send a request for blood. For that, the user needs to fill in some information. That information will be store in the database and other users can see that request information.

Figure 5.6: Request for Blood

Only the admin can add the Blood bank information. When any blood bank information has been inserted by the admin it will automatically be visible to the user's end.
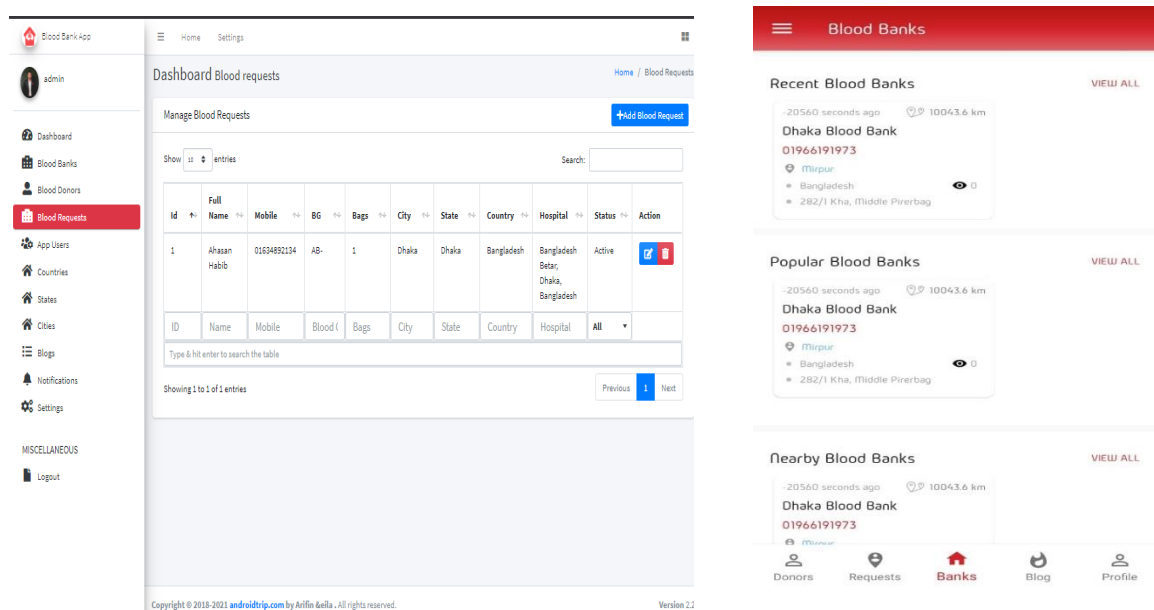

Figure 5.7: Blood Bank Information

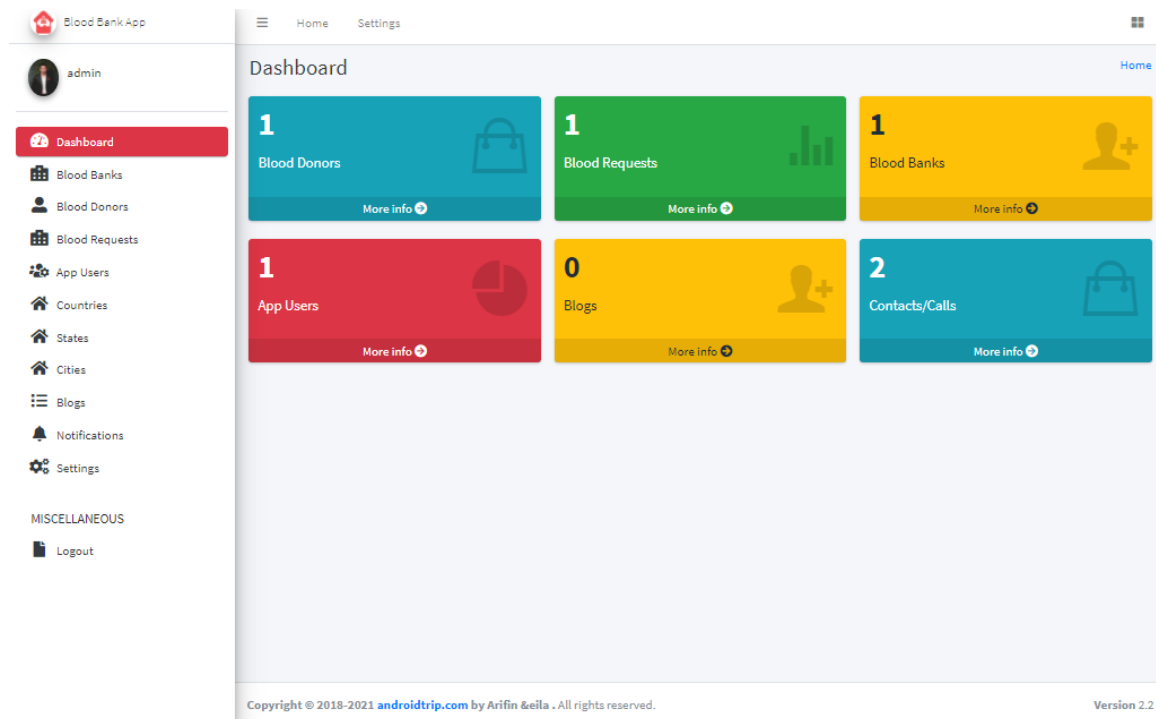And the final dashboard for the admin panel will be like this one.

Figure 5.8: Admin Panel

Chapter 6

Empact on Society, Environment and Sustainability

6.1 Empact on Society

Although we all know that blood is necessary for survival, many of us are unaware of why. Blood includes life-saving substances that aid in the body's battle against sickness and injury. Millions of people in the United States rely on blood donors for survival. Blood donors, in general, feel a sense of pride since they know that the blood they donate will help those in need. It's also crucial to remember that we may require the blood of anyone at any time during our lifetimes, making blood donation a crucial civic duty. Many people may have negative reactions to blood donation because they are unclear of how safe it is. Donating blood does not have a substantial negative impact on the health of any particular donor in general. Donors typically provide between 10% to 12% of their entire blood donation with each donation. Adults who meet the necessary screening criteria will be able to donate safely and on a regular basis. In rare situations, donating blood might even enhance your health and lessen stress. A tiny percentage of donors may experience dizziness following the grant cycle. It only lasts a few minutes, though. The great majority of donors experience no side effects at all.

6.2 Ethical Aspects

Developing countries frequently lacked resources. There is no centralized blood service system in the United States. To get started, you'll need either skills or money. In that situation, foreign consultation could be beneficial. However, it is important to note that creating a long-term blood circulation service system is only possible if everyone works together. If locals are directors or decision-makers in the construction process, you shouldn't be a consultant. Locally, staff training should be a priority, making it easier to fit equipment, materials, and supplies, as well as processes, into the available budget and infrastructure. Preparation Those who do not have the same financial restraints as those who work in advanced laboratories abroad can be ambitious. Trainees can try to fit into the same system as their instructors. Due to infrastructural and resource constraints, creating

one's own environment may be impossible. What if there isn't enough money to fund operations at the same level as industrialized countries? It's not possible. It is not recommended to leave something contagious unattended. Undo or propose normal use with identification tests Instead of pricey laboratory, domestic refrigerators will be used. The director of the blood service, on the other hand, has a job to do. What should be done with available cash and how should decisions be made? Which may be forced to make sacrifices on occasion. When making contentious decisions - such as refusing to be tested for hepatitis C - for financial or administrative grounds, and when they potentially lead to harm It's crucial not to cut corners when it comes to blood protection. To keep track of the entire decision-making process. Documented explanations of final hazards to political decision-makers are included. The final Responsibilities are therefore shared. If there are no national laws or regulations governing blood infection service, blood service should be provided, and the thesaurus guarantees some money (for example, for salaries and buildings) at the start of the development project, and there is a plan for the organization's external withdrawal and gradual increase in local financial responsibility, a sustainable and adequate blood supply should be provided.

6.3 Sustainability Plan

72 percent of the world's population lives in nations with low and medium human development indices (LDCs and developing countries). Blood services are required for further financing for these countries; however, this is not the sole level. Look for this unjust balance. Decision-makers acknowledge the importance of blood transfusions and blood banks, as well as the political will to create a single prerequisite for their development. Blood transfusions are recognized as a medical specialty, and national coordination is a specialty. Despite the fact that blood services currently exist, they provide better services. Different models for blood service operations exist; without a central national blood service, not only are alternatives and big countries viable, but a national combination is much more desirable. The general public's education with modest resources and supervision, volunteerism, free blood donation, and staff training can be accomplished. The World Health Organization, for example, has training materials available. The regulation

of blood services aids in the improvement of blood safety. However, the absence of laws and regulations should not be taken for granted. Explanations on why blood services have not been organized. After the blood service system has arrived and implementation has been planned, it may be required to organize or coordinate decision-making at a national level. Sustainability cannot be expected without national, regional, and local commitments at all levels.

Chapter 7

Conclusion and Future Scope

7.1 Conclusion

Technology is ushering in a new era of innovation, shortening the time it takes to complete tasks. The proposed approach can be utilized to shorten the amount of time it takes to get blood to people who need it in an emergency. People who want to donate blood can use the Android app to discover their nearest blood bank and donate their blood. The web application allows hospitals and blood banks to reconnect their synchronization. It also provides them with a means of contacting local emergency services. The program's website is a crucial component. Hospital and blood bank databases should be examined on a regular basis to ensure consistent system operation. The suggested solution, which makes use of Google Maps, allows users to quickly locate donors and blood banks in their area. The Android app was created using open-source software, and a web application for hospitals and blood banks was also created using open-source technologies, which explains why the program was created.

7.2 Future Scope

Some future scope that the system can accomplish is: Provide a powerful platform for users to visit.

The nearest blood donor, hospital, and blood Banks anywhere and anytime so that they can Connect there easily. Provide GPS with GPS, which is enabled Hospital for blood seekers, to help ask for Blood Donors, and blood banks are closer Place from where the request for

blood Generated to avoid wasting their time. Friendly develops a very friendly design that takes the user to each module very easily.

Without any difficulty Adding features to the system where users can Sync data for later use if they don't have an internet connection.

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