DEPARTMENT OF INFORMATION TECHNOLOGY

Synopsis of Mini Project On

BLOOD CARE

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Department of Information Technology

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Autonomy Syllabus Scheme-I (2021-22) - SEMESTER III (SY - IT)

SOMAIYA VIDYAVIHAR

K J Somaiya Institute of Engineering and Information Technology

An Autonomous Institute Permanently Affiliated to the University of Mumbai

Accredited by NAAC with 'A' Grade (3.21 CGPA), Approved by AICTE, New Delhi

DEPARTMENT OF INFORMATION TECHNOLOGY

CERTIFICATE

This is to certify that following students:

	Roll No. / Seat No.
Manav Gupta	20
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Mansoor Kanorewala	27

have submitted PBL – Mini Project I Report on *"Blood Care"* as the partial fulfillment for the requirement of Second Year of Engineering (3rd Semester) in S.Y. - Information Technology under my guidance during the academic year 2021-2022.

Mrs. Sarita Rathod
Project Guide
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Head of Department
Associate Professor
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Date of Examination: _____

Signature of Internal Examiner

Signature of External Examiner

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Acknowledgement

We have taken a lot of effort into this project. However, completing this project would not have been possible without the support and guidance of a lot of individuals. We would like to extend our sincere thanks to all of them. Their guidance and motivation have helped in making this project a great success. Thus, we express deep sense of gratitude and satisfaction.

We convey our thanks to our project guide *Mrs. Sarita Rathod* of Information Technology Department for giving us a good guideline for mini project throughout numerous consultations.
We are indebted to our inspiring HOD *Dr. Radhika Kotecha* and Project Coordinator *Mrs. Sarita Rathod* who has extended all valuable guidance, help and constant encouragement through various difficult stages for the development of the project. We express our sincere gratitude to our respected Principal *Dr. Suresh Ukarande* and Vice-Principal *Dr. Sunita Patil* for encouragement and facilities provided to us. We would also like to acknowledge the patience that our ever-beloved parents have shown during our efforts and the encouragement we have received from them. Thus, we are fully obliged and convey our thanks to the teaching and as well as non-teaching staff of the department.

Abstract

The need for blood is great as it is life as there is no replacement for human blood. Blood is a saver of all existing lives in case of emergency needs. The task of a blood bank is to receive blood from various donors, to monitor the blood groups database and to send the required blood during the need to the hospital in case of emergencies. The problem is not the insufficient number of donors, but finding a willing donor at the right time. Interestingly there are many people across the world interested in donating blood when there is a need, but those donors don't have access to know about the blood donation requests in their local area. This is because there is no platform to connect local blood donors with patients. Conventionally, when a patient needs blood, he/she has to contact a blood bank or a compatible blood group of a donor in their circle, family, and friends. However, it is difficult to find a suitable donor within a limited group of people at a given time. In addition, there is no guarantee that blood banks will have compatible blood groups in stock. There is also a steady increase in blood donation requests posted in social networking sites (like Facebook, twitter, Instagram, etc.) requesting for donation. Emergency situations, such as accidents, create an immediate, critical need for a specific blood type. In addition to emergency requirements, advances in medicine have increased the need for blood in many on-going treatments and elective surgeries.

We want to build a network of people who can help each other during an emergency. Donors will be prompted to enter an individual's details, like name, phone number, and blood group. In the urgent time of a blood requirement, you can quickly check for blood donors matching a particular or related blood group and reach out to them through the App. Since almost everyone carries a mobile phone with him, it ensures instant location tracking and communication. Only a registered person, with willingness to donate blood, will be able to access the service via their login credentials.

Chapter 1: Introduction

The blood is a specialized bodily fluid that delivers necessary substances to the body's cells such as nutrients and oxygen. According to the survey conducted by World Health Organization (WHO) for the Year 2019, India wants eight crore units of Blood, however only ten lakhs' units are available on the market, which shows the intense shortage of blood. Blood and its parts are vital for human life as there's no substitute for human blood. No major operation will be performed while not the utilization of blood in any hospital or clinic. Since India has a huge population, the requirement of blood is rising on a daily basis. Statistics specifically show an alarming level. The quantitative relationship between the number of blood banks available and the number of blood banks required is not optimal.

The Blood Donation App is to create an e-Information about the donor and organization that are related to donating the blood. Through this application any person who is interested in donating blood can register himself in the same way if any organization wants to register itself with this site that can also register. Moreover, if any general consumer wants to request blood online, he can also take the help of this site. This project acts as an important role in saving the lives of human beings and which is also its main aim. The project Blood Care is developed so that users can view the information about registered blood donors such as name, contact information, and other such personal information along with their details of blood group and other medical information of the donor. The project also has a login page where in the user is required to register and only then can view the availability of blood and may also register to donate blood if he/she wishes to. This project requires internet access and thus there is a disadvantage of internet failure. Thus, this application helps to select the right donor online instantly using medical details along with the blood group. The main aim of developing this application is to reduce the time to a great extent that is spent in searching for the right donor and the availability of blood required. Thus, this application provides the required information in no time and also helps in quicker decision making.

Ease of access, requirements of blood, and the blood donation statistics are taken into consideration while researching the topic. The platform used to develop Blood Donation App is Android studio and Firebase for Backend implementation.

1.1 Motivation

In spite of the availability of the potential blood donors, not more than 5% of the total Indian population donates blood. Advancement in medical science has increased the blood demand. Also, blood-donors usually don't come to know about the need for blood. There is a steady need for blood and blood components (red blood cells, blood plasma, platelets). Every minute of every day someone is in need of blood. These reasons motivate us to develop a more efficient system that will assist the present blood donation system.

Every blood bank starts with a good motive and highest principle in mind. However, personal interest hacks into their high morals and good work which deviates the initial vision and mission of the organization, many a times. They have to come to their selfish motive to earn from the multi billion

rupees blood banking industry. This increases the need of the purposed system as it overcomes the problem.

1.2 Problem Analysis

Despite advances in technology, today's blood bank systems are running in manual system. As such, there is a prevalent problem in the availability of needed blood types. For instance, when a person needs a certain type of blood and this type is not available in the hospital, family members send messages through social media to those who can donate to them and this process takes longer than the life of the patient to the most dangerous. In addition, it seems that there is lack of proper documentation about blood donors and its medical history. This may lead to blood bag contamination and may affect the blood transfusion safety. Generally, this study aims to determine how the use of blood donation application enhance blood transfusion safety. The process of blood donation can be made simpler and effective with the use of this application.

1.3 Objectives

This project aims to design, develop and implement an android based application. The objectives of this application are:

- To design an efficient way to connect donors and recipients
- To help the people in need of urgent blood
- To reduce the data entry process
- To encourage people to come forward and donate blood
- To support fast searching to matching blood type for right person
- Some blood types are rare so the system can find the required donors with the required blood type easily from the database by using the search feature
- To use the latest technologies and the available tools to fill the gap between blood donors and needy people by offer comprehensive system services that make blood donation fastest, safest, most reliable and most cost-effective.
- To provide fast, easily accessible, safest, most reliable and most cost-effective system for patients and donors.

1.4 Scope

This project study covers three basic operations of blood bank, namely: donor registration, donor and recipient records, and recipient registration. In addition, the study considers two (2) possible users of the system, namely: donors and blood receptionists/doctors.

The functional areas of this application that lies under the scope of the proposed system are the management of the availability of donors to the user or member at any time. The system calculates the estimated locations of the donors and also provides direct email or notification service to the seekers. To be a member of the Android Blood Bank, one has to fill the registration form and provide the necessary information.

The users will also be able to check for the compatible blood types with their blood group and the required donors or seekers nearby them. This application also aims at providing users with a user-friendly platform with easy to access and use features and components such as details of willing donors or seekers.

Chapter 2: Literature Review

1.1 Related Work

Literatures on the prior research work done by researchers in the Computing domain/ Android and Mobile computing are reviewed.
In an era of technological explosion, humans seem to tend to develop a tight "bond" between them and their smartphones. It would not be an exaggeration to say that these portable devices have become some kind of "wearable", accompanying users almost everywhere and at any time, in contradiction to personal computers or laptops.

Review of similar systems is made and the strength and weaknesses are identified. The similarities between the reviewed systems and the proposed system are outlined as well as the differences. There are various android applications and web sites which are international and state wise but not for locality.

Existing System

In existing system, if someone needs the blood, then either the person has to go to the blood bank nearby to him or else have to buy the blood from the hospital but in case, if both the places don't have the blood of the required group than finding blood of that group might be a tough task at the required time. In existing system, wastage of time is done more and still there will be chances that you won't get blood at the required time.

At the present there is no software to keep any records in blood bank. It becomes difficult to provide any record immediately at times of emergency. Requires more human efforts in maintaining the branch related information. Manually to keep the accounts is also tedious & risky job & to maintain those accounts in ledgers for a long period is also very difficult. It's difficult to manage and maintain the files. There are chances of damage of files, if the data is stored in the files for duration of time. Privacy is difficult. Time consuming is retrieving, storing and updating the data. It is difficult to keep track the record about the donor & receiver he has donated or received the blood at the last time.

Limitations of Existing Systems:

Each and every system has certain drawbacks that lead them into the improper working. Our traditional manual system of blood donation and reception requires both the donor and seeker to manually fill out forms which may be up to 2-3 pages and might take up the essential time of the patient in case of emergencies. Then the blood banks need to look through the records for availability of required blood type and if not available than it may take time to arrange for the blood briefly. Along with that, storing the records of all the donors and recipients in hardcopy format takes up space and will require huge man power to search for records when needed. This may delay the process even further.

Apart from the manual system, some android-based or web-based applications have also been developed and are available for the general public to use. These applications too come with their own shortcomings and drawbacks or limitations. The current applications are less secured while registering a user. This can lead to misuse of the application and affect the aim with which it was developed.

Along with this, some of these applications are not up-to date with the modern technologies and may not run on the latest softwares or may cause complications which are never a good sign and may fail to deliver its intended purpose. Even the latest applications lack some features or description to the available ones. This makes the application less user friendly and might be difficult for the not-so-technology-friendly people to access the application to its full potential.

Solutions to Limitations:

While there are a lot of known limitations to the existing systems, each limitation comes with a solution to overcome them. The solutions to various limitations in the existing systems are:

- Rather than having the users fill up huge forms of 2-3 pages, an android application works in a lot simpler manner by asking for just Name, Contact number, Email ID, Aadhar ID and Blood Group.
- For security reasons, an app can just ask for a government-authorized identity proof such as an Aadhar ID. This can make the application less prone to fake users and people with bad intentions.
- To make the process and application more user-friendly, the developers can add-in some new features and descriptions to enhance the user experience such as more information about blood donation process and related information, features that enable the seekers to directly contact the available donors, etc.

Chapter 3: Proposed System

3.1 Proposed Approach and Details

Blood Donation Application will be an android application. The proposed system will help the needy person, access to all the donors of the blood of the particular group, nearby to their place, in a minute of time. The purpose of the system is to simplify and automate the process of searching the blood in case of emergency and maintaining the records of blood donors and recipients. Using this application blood seeker can search for blood donors and can call or message the donors through this app on android. The user in need of urgent blood can also send a direct mail to the preferred donor through this android application with the help of email feature provided adjacent to the details of the donors. The details will include the name of the donor, his/her blood group, contact number and email address. This automated android blood bank will reduce the time and efforts for finding the right choice of donor for the needy receiver and thus most of the times helps the person to save his/her life also. The application will contain the following modules:

- *Donor Module:* This module will be for the donors to register themselves and check if someone near them is in need of urgent blood. They will have to provide their basic details while registering such as name, contact number, blood type, email address and Aadhar number.
- *Recipient Module:* This module will be for the people in need of blood donation. They can register themselves as recipients and can look for the donors with the required blood type. They will be able to contact the donors through the contact number displayed and can also send an email to them.

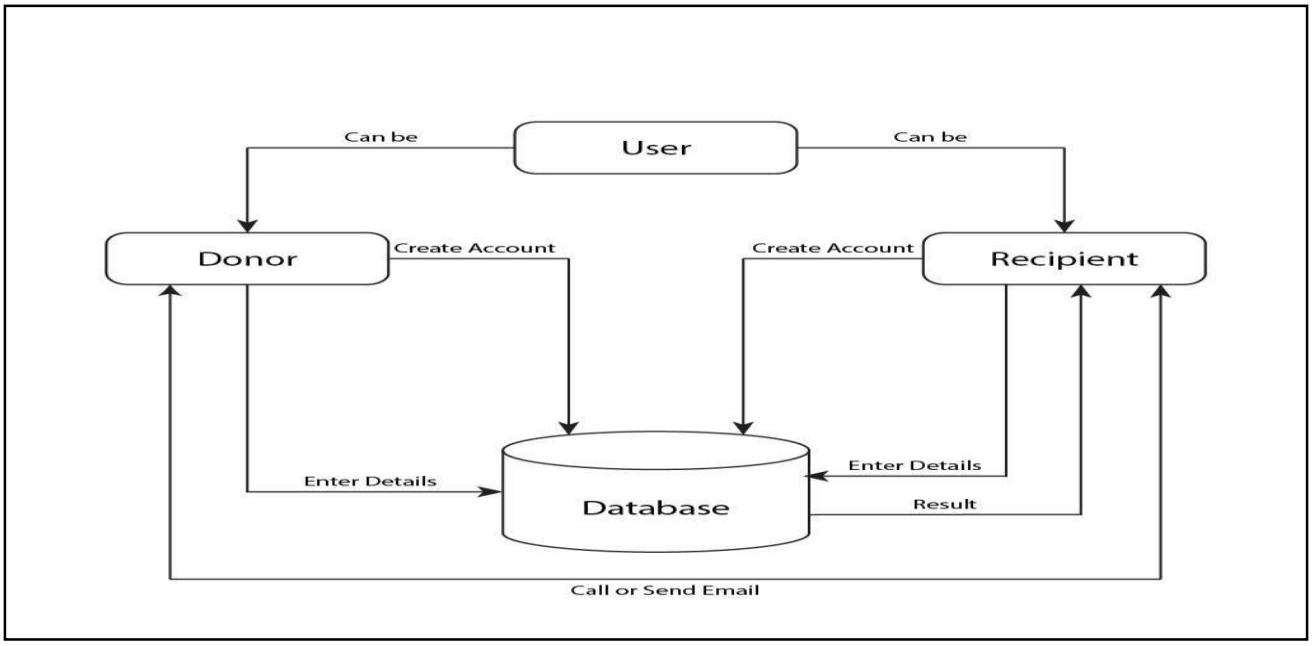


Fig 3.1.1 Block Diagram

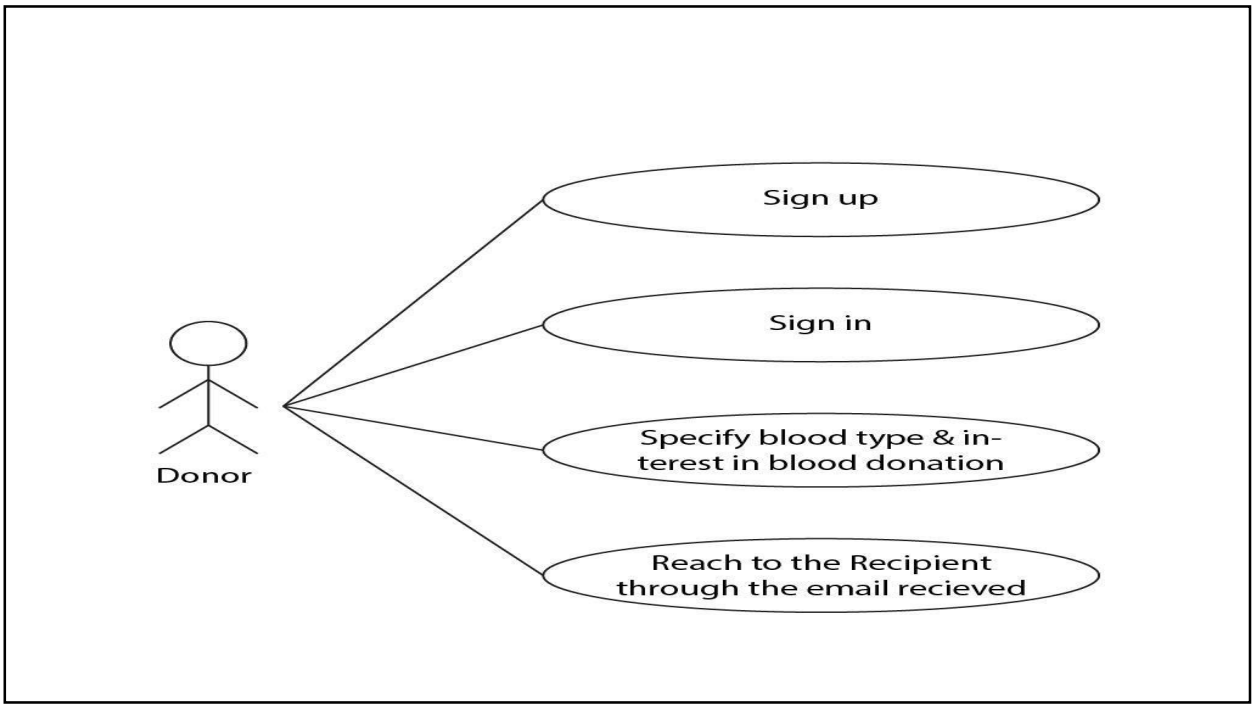


Fig 3.1.2 Use-Case Diagram for Donor

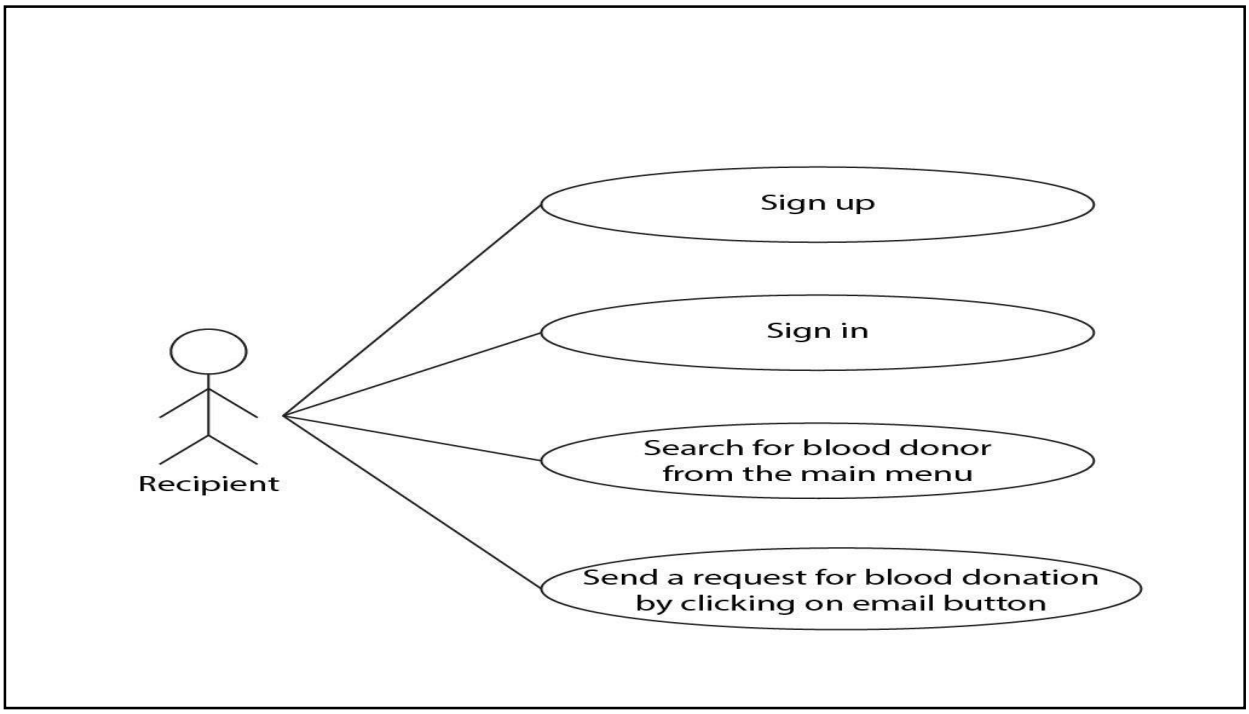


Fig 3.1.3 Use-Case Diagram for Recipient

3.2 Innovation in Idea

Along with the features of the existing blood donation applications and systems, we have included various other features and components to make it more user friendly and helpful for the users, i.e., the donors and recipients. Some notable innovations in this idea are:

- *Send Email:* The recipient user will be able to send direct email to the preferred donors near them to request for donation. This feature will be available to them just adjacent to the donor's name and details in the available donors list on their Home page.
- *Compatible with me:* Along with the donors list or the recipients list present on the Home page of the user, the users will also have a "Compatible with me" feature in their side menu to check for the donors or recipients with blood type compatible with them.
- *Official ID registered:* The users will be required to enter their official ID number (Aadhar number). This will help in preventing fake users from misusing the application.
-

3.4 Timeline

Project Title: BLOOD CARE

Start Week		Sep 17, 2021						
Week	1	2	3	4	5	6	7	9
Starting	Sep 17	Sep 23	Oct 30	Oct 10	Oct 14	Oct 21	Oct 28	Nov 18

									Notes
Phase One	Finalizing the topic								Discussing the topic with mentor and finalizing the topic
		Research work							Doing in-depth research on the topic and understanding alredy existing theory papers and applications
			Android Studio						Learning Android Studio basics and requirements for project
				Gantt chart					Prepairing timeline of the project and Gantt Chart
				Panel presentation					Preparing panel presentation for the project
Phase Two					Learning Firebase				Learning Firebase for storage of database of project
					Learning Features				Understanding the implementation of various features for application
					Splash screen and login page creation				Created the initial screen and login page of application
						Database connection and testing			Connecting the Firebase to android application and testing of its working
							Modules and components		Built user modules for donor and recipient and further components
Three								Testing	Creating Demo Users and Testing all functioning
								Panel Presentation	Displayed Working of all Modules By Creating Demo Users.

3.4 Roles and Responsibilities

- We worked together in researching the topic, finalizing the features of application, designing the User Interface (UI) and initializing the database.
- The team together worked on the Frontend part of the project with suggestions and discussions involving everyone in the team.

- Inputs and contributions were made by everyone in the team in preparing the presentations and reports of the project.
- Worked together in making the android application more user-friendly and completed the finalization of Frontend and Backend parts along with all the documentations and presentations.

Chapter 4: Implementation Details and Results

4.1 Technology Stack

The making of the "Blood Care" android-based application requires the use of some client-side as well as server-side softwares to make it user friendly and help in achieving the purpose it was built. Some of the major softwares used in this project are:

Android Studio

Android Studio is the official integrated development environment (IDE) for Android app development, based on IntelliJ IDEA. Android Studio is designed specifically for Android development. It is available for download on Windows, MAC OS X and Linux, and replaced as Google's primary IDE for native Android application development. Android Studio offers flexible Gradle-based build system, code templates to help you build common app features, rich layout editor with support for drag and drop theme editing, built-in support for Google Cloud Platform, making it easy to integrate Google Cloud Messaging and App Engine and much more.

Android Studio features a new and improved interface design perspective where you can view the interface you are working on and its related components. Android Studio provides a number of user interface tools to assist you with creating layouts, implementing style themes, and building graphic or text resources for your app.

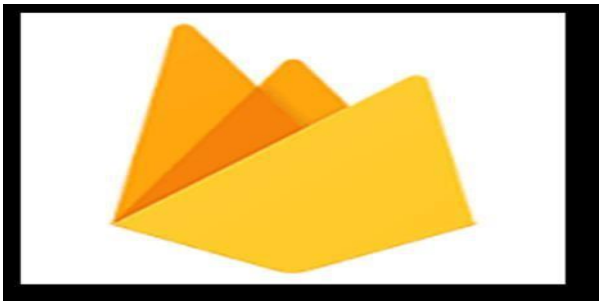
The Android build system is the toolkit you use to build, test, run and package your apps. The build system can run as an integrated tool from the Android Studio menu and independently from the command line.

Firebase

It is Google's one-stop platform for mobile and web apps. It began out as a stand-alone business in 2011. Then, in 2014, Google acquired the platform, and it has become its major software development platform. It is the backend application for Web, Android and IOS. It has an in-house database, different APIs, countless authentication types and hosting services. Google Firebase is a Google-backed application development software that enables developers to develop IOS, Android and Web apps. Developers rely on this platform because of extensive tools, fast development, and real-time databases to make interactive apps. Crash reporting, Google Analytics, secure hosting and authentication are also benefits of using Firebase. Firebase provides developers with advantages such as its free to start, creates reliable databases, is an all-in-one platform, provides an end-to-end development and is scalable.

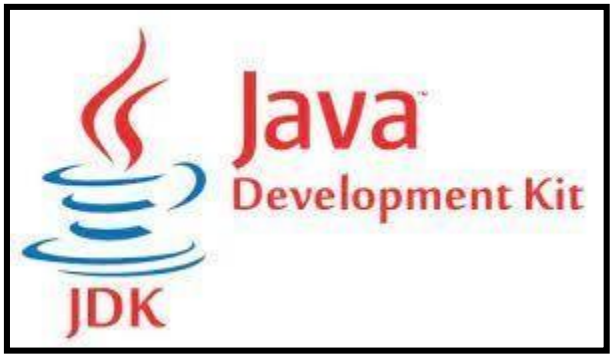
A real-time database is all that Firebase is aimed at. Additionally, Firebase offers Backend-as-a-Service. It is a cloud-hosted database with no SQL. With Firebase, there is guaranteed synchronization between user data. Backend-as-a-Service gives developers an API that enables data to coordinate through customers and keep them on the cloud messaging server of Firebase. Additionally, Firebase is also essential in synchronizing browsers and devices using a similar database. All these are done in real-time.

With Firebase, developers can focus on enhanced customer experience. With it, you need not control servers or write APIs. In short, Firebase is just but a server, an API, and a data store where modification as per individual needs can occur.



Java Development Kit (JDK)

The Java Development Kit (JDK) is a distribution of Java Technology by Oracle Corporation. It implements the Java Language Specification (JLS) and the Java Virtual Machine Specification (JVMS) and provides the Standard Edition (SE) of the Java Application Programming Interface (API). The Java Development Kit (JDK) is a software development environment that offers a collection of tools and libraries necessary for developing Java applications. You need the JDK to convert your source code into a format that the Java Runtime Environment (JRE) can execute.



4.2 Preliminary Results

Home: This is the front page of application that gives us information about user interface of the android application.

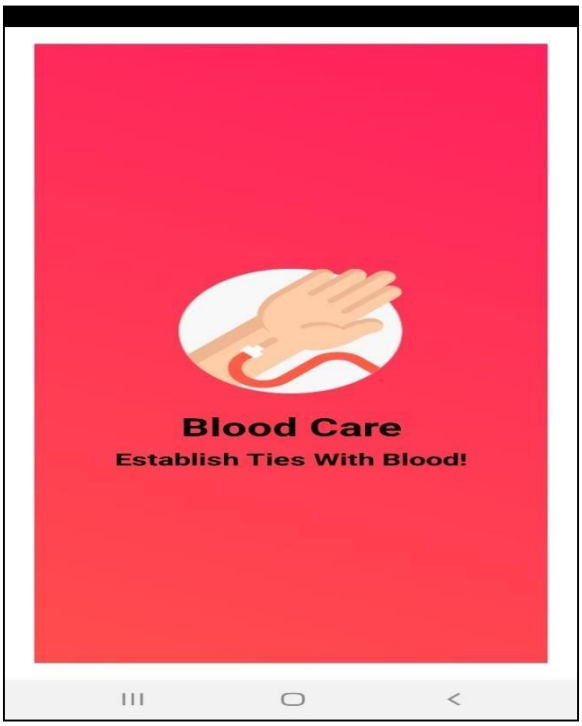


Fig 4.2.1 Home Screen

Sign-up Page: This part lets user sign-up for the application or move to login page if he/she is a registered user.

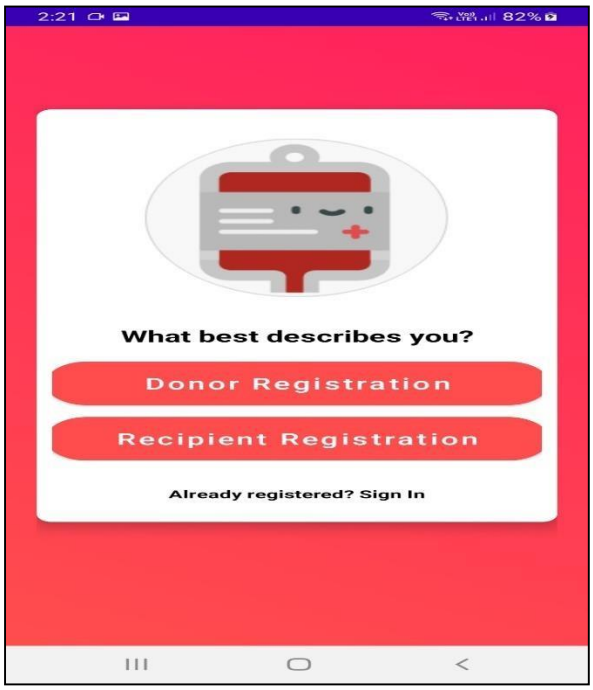


Fig 4.2.2 Sign-up Page

Login Page: An already registered user can click on sign-in and will be prompted to the login page where he/she can enter their credentials and login on their profiles.

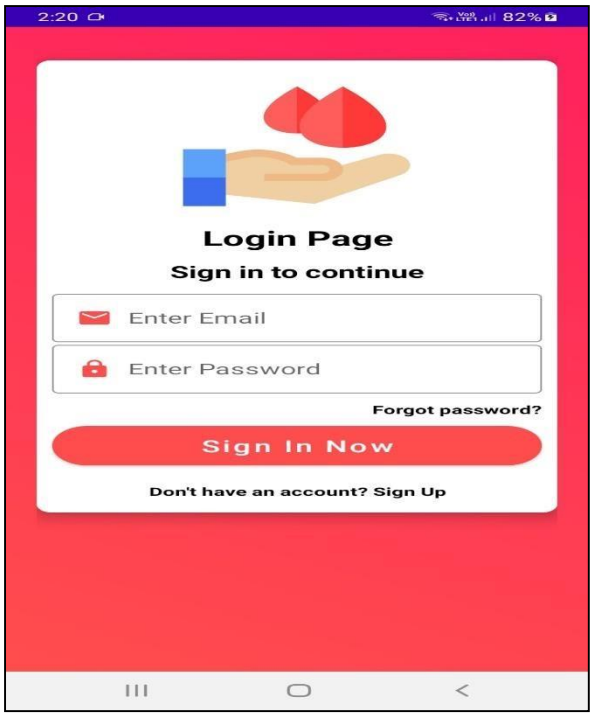


Fig 4.2.3 Login Page

Registration Pages: A new user can sign-up for any of the two components based on their requirement, i.e., as a donor or as a recipient.

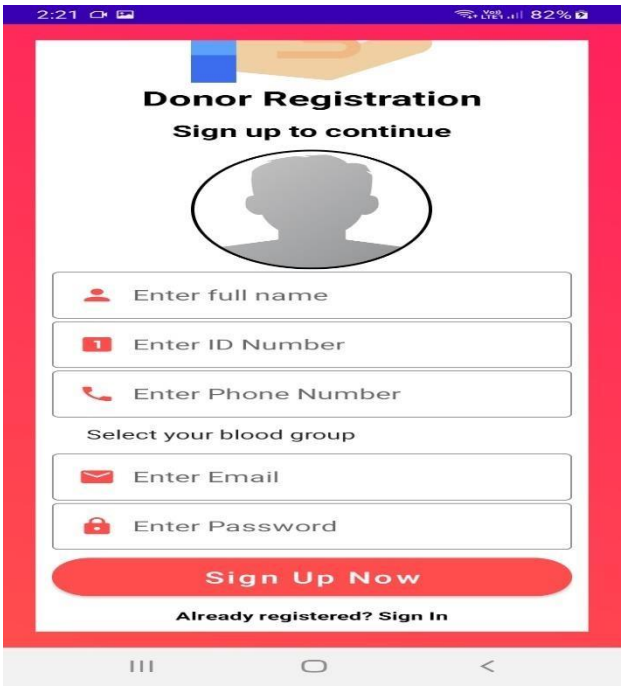


Fig 4.2.4(1) Donor Registration

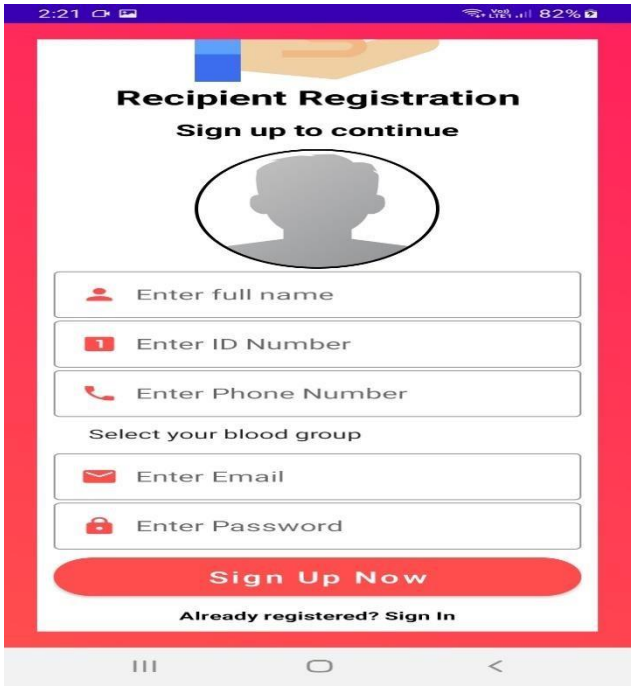


Fig 4.2.4(2) Recipient Registration

Donor Registration:

Menu: Once the donor logs-in, the following page will be shown, i.e., the menu of the donor. The menu will have features such as ‘compatible with me’, ‘Blood groups’, ‘received emails’, etc. for user convenience.

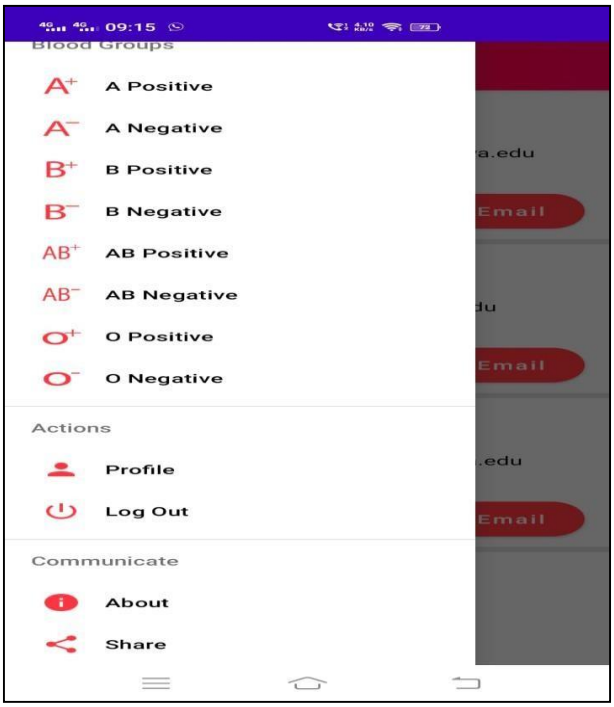


Fig 4.2.5 Donor Menu

Recipients List: The donor will be displayed the list of seekers of blood donation.

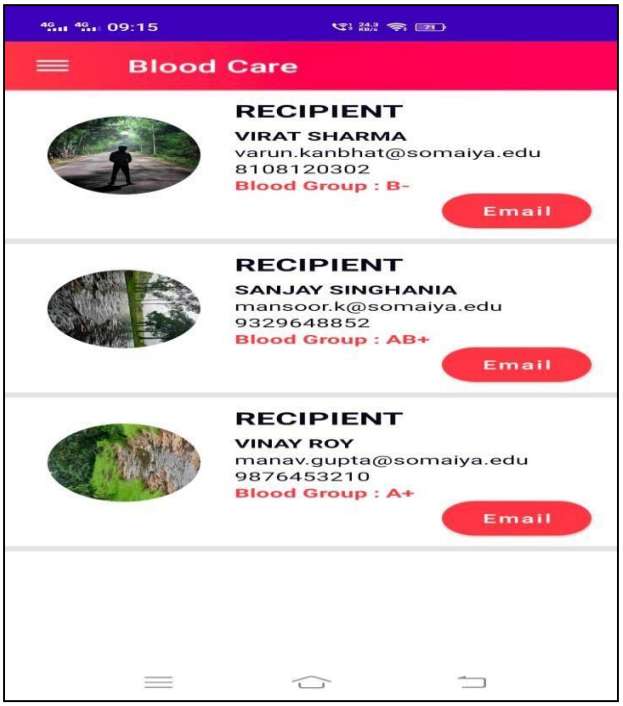


Fig 4.2.6 Recipients List

Notifications: The donor can check for the emails received, sent by various seekers of blood near them.

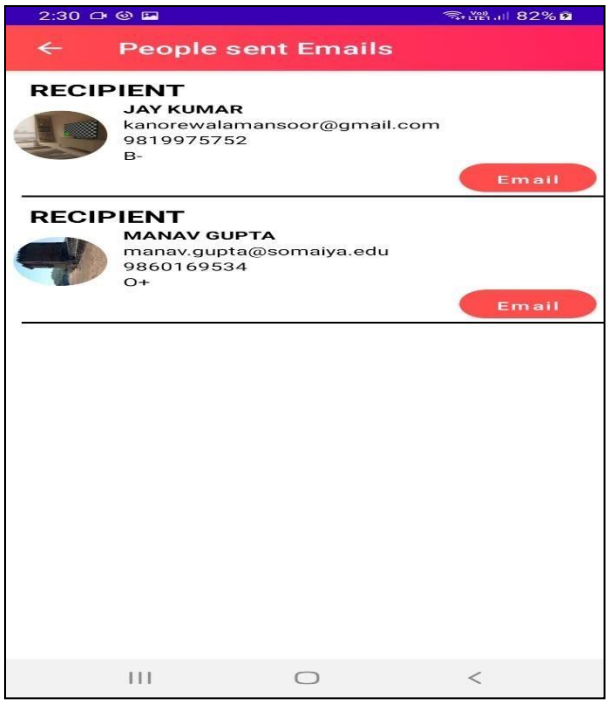


Fig 4.2.7 Email Notifications

Recipient Registration:

Menu: Once the recipient login takes place, he/she will be directed to this page.

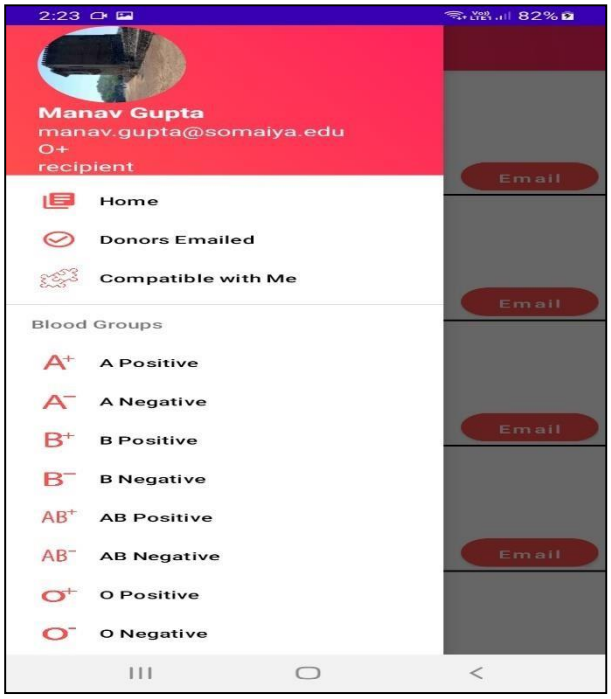


Fig 4.2.8 Recipient Menu

Donors List: The recipients will be displayed the list of available donors of various blood types near them.

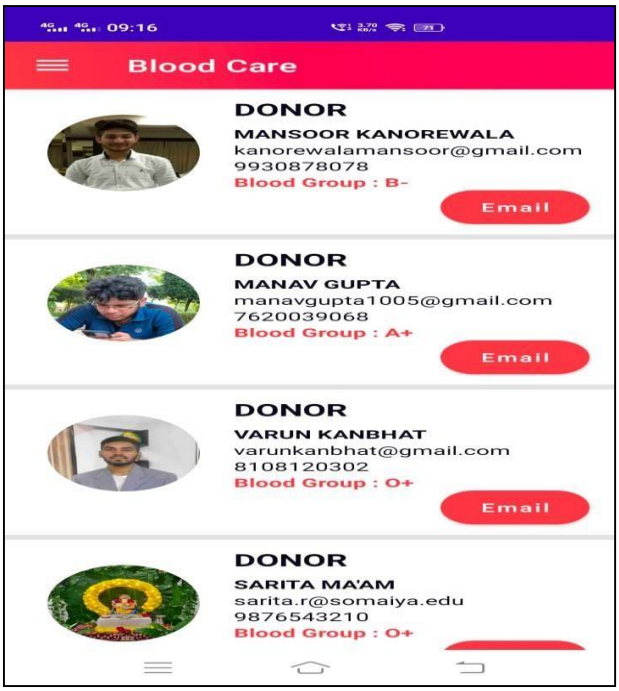


Fig 4.2.9 Donors List

Send Email Option: The recipient can send email directly through the 'Email' button present.

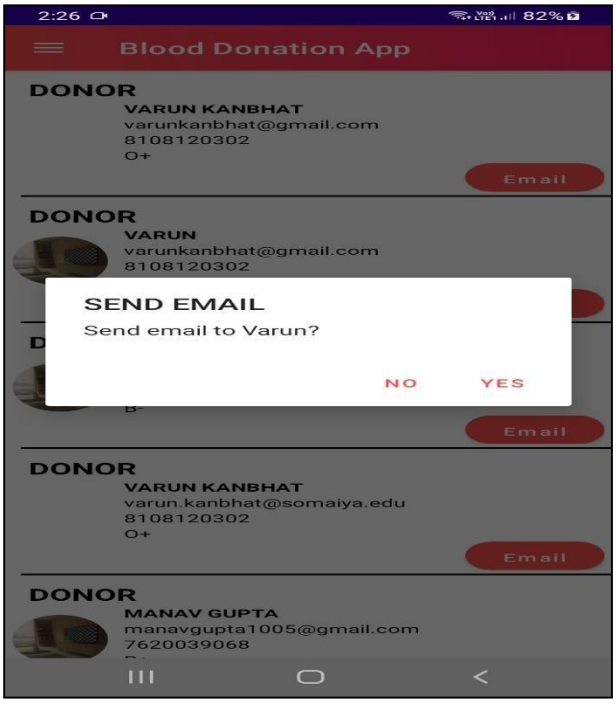


Fig 4.2.10(1) Send Email Message

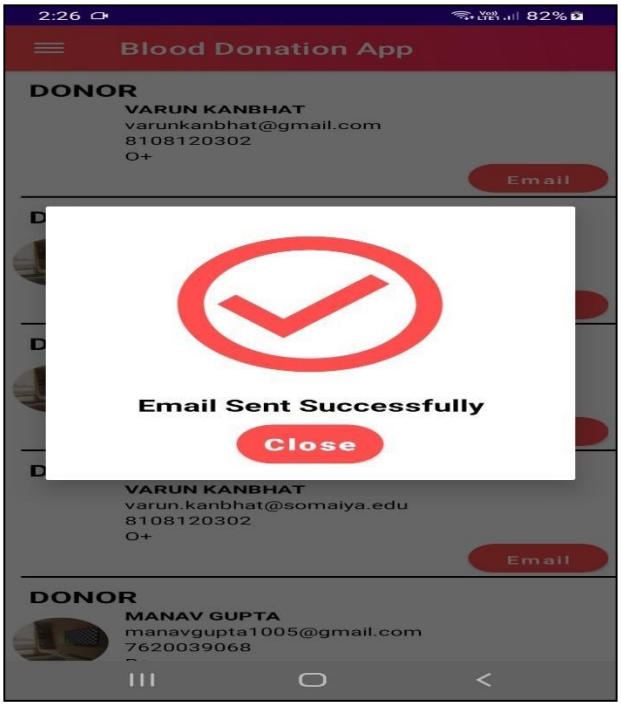


Fig 4.2.10(2) Email Sent Notification

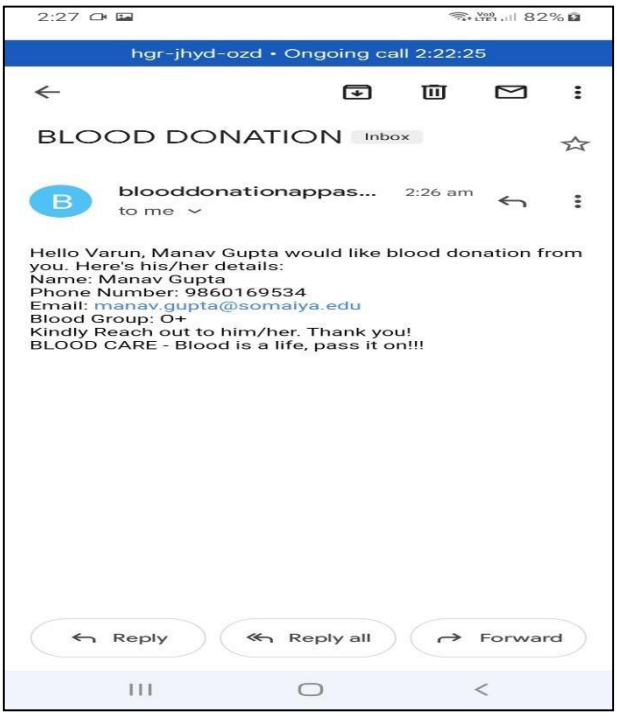


Fig 4.2.10(3) Received Email

Sent Mails: The recipient user can check the list of donors they have sent the email notification requesting for blood through this feature.

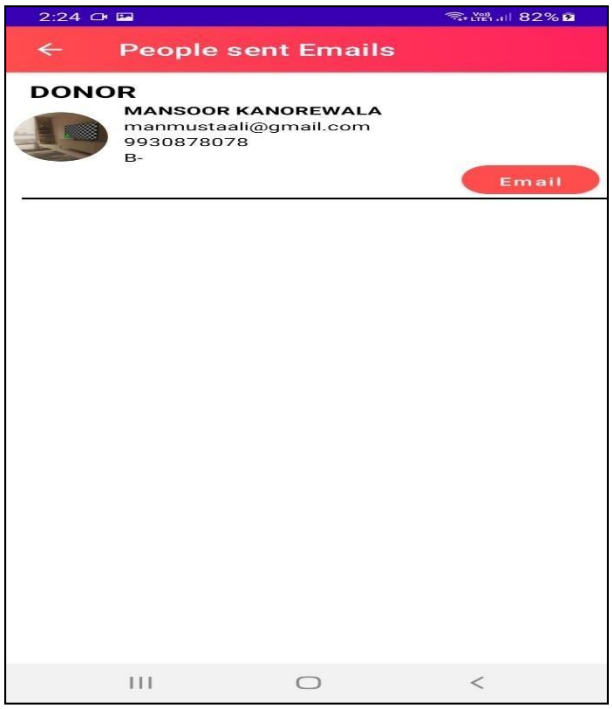


Fig 4.2.11 Sent Mails List

Features: Various other features provided to the users are-

'Compatible with me' Feature: The user can check for other users with blood type compatible with them to check for blood availability near them.

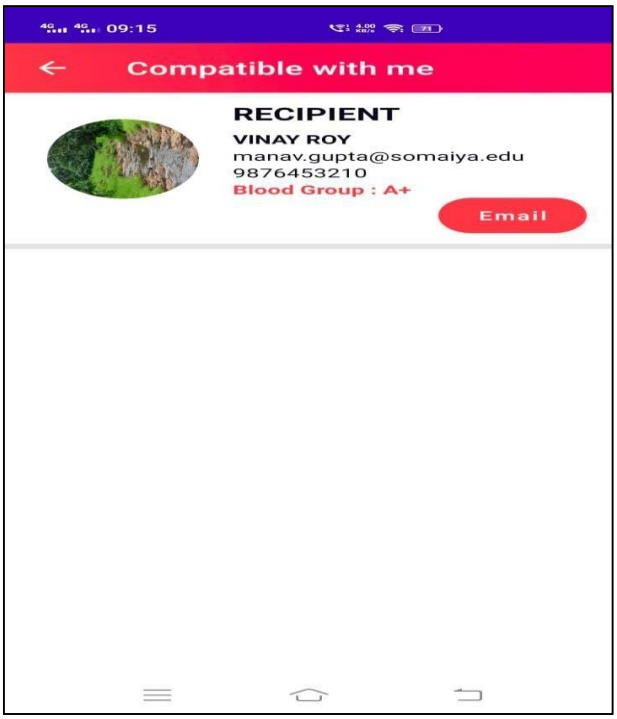


Fig 4.2.12 'Compatible With Me' Feature

User Profile: The user can see how their respective profile looks from the profile feature available to them.

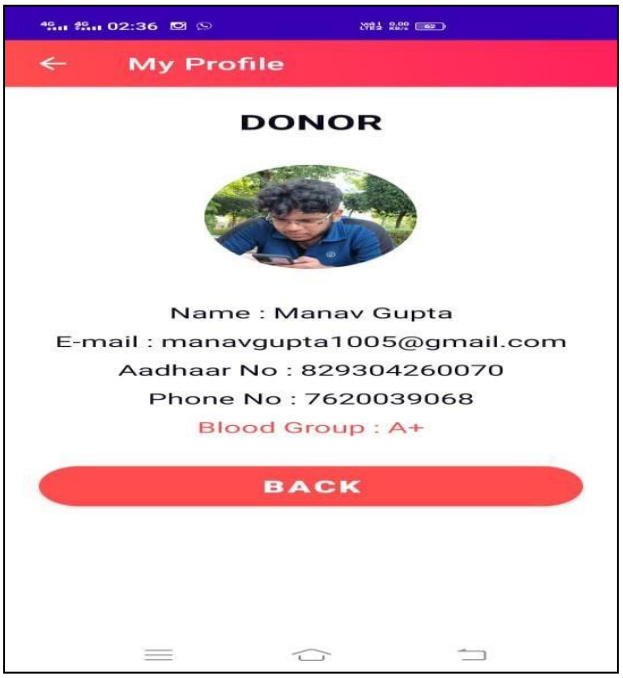


Fig 4.2.13 User Profile

Blood Groups: This feature allows the user to see the various registered users of different blood types near them.

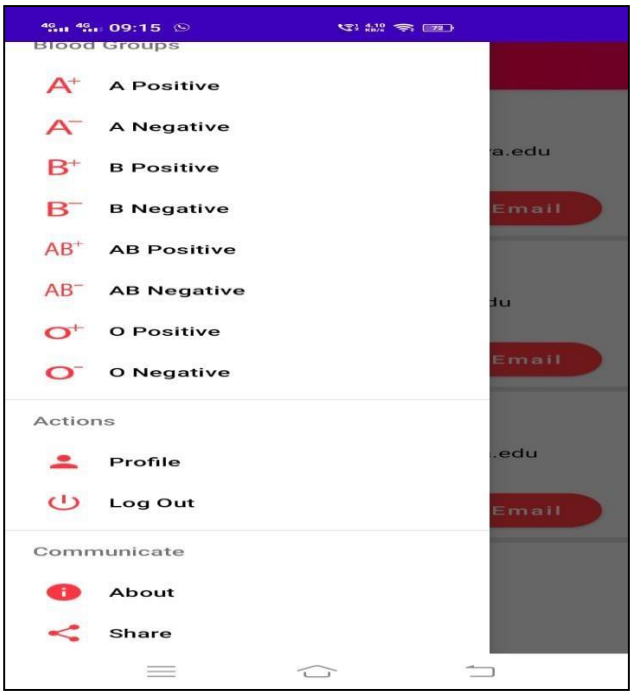


Fig 4.2.14(1) List of Blood Groups

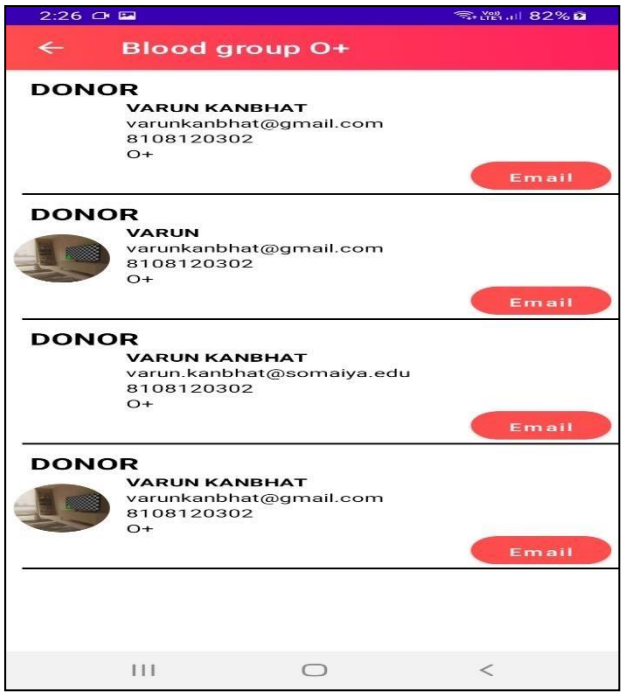


Fig 4.2.14(2) List of Donors of a Blood Group

Firebase:

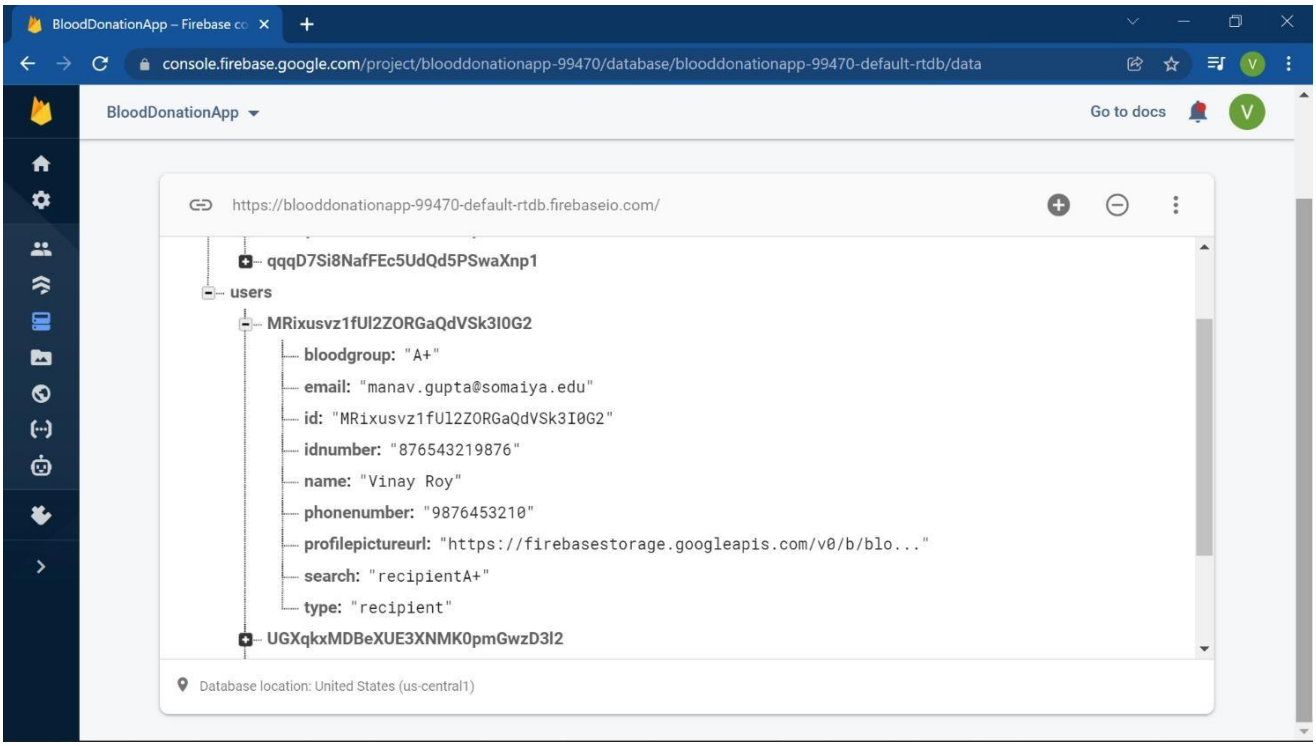


Fig 4.2.15(1) Database of a single user

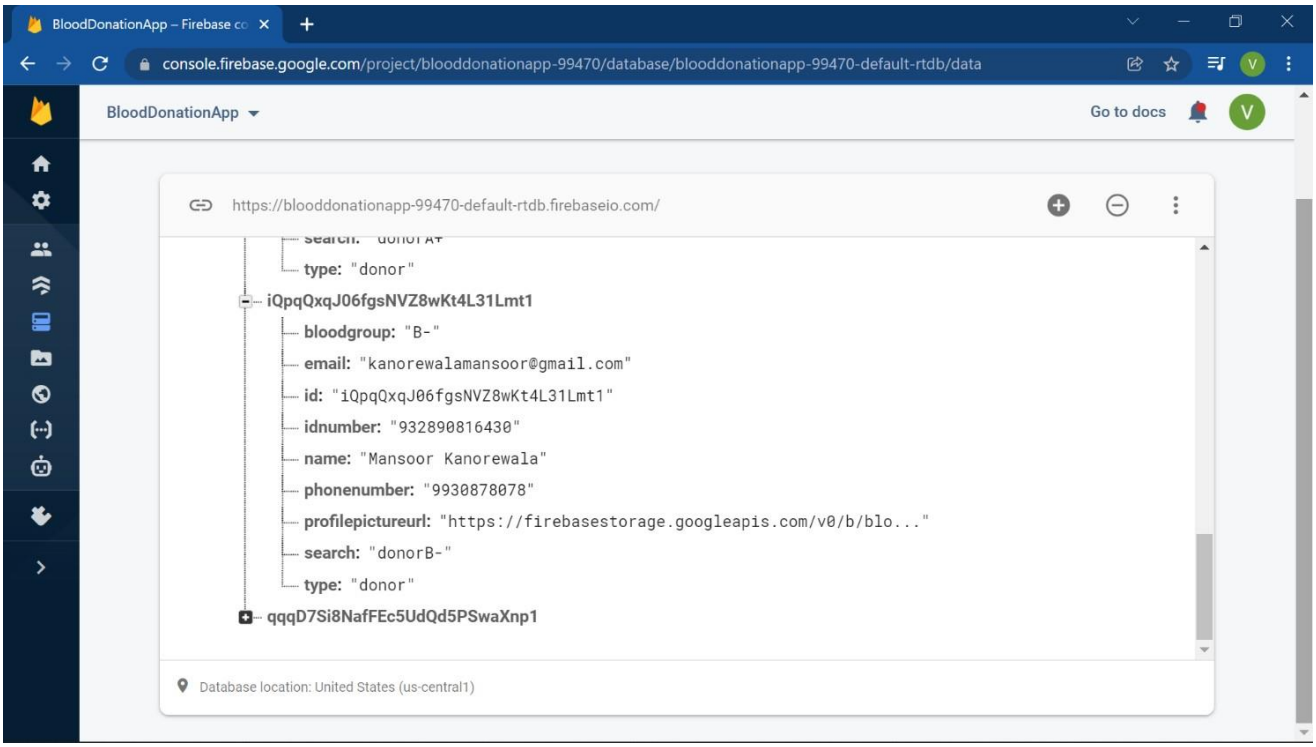


Fig 4.2.15(2) Database of a single user

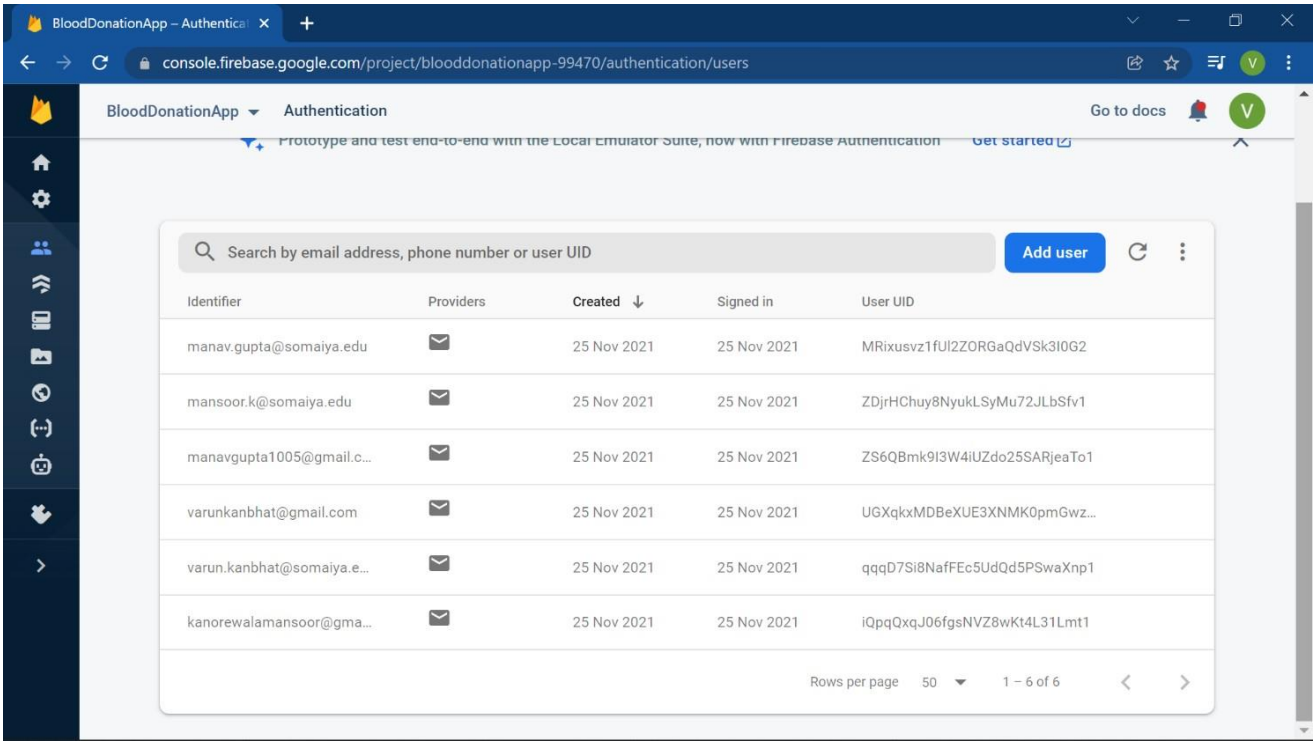


Fig 4.2.16 Database (Details of all Users)

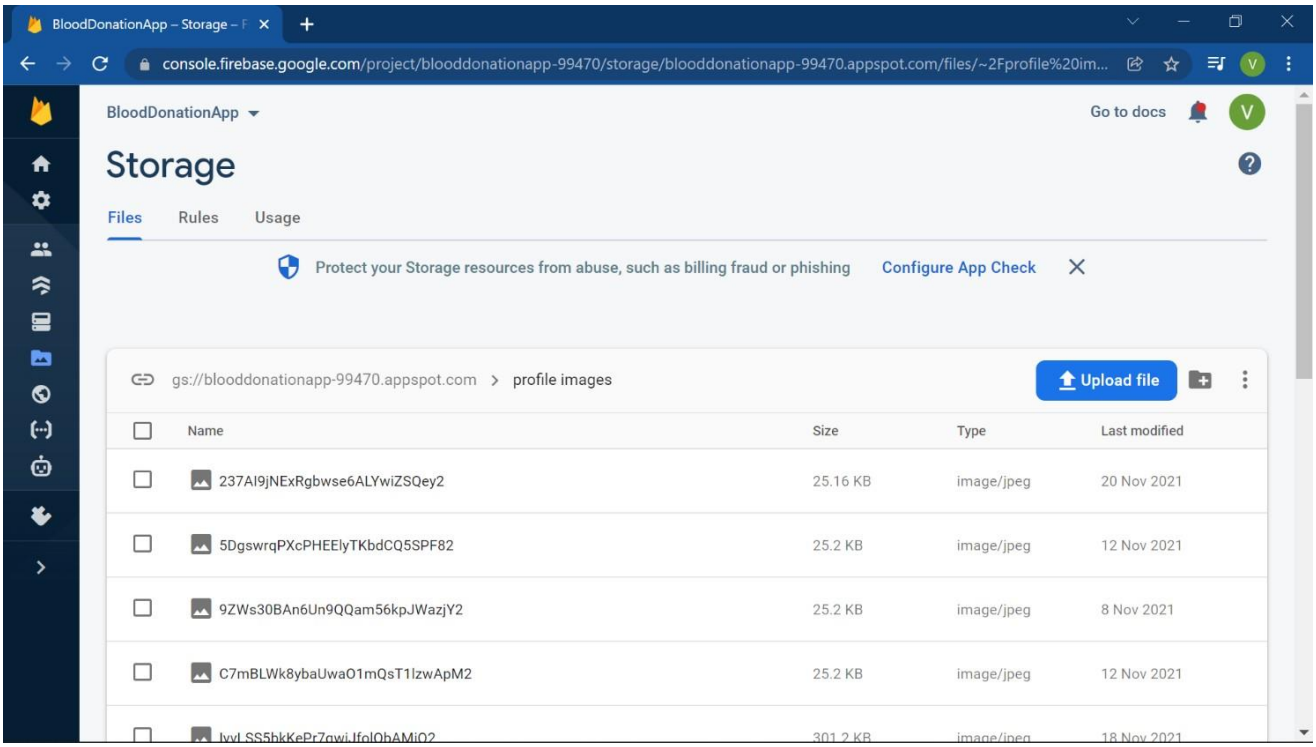


Fig 4.2.17 Database of profile images of users

Chapter 5: Conclusion

The application is designed to maximize the blood donation potential of millions of healthy smartphone owners which is currently underwhelming given that the degree of voluntarism is low, with different blood collecting organizations resorting to schools among other institutions of learning in order to organize the blood donation drives. By maximizing the blood donation potential of the healthy smartphone users, there will be a lot more blood units in stock for when patients require it. This application will bring the time spent in manually filling of forms at blood banks, for when the patients in need of urgent blood, to zero by bridging the gap between the donors and seekers acting as a free-of-cost intermediate between them. All the user is required to do is sign-up to the application as a potential donor or as a recipient with valid credentials such as Email ID, contact number, and Aadhar ID. In the modern world, where everyone has a smartphone to use, an android-based application can surely increase the number of potential donors willing to come forward in times of emergency. Also, the patient's family needn't waste their precious time in calling up everyone they know and rather take the help of such an application.

Future Scope:

In future, more upgrades or additional changes can be done to this application to make it more suitable and useful for the target users. Some scopes are:

- User interface (UI) can be improved in future to accommodate global audience by supporting different languages across countries.
- Data scraping can be done from different social networks and can be shown in a Notifications Feeds. Incorporation of Application programming Interfaces of popular social sites into the application.
- Appointments can be synchronized with Google and Outlook calendars for the ease of users.
- Hosting the database on an online server and putting the application prototype on the Google play store in order to operationalize it for use by whomever may need it. Monitoring of the application downloads and use in order to perform analysis and gauge the effectiveness of a mobile application in increasing the number of donations along with response to calls made by donations drives through the application for people to go and donate blood.
- Pursuit of partnerships with companies and organizations that are chiefly known for organizing blood donation drives.
- Providing the application with GPS-based location tracking to narrow down the nearest donors.

All these steps can help in making this android-based application more effective and ready for a use nationally or world-wide. With proper and more advanced implementations in this application, one can make it more user-friendly, with lots of features to help those in need.

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