

Nearby Blood group identification and donation

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

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APPROVAL

This Project/internship titled “NEARBY BLOOD GROUP IDENTIFICATION AND DONATION”, submitted by Yeamin mahmood ID: 181 – 15 – 10575, and Ariful hsan ID: 181 – 15 – 10675 And Fahim sakil shuvo ID: 181-15-10589 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 5-1-2022.

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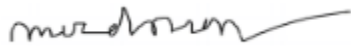
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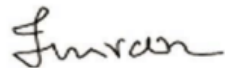
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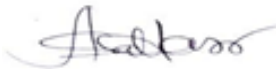
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DECLARATION

We hereby declare that this thesis base project has been done by us under the supervision of **Mr. Abdus Sattar, Assistant Professor of CSE Department, Daffodil International University**. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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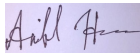


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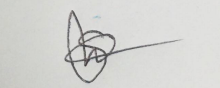
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Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

The primary goal of this project is to provide users with an adequate supply of blood. Each year hundreds of thousands people die due to lack of blood supply. This system will gather information from the registered user and store it in the database. Upon requesting, the system will provide the information of the user with matched blood groups. Transport and distribution is an issue for blood supply management, therefore, the user can set the filter for how wide an area will be searched. If a user searches for blood in a 5 km radius, then only registered users from that 5 km radius will show up. Information will stay secured and private. Upon requesting, the donor will receive a request prompt. If he/ she accepts the request, the donor's information and live location will be shared. The live location will be gathered with the help of GPS. The project mainly includes two types of users. Registered users, registered donors. The users and donors can modify their information in the database at will.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

On-time blood donation is becoming a major public health concern in Bangladesh. Finding blood donors can be difficult at times, and even if donors are found, if they do not arrive on time, another issue may arise. Our blood management system will assist people by tracking down multiple donors in their area and nearby locations, and they will send them a request to help the patient by donating blood if the patient's and donor's blood groups matched. When the blood donation is completely successful, our system will mark the donor and his profile will be updated with his current health status, and he will not receive any requests from blood recipients for a period of time.

Our blood management system is both a web and android app-based software system. Users must first register on the website before downloading the app. Users can also find information about different blood banks on the website, as well as find other users in their area. The Android app assists blood recipients in finding a match from their area, as well as potential donors in locating nearby blood banks.

1.1 Motivation

Getting a safe supply of blood at the right time has become a major concern in several countries. The main motivation of this system's development is to quickly deliver blood to those who are in immediate need of it. Every day, the number of people in need of blood rises dramatically. By using this system the user can check up the blood groups that are available in his/her nearby area, as well as receive the phone number of a donor (if the donor shares) who has the same blood group that the user requires. This Online Blood management system can successfully assist those in need of blood by providing information about available blood groups and allowing users to obtain the contact information of blood donors who share the same blood group and live in the same region.

1.3 Rationale of the Study

Blood is the most important component of human life. When a patient is in a serious condition and needs blood right away, our application will assist them in finding a donor as quickly as

possible. Also, this application will encourage voluntary blood donations, motivate and educate the public about the benefits of blood donation. A blood management system will save thousands of lives by quickly locating the appropriate donor for the user in an emergency situation. So this is an important and compulsory area of study that requires far more attention than it currently receives.

1.4 Objectives

The goal of this project is to develop an android and a web-based application for users who are in need of blood immediately. The following are the main goals of this system:

- To keep records of blood donors and donation information in a centralized database system.
- To make it easier for users to identify blood donors with the same blood type.
- To notify blood donors of the results of their donation.
- To provide a function to see if the person has donated blood in the last three months.

1.5 Expected Outcome

- Users can use both the web and the android system platforms for seeking or donating blood.
- The UI design will encourage the donor to donate the blood
- The major purpose is to perform blood transfusions as fast as possible.
- The information about the blood group that is not suitable for blood transfusion will be provided to the seeker.

The proposal is a great solution for those who need blood immediately. It will help the critical patients in times of emergency. It will provide users with a sufficient, safe, and timely supply of blood and blood products, as well as donors with instant access to medical reports.

1.6 Report Layout

Chapter 2, here we discuss the background of our project. We also add information about the allied work, the opportunity, and challenges of the project and we are compared too many other applicant systems.

Chapter 3, Give the engrossments of the project. We defined the different diagrams and design requirements. We also discussed the features.

Chapter 4, we present the experiment result of our project and also specify the front page of this project.

Chapter 5, we implemented and tested our project and we discussed that.

Chapter 6, discussed the conclusion and the scope for further development of the project.

CHAPTER 2

BACKGROUND

2.0 Introduction

Blood donation could be a handle whereby an individual intentionally has blood drawn to be utilized for future transfusions when required at hospitals for treatment procedures that require them. Donation may be of entire blood (blood drawn specifically from the body) or of particular components of the blood; such as red blood cells, white blood cells, plasma, and platelets. Blood banks frequently take part in the process of collecting blood and other methods such as managing stocks, approving blood requests, and updating donation information. In this chapter, we try to give the overall idea of our project “Design and Development of a website and Android Based blood management Application”.

2.1 Related Works

Rokto

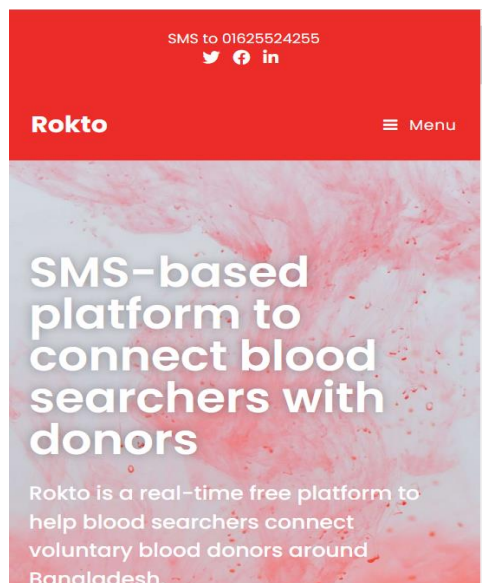


Figure 2.1.1: Rokto (Bangla Alphabet) [6]

Rokto is an automated blood service that connects those in need of blood with willing donors in a matter of seconds via SMS and a website. Rokto is a completely free service for everyone. There will be no more deaths due to a lack of blood. Rokto services are easily accessible to people from all walks of life because they may be accessed via SMS.

বাঁধন

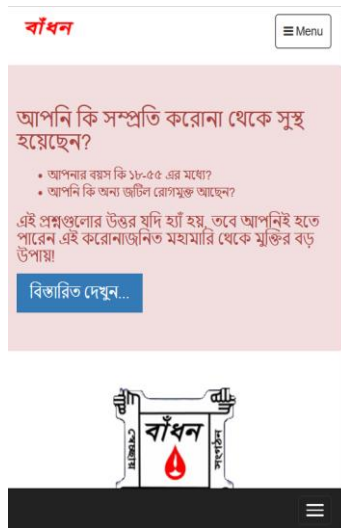


Figure 2.1.2: Badhon-Bangla Alphabet [7]

BADHAN is a non-profit organization that encourages people to donate blood. Initiating a social movement to promote a healthy society by encouraging voluntary blood donation, as well as other services and educational activities. Inspiring Bangladeshi students and the younger generation to donate blood voluntarily.

eROKTOKOSH

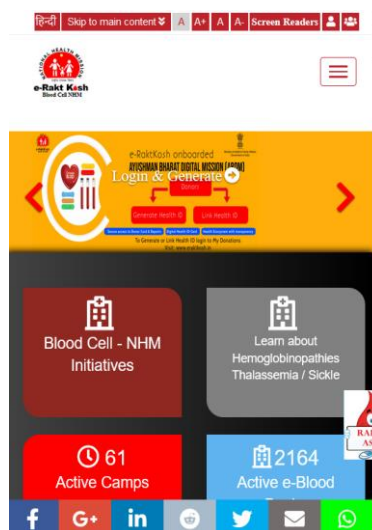


Figure 2.1.3: eROKTOKOSH [8]

The biometric Donor Management System uses biometric data to identify, track, and block contributors based on their health, donation history, and other factors. It offers functions such as blood grouping, TTI screening, antibody screening, component manufacturing, and so on, all in accordance with established protocols and rules. A centralized Blood Inventory Management System that allows many blood banks to maintain track of their stock. Disposal of wasted blood and other waste created during this process is handled by a Bio-Medical Waste Management System. The creation of donor registries for rare blood groups, as well as the creation of regular repeat donors Notifications and Alerts

Blood Donation

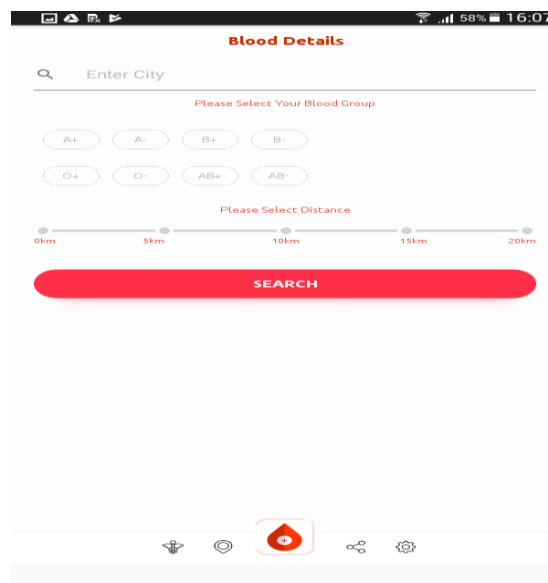


Figure 2.1.4: Blood Donation App [9]

The free edition of the Blood Donation app makes it simple to locate blood donors in our area. It also gives us information on neighboring hospitals. The software is quite useful for locating blood donors in a foreign city.

BLOODLINE - BLOOD BANK APP BD (ANDROID)

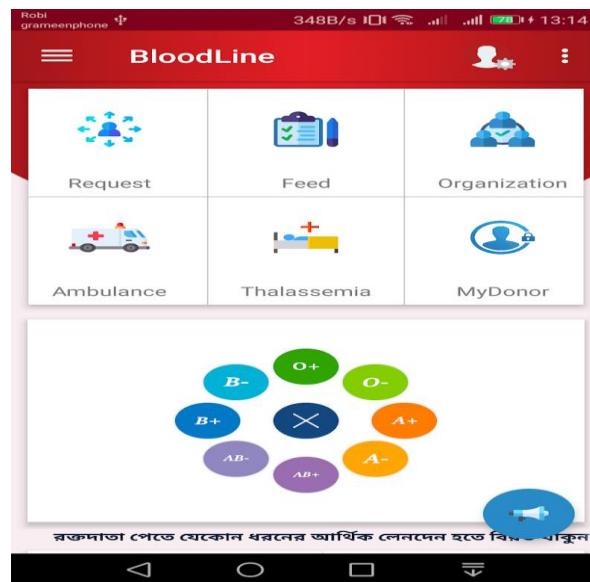


Figure 2.1.5: BLoodyLine -Blood Bank App BD (ANDROID) [10]

BloodLine (BloodHouse) is a blood donor app that puts the ability to save lives in your hands. The major goal of the BloodLine App is to build and maintain a platform for all Bangladeshi blood donors in order to alleviate the country's blood shortage.

Blood Friends -Blood Donor App



Figure 2.1.6: Blood Friends -Blood Donor App [11]

This is a centralized blood donation smartphone app that allows blood banks, hospitals, and recipients to search for blood donors in their area who will be available in as little time as possible. The Blood Friends application will allow registered users to examine full information about blood donors as well as generate blood requests through a communication network.

Live Blood Bank - Fine Nearby Blood Donors

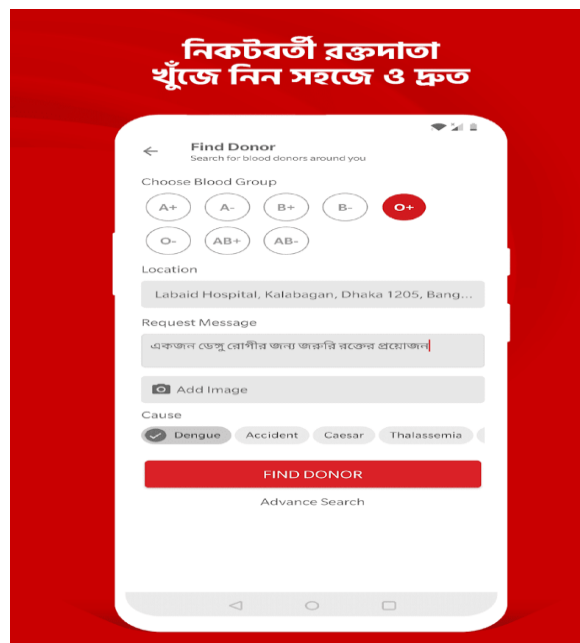


Figure 2.1.7: Live Blood Bank -Find Nearby Blood Donors App [12]

BloodBank Live is a public platform where people can request blood when they need it in an emergency. Once a blood donation is sought, nearby registered donors can view and accept the request and connect right away. Both donors and seekers can use our app, which is fully secure and free to use.

LifeStream Blood Bank:

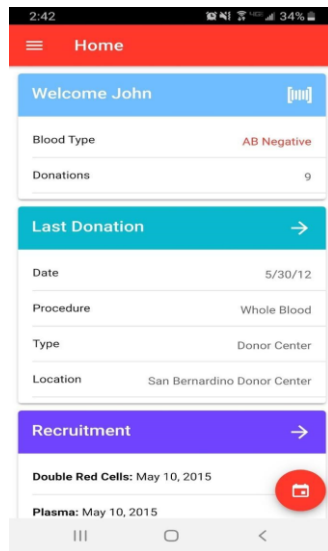


Figure 2.1.8: LifeStream Blood Bank [13]

The LifeStream Blood app allows anybody to easily locate and book appointments at LifeStream donation centers and mobile blood drives. Donors can use the LifeStream mobile app to view their blood type, donation history, test results, eligibility to give, and access the donor rewards store.

Blood Donation - Canadian App

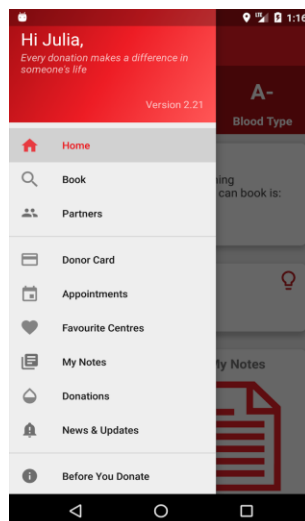


Figure 2.1.9: Blood Donation Canadian App[14]

The official app of Canadian Blood Services is GiveBlood. Donors in Canada (except Quebec) can use this app to book, manage, and track their donations on the move. With ease and efficiency, users can find their nearest donor centers and confirm their donation appointment.

2.2 Research Summary

The purpose of this study is to find out how this system is going to help those who need blood. Also, it shows the similar kinds of work done before and how this system is going to solve most of the problems related to blood supply management in the most efficient way possible. The study also shows the lacking of existing work and how this system has overcome the issues.

2.3 Scope of the problem

Different applications are designed or featured in very different ways. Scope of problem are given below

- Some app doesn't have a website or some website doesn't have an android app
- Few applications have a mobile SMS system
- Don't show directly donors are available
- Don't provide emergency notification towards nearby donors

2.4 Challenges

In order to develop any project, we must overcome several obstacles. Similarly, we are facing certain charges in this project. We're attempting to consider this application as a user encouragement resource at first, therefore we'll have to complete it with all of the users' indictments. The following are the challenges' requirements:

- Security of data.
- User-friendliness and interaction.
- Free versions for all.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.0 Requirement Collection and Analysis

This single-page web application (SPWA) runs on any browser on any platform. However, most recent browsers compile the app faster.

Hardware configuration required:

- Any hardware/system (windows, Linux, android, mac) capable of running browser (i.e. Chromium, firefox, edge)

Software configuration required:

- OS: Windows, Linux, android, mac
- Browser: Any modern browser with a javascript interpreter. (Google Chrome, Chromium, Firefox, etc)

The application works best with the following permission granted:

- Local storage Access
- GeoLocation Access

3.1 Features:

- Login, Registration
- See the list of donor
- Create Blood Request
- Respond to blood request
- See donors nearby (geolocation permission needed)
- Hide sensitive data of the user, show on-demand (i.e. Phone)

3.2 Use Case Modeling and Description

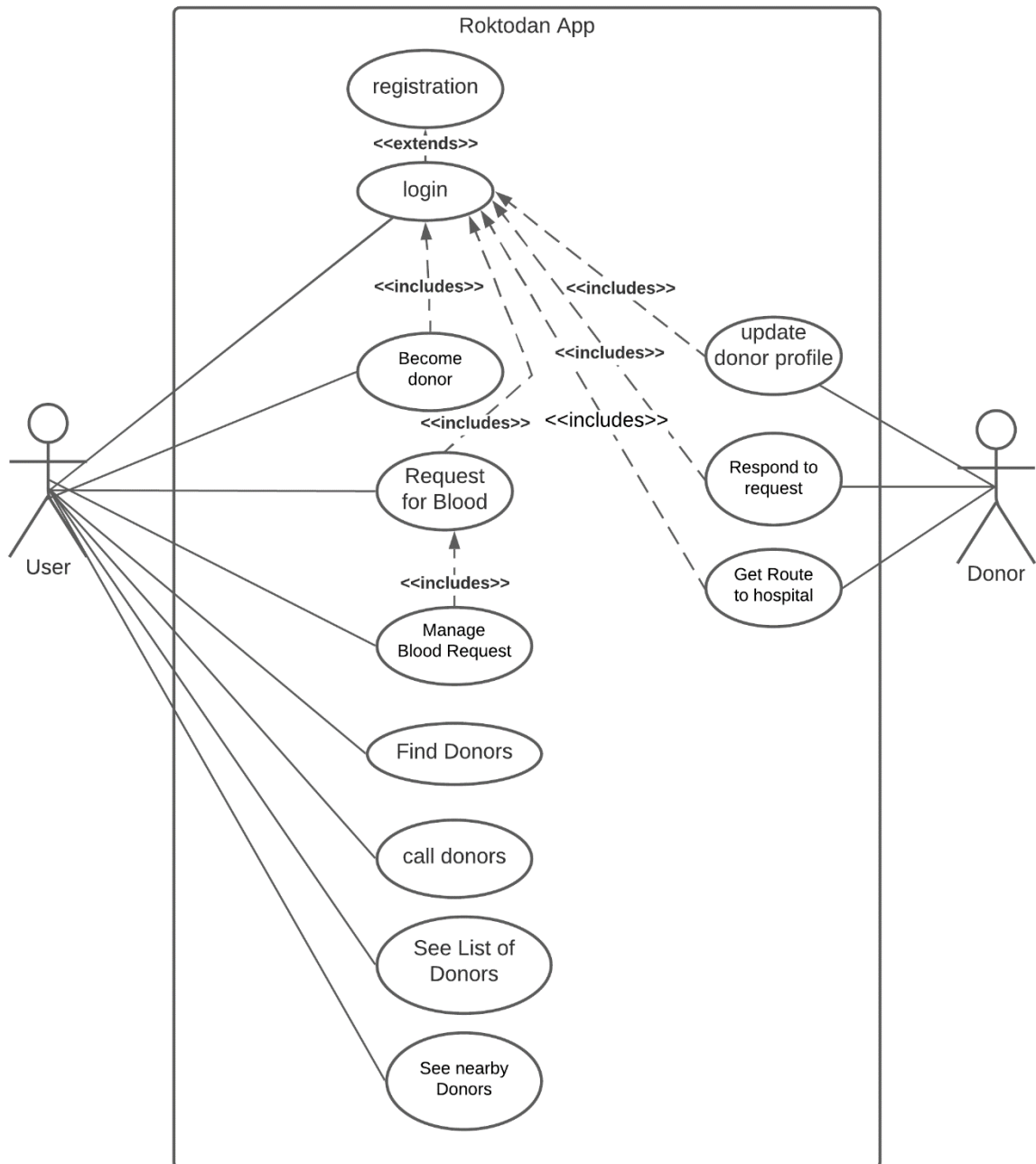


Figure 3.2: Use Case Model

3.3 Entity Relationship Diagram

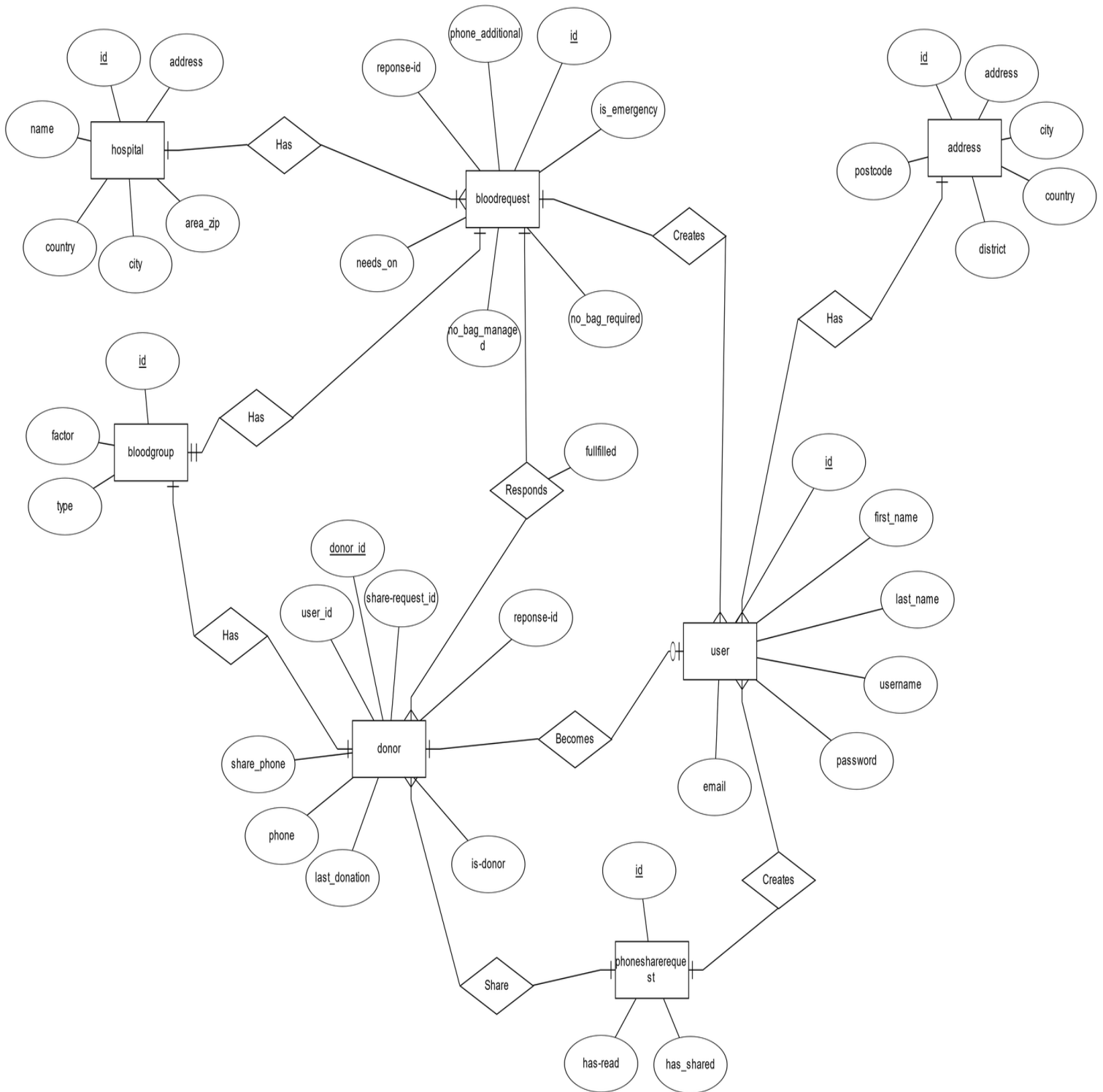


Figure 3.3: ER Diagram

3.4 Activity Diagram

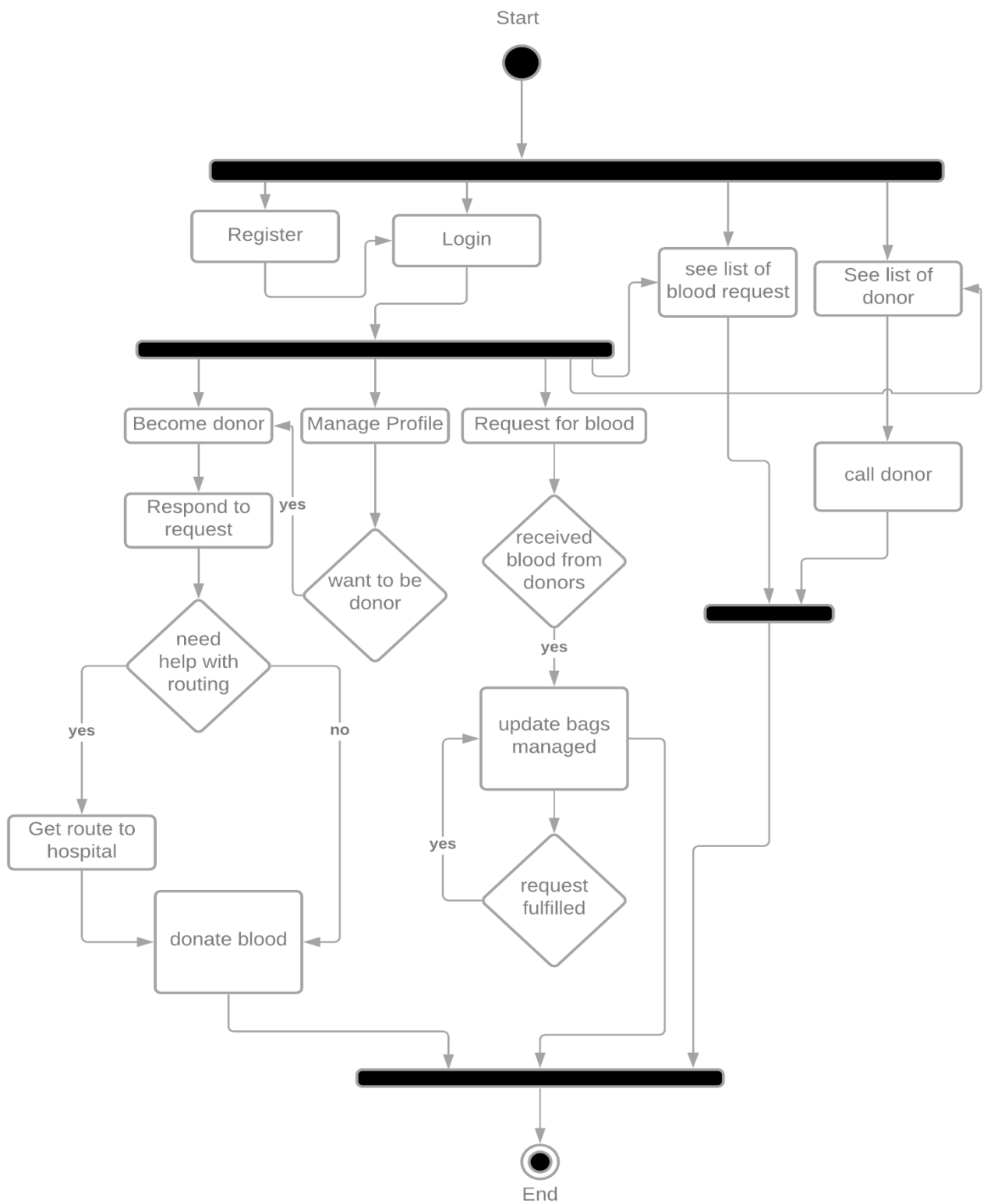


Figure 3.4: Activity diagram of the project

3.5 Sequence Diagram and description

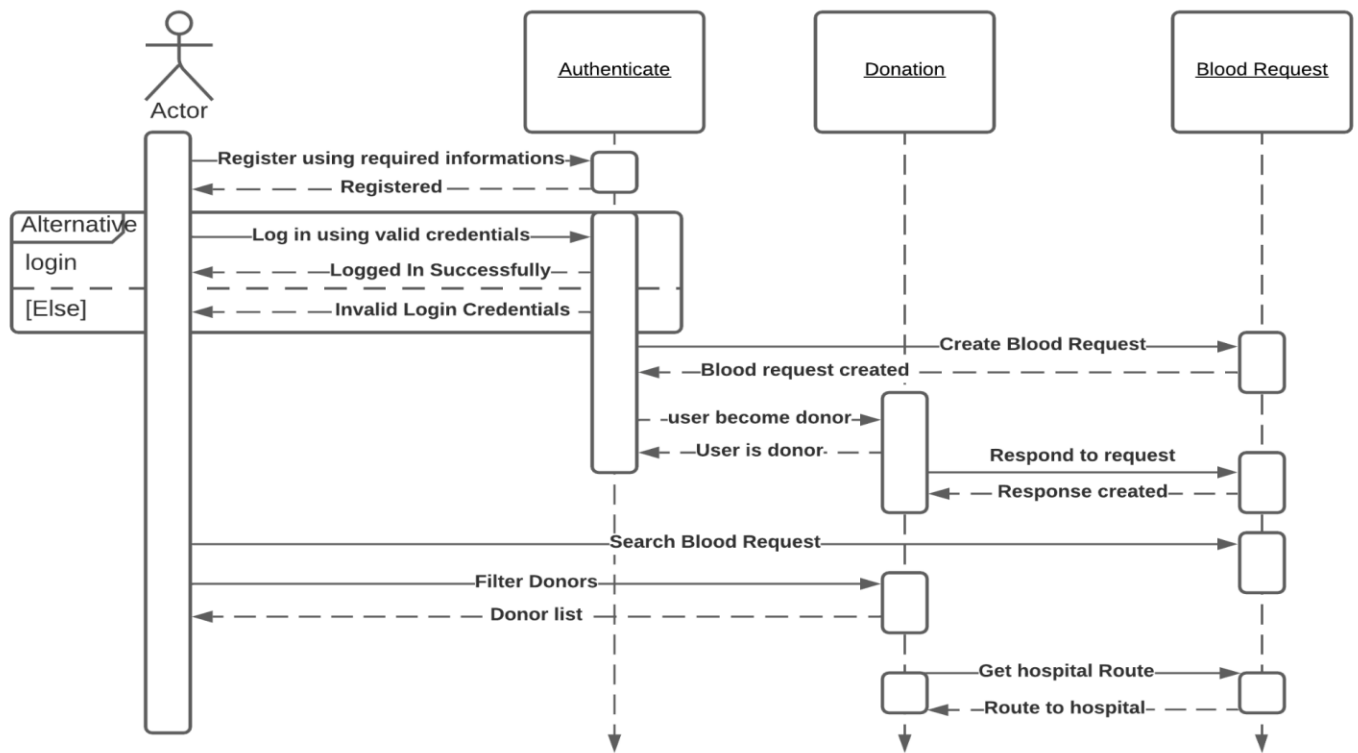


Figure 3.5: Sequence Diagram

3.6: Development Process:

Our project is separated into frontend and backend. The backend provides data and the frontend consumes data. Representational state transfer or REST API was used to guide the design and development of the architecture for the World Wide Web. The web app is fully responsive using bootstrap based library 'vuetify'.

Development Tools:

- Code Editor: Visual Studio Code
- DBMS: sqlite3
- Server: Node.js

3.6.1: Backend Design and Description

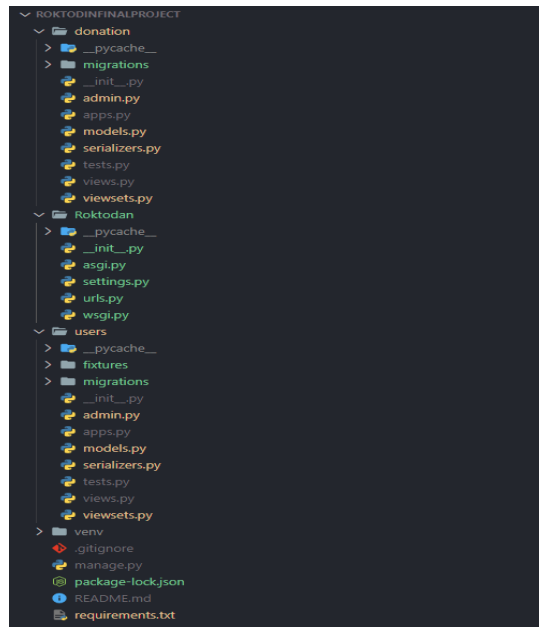


Figure 3.6.1: Back End File Structure

The backend of this project is developed by Django (a python framework). Django uses an MVT (model, view, and template) pattern to fetch and provide data from the database.’ Roktodaan’ module contains all the configurations. We have two applications named ‘users’ and ‘donation’. Module ‘users’ contains models related to users and module ‘donation’ contains models related to donation.

3.6.2 REST API Integration:

Django REST Framework (DRF) was used to map object models into serializers. DRF provides data as JSON objects which can be easily implemented into any system development.

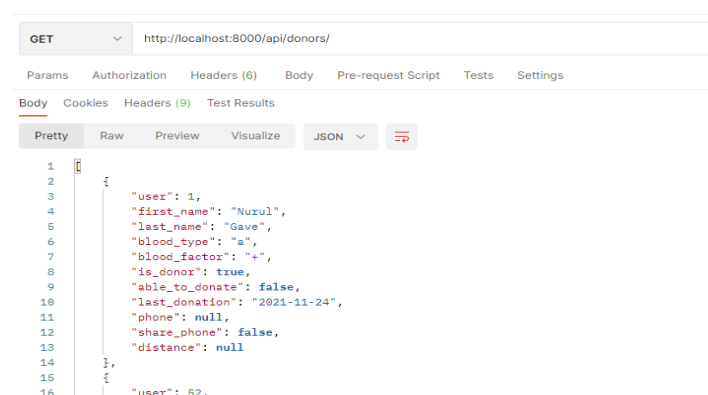


Figure 3.6.2: REST API Consumption using POSTMAN

3.6.3: Frontend Design and Description:

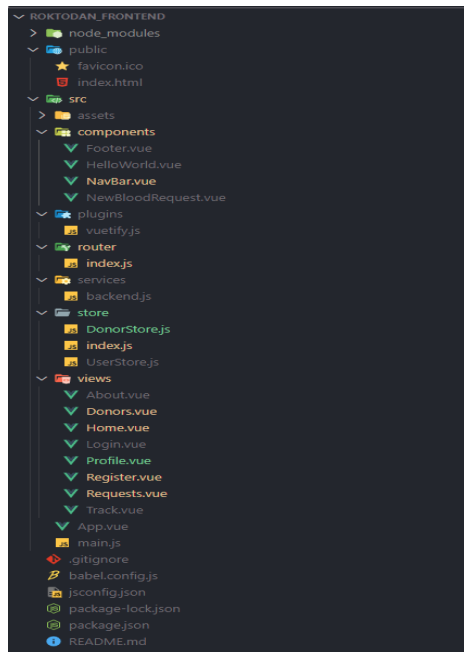


Figure 3.6.3: Frontend File Structure

The frontend (web app) of this project was developed with Vue.js, which is a javascript library for frontend development. Vue uses virtual DOM to update only the portion that changed rather than the whole component. Virtual DOM provides a more efficient way of updating the view in a web application. Here 'axios', a javascript ajax library was used to call the URL endpoint of the backend and receive data.

'views' folder contains all the views or pages of our application [figure 3.5.3]. 'Router' has all the routes which render different pages on different URLs. A centralized store for all the components is contained by 'store'. 'Vuex', a state management library, was used to do so

CHAPTER 4

DESIGN SPECIFICATION

4.0: Introduction

In the blood donation system, technology plays a significant role. Blood Bank Management Software is designed and suitable for a variety of blood banks, whether they are independent or part of a larger organization. It covers all aspects of the blood banking process, including donor recruitment, donor management, mobile session component preparation, screening for all tests, bloodstock inventory maintenance, patient registration, cross-matching, and patient issues. We strive to provide a conducive environment for blood donation.

4.1: UI design:

4.1.1: Starting Page

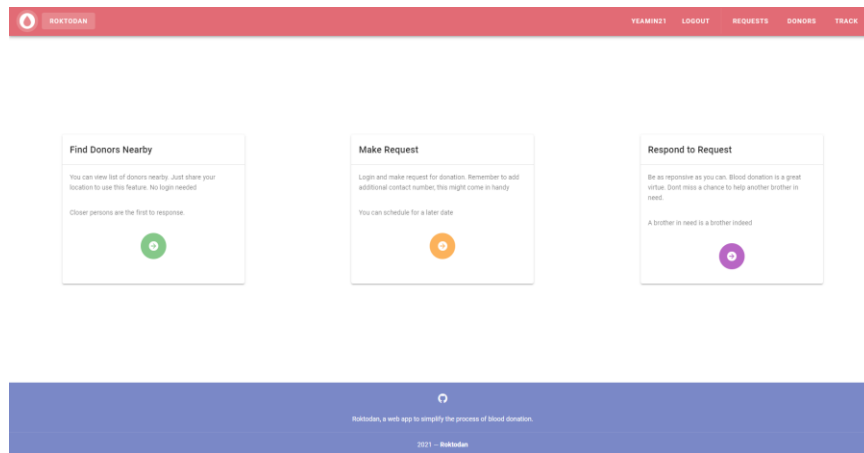


Figure 4.1.1.1: Opening Page of this application

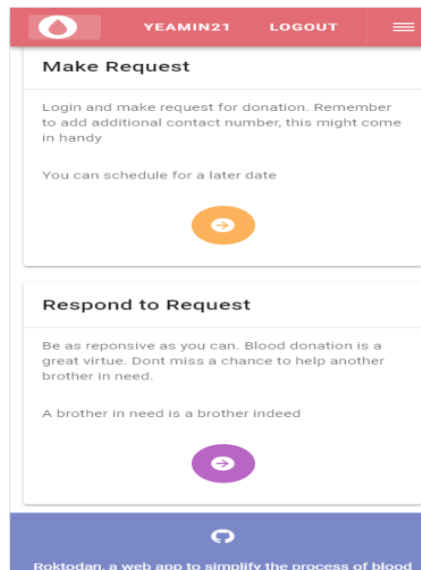


Figure 4.1.1.2: starting Page of this application (mobile view)

The starting page on endpoint ‘/’ shows the most basic features of our application. The cards describe briefly the features and each has an icon linking to a specific page.

4.1.2: Login Page

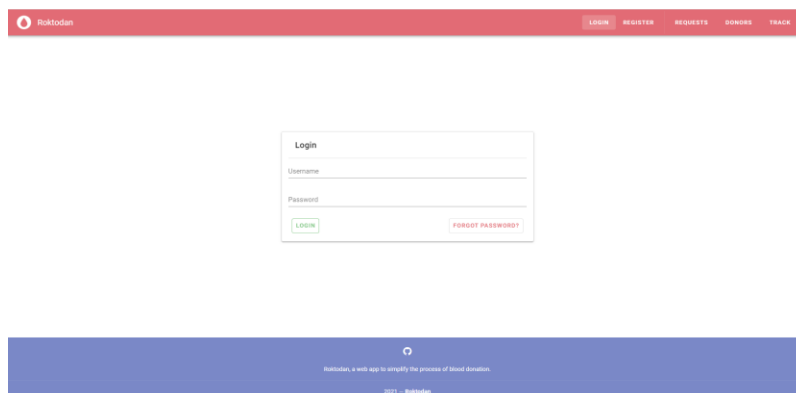


Figure 4.1.2.1: Login page

To use most of the features one must log in username and password.

4.1.3: Registration

Before login one user must create an account. We have divided the registration process into three.

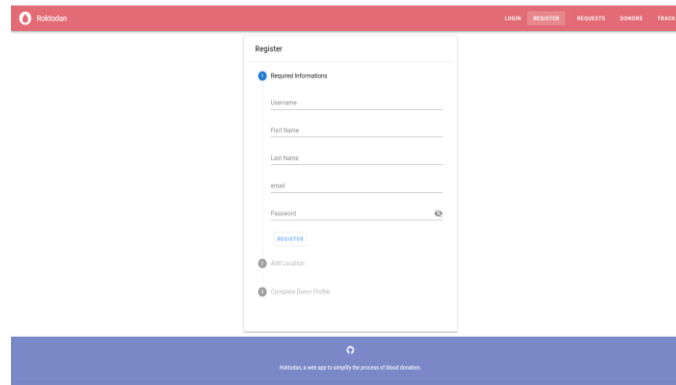
A screenshot of a web application's registration page. The page has a red header with the logo 'Rakibdan' on the left and navigation links 'LOGIN', 'REGISTER', 'REQUESTS', 'DONORS', and 'TRACK' on the right. The main content area is white and contains a 'Register' form. The form is divided into three steps: 1. 'Required Informations' (selected with a blue dot), 2. 'Add Location', and 3. 'Complete Donor Profile'. The 'Required Informations' step includes input fields for 'Username', 'First Name', 'Last Name', 'email', and 'Password'. A blue 'REGISTER' button is located below the password field. At the bottom of the page, there is a blue footer with a small icon and the text 'Rakibdan, a web app to simplify the process of blood donation.' and '2021 - Rakibdan'.

Figure 4.1.3.1: Provide basic information

The first one requires basic information about a user. Users must provide each of them to create an account.

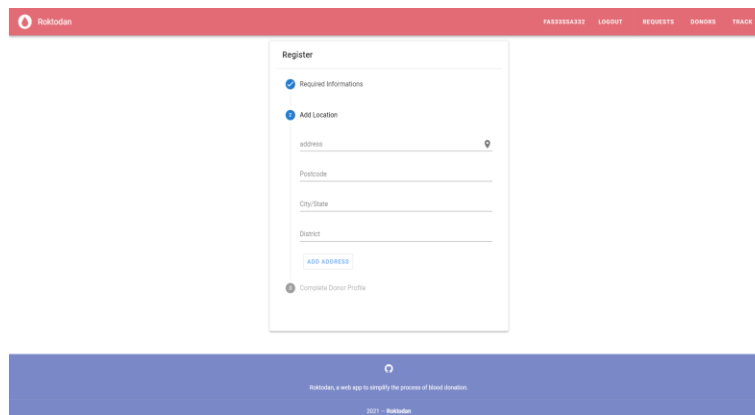
A screenshot of the same web application's registration page, but now the 'Add Location' step is selected with a blue dot. The 'Required Informations' step is now greyed out. The 'Add Location' step includes input fields for 'address', 'Postcode', 'City/State', and 'District'. A blue 'ADD ADDRESS' button is located below the 'District' field. The footer remains the same as in the previous screenshot.

Figure 4.1.3.2: Provide address information

The user has to add his/her address. The icon in the 'address' textbox can be used to automatically gather his/her location information based on geolocation API. To use this feature, the user must provide location access.

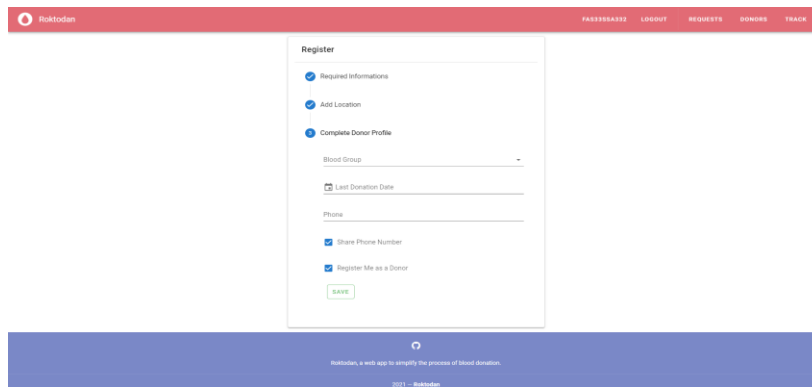


Figure 4.1.3.3: Create Donor Profile

The user has to create a donor profile with information regarding blood donation i.e. Blood Group, Last Donation Date. The share phone number option provides him/her a choice whether he/she wants to share his phone number. And the ‘register as donor’ registers him/her as a donor. By selecting this he will be listed as a donor.

4.1.4: Blood Requests:

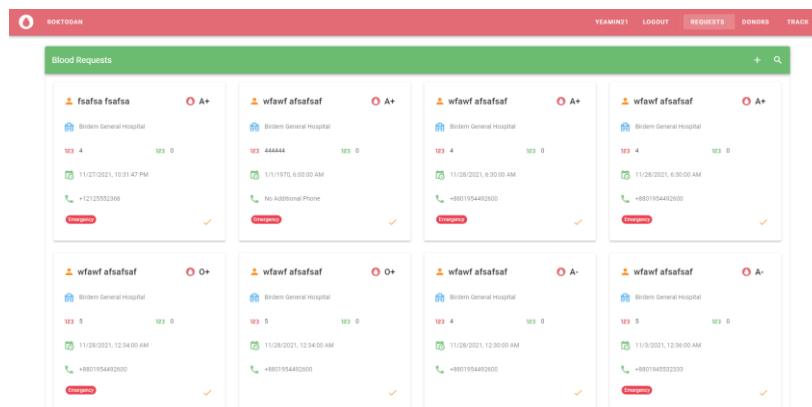


Figure: 4.1.4.1: List of Blood Request

This Page shows blood requests made in this application. Users can create new requests after login, however, without login, anyone can see this page and filter requests. Phone numbers are publicly visible.

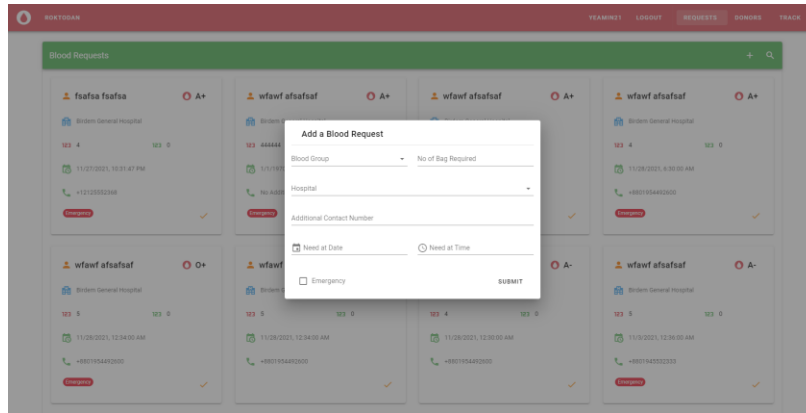


Figure 4.1.4.2: Blood Request Creation Page

Authenticated users can add blood requests. Here users can select only hospital addresses as destinations for security purposes. Users add no of bag they need and when they need them. Users can mark their requests as emergencies that have higher priorities.

4.1.5: Donors

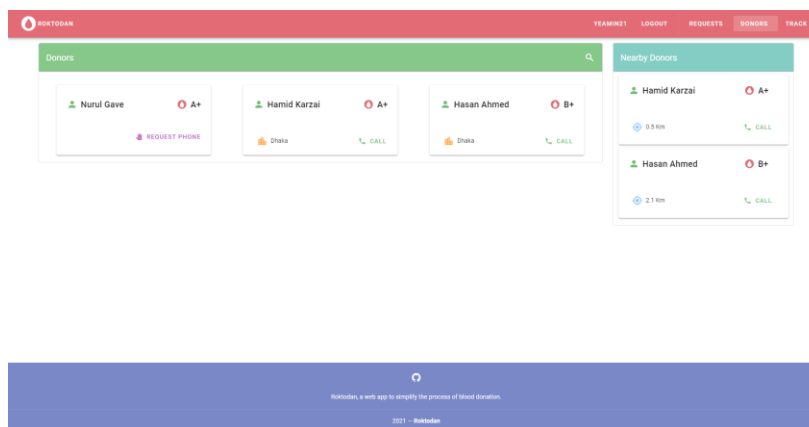


Figure 4.1.5.1: Donors Page

The 'donors' page shows a list of donors with their blood group. If a donor opted out of sharing their phone number, the user browsing the application won't be able to directly call the donor. A logged-in user can request the phone number of the hidden-phone user.

The 'Nearby Donors' tab shows a list of donors nearby with their blood group. This feature uses geolocation-API, hence to use the feature one must provide location access.

4.1.6: Profile

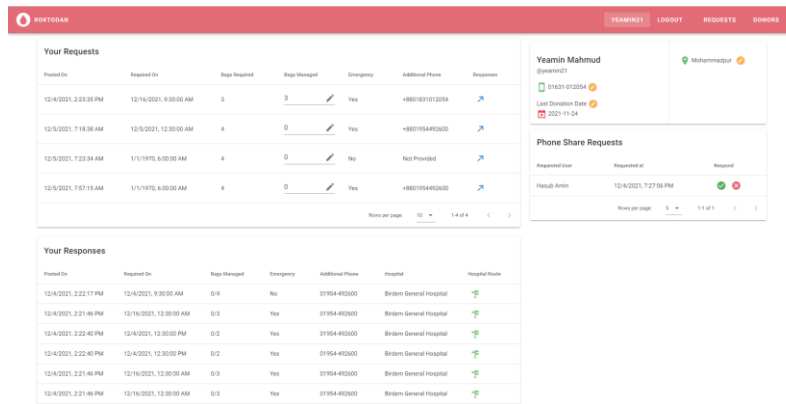


Figure 4.1.6: Profile Page

The profile page works as the dashboard of an individual user. Users can see updates on their requests, who responded to their requests, which requests they have responded. etc. Users can respond to their phone number requests from this page.

4.1.7: Helping with Route

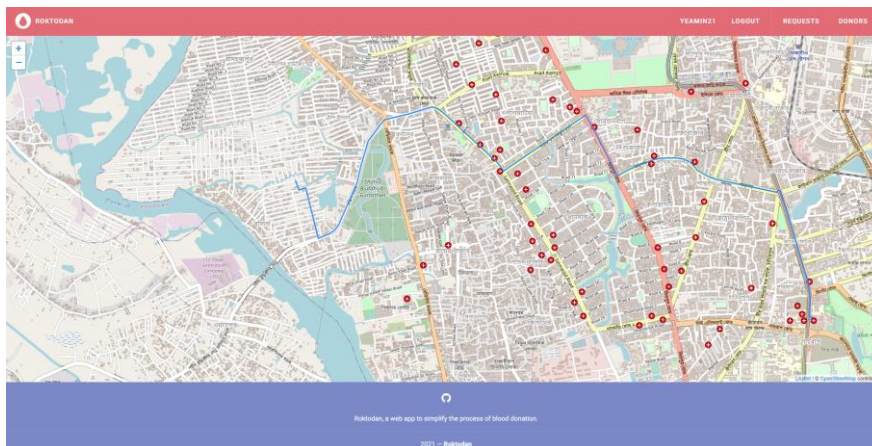


Figure 4.1.7: Street Routing Page

Users can see the route to the hospital from his current location. All the hospitals listed has their address inserted into the database. Our system uses 'openrouteservice' to provide the users with route information. The location is set to hospital for user security.

4.1.8:Android App

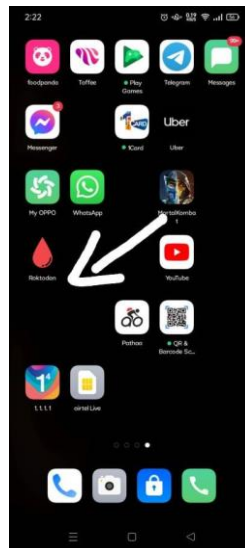


Figure 4.1.8: Android app

User can download our App from google play store. It's totally free to download and it doesn't need so much highly device.

4.2: Descriptive Analysis:

A user can be both donor and blood receiver at the same time. One must log in to create a blood request. However, without logging in user can see donors and requests but cannot respond to any request and cannot make a 'phone sharing request' to any user though he/she can call any donor who listed their phone numbers not as private.

Users can see donors nearby as well as filter donors based on blood groups and other configurations. Those who have donated blood within the last 120 days won't be listed on the donor page. Tracking will provide a receiver with the feature of seeing how far the donor is from the destination. This web app is fully responsive on almost all devices.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.0 Requirements for Implementation

Our project requires some must-have requirements to achieve the target.

- A modern internet browser with moderate internet speed

If the target machine has good hardware and moderate internet speed and a modern internet browser, our project will be able to fulfill its target.

5.1 Testing Implementation

This is a procedure in which an application tester or the program's creator will be able to examine a variety of scenarios to ensure that the application and specifications are met. However, the application may have limits in the beginning or later stages.

Table Name: Test Results

Test case	Test input	Expected outcome	Obtained outcome	Passed/Failed	Testing Period
Browse	Browse the website from chrome 96.0.4664.45	Browse Successfully	Browsed Successfully	Passed	27-11-2021
Browse	Browse the website from internet explorer 11	Trouble Browsing	Had Problem Browsing	Passed	27-11-2021
Browse	Browse the website from Mozilla Firefox 95.0b12	Browse Successfully	Browsed Successfully	Passed	27-11-2021
Geolocation Permission Granted	Automatically gather user location	Successfully Gather user Location	Successfully Gathered user Location	Passed	03-12-2021
Geolocation Permission Denied	Automatically gather user location	Fail to Gather user Location	Failed to Gather user Location	Passed	03-12-2021

Create A Request	Create a request	Successfully Created	Created	Passed	02-12-2021
Response to a request	Response to others request	Respond Successfully	Responded Successfully	Passed	03-12-2021
Response to a request	Response to self-request	Can't Respond	Could not respond	Passed	03-12-2021

Figure 5.1: Testing Table

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.0 Discussion and Conclusion

According to the findings, an online blood bank administration system is far superior to a manual system. According to the data, respondents prefer to utilize an online blood bank management system over a manual method since it has many advantages and benefits that contribute to its efficacy and efficiency. Because of the enhanced user confidence in the system, it can be stated that the online blood bank management system improves blood transfusion safety by providing better means of handling the various procedures in the blood bank.

6.1 Future work and Further Development:

We have plans to implement some exciting improvements in the system. Currently, the system is web-based with an Android version available for mobile. We plan to design an app for IOS users as well. We also have plans to store more blood-related information such as donors' blood specifications. Users will be able to see and verify if the donor's blood specification is good enough. Blood-related problems are very common. It takes time to diagnose blood samples and then come up with a result. Our system will record the donor's blood specifications. Therefore it will be easier for the patient to receive blood in a more efficient manner.

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28-12-2021

Nearby Blood group identification and donation

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