

E-BLOOD APP CONNECTING BLOOD DONOR WITH RECEIVER THROUGH MOBILE APPLICATION

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ABSTRACT

The best way to find blood in Pakistan is either through hospitals or by contacting other peoples. Neither of the ways are easy or quick as each of them can take time finding the correct blood type. It could take you hours in just searching multiple hospitals to find the correct blood type and amount which could be grave for a patient in need for quick blood infusion. Our project is based on an app connecting blood donors and the ones in need for blood. The app will allow user to find donors in close proximity and allow them to communicate with each other for the donation. Both of the users must allow live tracking using GPS so they can know who are close to them. The blood receiver will select the blood type, then the app will show live locations of donors close to the person. Then the blood receiver can talk to the donor through the in-app chat or direct contact number as feasible for the person. The app infrastructure will be based on flutter as it is platform independent.

Keywords: flutter, firebase, authentication, transfusion, development, integration

INTRODUCTION

With the fast growth of social networking sites throughout the world, there has also been a continuous increase in blood donation requests, as seen by the number of posts on sites like Facebook and Twitter asking for blood. Finding blood donors is a difficult problem in every nation. Blood is 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. In comparison to other nations, the number of blood donors in Pakistan is quite low. To facilitate communication between blood donors and medical facilities, there are several automatic blood endowment cores. There's no internet blood donation service that enables face-to-face communication between both donors and recipients. Here, we provide an innovative and effective solution to get around this outline. Through the use of GPS, the application finds nearby Donors who are immediately available for search. The software we provide significantly shortens the time needed to find a blood donor in a certain area who belongs to the desired blood group. As an outcome, the program we create delivers the necessary information (results) more quickly and aids in making decisions. The key impartial of our endeavor is to bring together all blood donors and recipients while authenticating and keeping their data and information regarding each person's blood and health.

LITERATURE REVIEW

Communication between blood distribution centers and donors is crucial since blood donation saves people's lives. Innovative applications are now considered as an important communication tool, and if they are adapted to the preferences and needs of the users, they may be most successful in promoting blood donation. Numerous researchers have carried out studies in response to this demand in order to assess the importance of using apps as a platform. A particular piece of literature outlines the specifications for a blood donation smartphone app for the city of Saudi Arabia (Riyadh) blood donation facilities and donors (Batis & Albarak 2021). A cloud-based medical monitoring system and a web-based blood donation system are also being developed by researchers (Nabil, Ihab, ElMasry, Said, and Youssef 2001). These systems will enable donors of blood as well as patients to donate or call for blood donation from blood centers. More researches are being conducted signifying the importance of having a medium to close the gap between donors and acceptor. Besides this, research was conducted implying that the efficiency of the medical systems of every nation viability, and capacity to reach

the objective of broad accessibility are significantly impacted by the availability of blood (Guglielmetti Mugion, Pasca, and Pietro 2021). As researchers begin their preliminary investigation into the benefits of using digital platforms for blood donation. Making use of the Theory of Planned Behaviour (TPB) framework (Torrent-Sellens, Salazar-Conch, Ficapal-Cusí & Saigí-Rubió, 2021). Another research was being done on application with a system intended to provide the entirety of the details available and used for the blood group or set that is always request on continuing basis. This system is characterized by ease of use and contact with other donors and the needy for different blood groups. To facilitate that there is an outbreak of the greatest number of blood donors in the nation, the application can be downloaded on smart devices (Alkandari, Alkandari & Alshammari 2016). Implementing this design scientific investigation approach was the focus of a subsequent investigation, which deduced design guidelines for successful smartphone applications and provided a theoretical framework in the form of mock-ups. They carried out two creative cycles, including regular, lapsed, first-time, and non-donors evaluated the design principles and the conceptual model (Opperman, & Müller 2022). Another (B-Door) study was also done on donating blood through mobile applications. It was developed in Flutter using Firebase as a database. The application had a list view of donors that an acceptor can look into and ask for blood from donors also have their location on the map which the donor has pinned during its sign-up.

E-BLOOD APPLICATION

This segment outlines the shortcomings of the current arrangement, the significant aspects of the proposed system, and the software features that make up the essential elements of the E-Blood application.

EXISTING SYSTEM

Blood donors are not rigorously checked before being given to patients. If the donor has a medical condition and gives blood to the recipient, there is a risk. It is usually advisable to verify the medical data of the donor.

- Blood donors should not have anemia
- Blood donors who have blood-borne infections should refrain from applying
- Donors who are not weighed according to height ought not to provide blood depending on height.
- Women do not give blood after a few pregnancies or when pregnant.
- The aforementioned medical records are not used in the current model. The result might be a disability. When assessing whether the blood matches the physiological conditions of the donor and patient, the two parameters below the geographical position of the donor and the distance that separates the donor and recipient are ignored into account.

PROPOSED SYSTEM

METHODOLOGY

This blood donor identity mobile app was created in compliance with Pakistan's National Blood Policy and the World Health Organization's (WHO) blood transfusion standards for usage by blood banks, blood donors, and users (around the age of 18) in Pakistan. Smartphones must be utilized since it is simple to track down blood donors in the modern-day age of social media. Together with several blood banks and private blood donors, an E-Blood app is utilized to track down blood donors

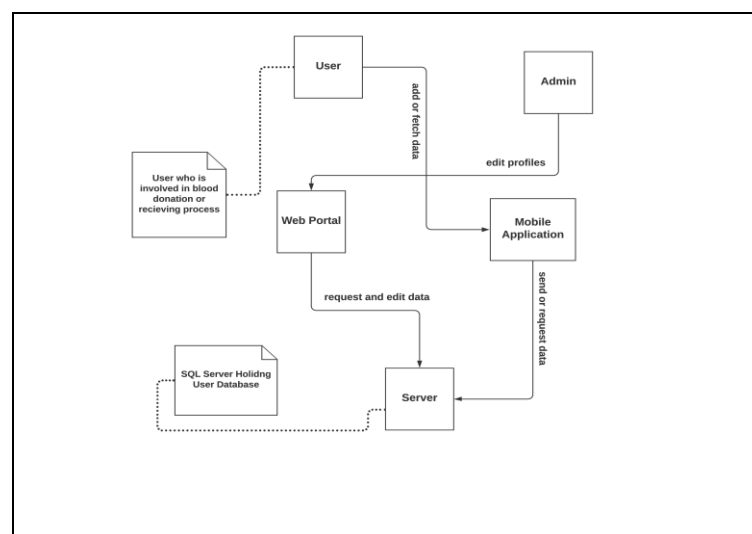


Figure 1. Architectural design

This smartphone software, which is centralized for blood endowment, permits Non-Governmental Organizations and hospitals to detect local blood contributors. The E-Blood application will store all of the blood donor's personal data. With this application, users can register as blood donors, blood banks, and non-governmental

organizations (NGOs). Authorized users can create requests on the availability of blood donors nearby using this application. There are already several smartphone applications available in the Play Store, but the majority of them do not guarantee the privacy and safety of the donor or the recipient. People are hesitant to disclose personal information online due to the possibility of misuse. Anyone may register to become a donor in a few simple steps. By inserting a reputable institution in the middle, the E-Blood app worked to find solutions to these issues. If the system is centrally positioned, all blood transfusions will be secure in it.

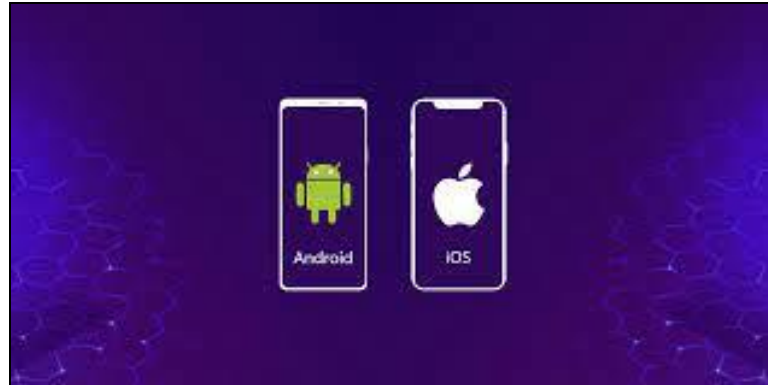


Figure 2. Mobile Application on Android and iOS

PRODUCT FUNCTIONALITY

FRESH USERS OR FIRST TIME USERS

- The first time a user uses this application, one can register by entering their email and other required details. They can also sign up using their Gmail account, and information from that account will immediately fill out the form for them.
- The sign-up module is used to gather data from users (around the age of 18) like name, blood type, phone number, and government ID of the person, address associated with their government ID, gender, and date of birth.
- After submitting their information, the user information will be verified from Admin web portal before they can login.
- An authorized user is able to donate blood and make a blood request. They can also use the map's radius filter.

BLOOD BANKS

- The government-approved hospital or blood bank may register (sign up) and set up an account on this app.
- They can list available blood types in their profile and can also reach to donors for blood donation.
- During an emergency, use the app to text the donor.

DONORS

- Someone who desires to donate blood is called a donor.
- Donor history is maintained in application.
- Donor account will be suspended for 2 months when they will donate blood.

SYSTEM DESIGN

VISUAL STUDIO CODE

Android runs an operating system based on Linux. Android is free to use for everyone and is software that is open-source. It is primarily utilized for interactive displays on portable electronics like smartphones and tablets. The design of Android provides support for every feature of the Java language. Microsoft created and distributed Visual Studio Code (VSCode), a platform-independent code editor, under a proprietary license. It only contains slight changes to code, base Code - OSS, which is otherwise free and open-source. In this study, the progress of VSCode and Code OSS is presented, and several elements of FOSS development are examined.

FLUTTER

Google developed and released Flutter, an open-source mobile UI Framework, in May 2017. In other words, one base piece of code can be used to construct a native mobile app. As a result, users may create two distinct applications using the same code base and programming language (for iOS and Android). Another programming language used with Flutter is Dart.. The language was developed by Google in October 2011, however it has significantly advanced since then.

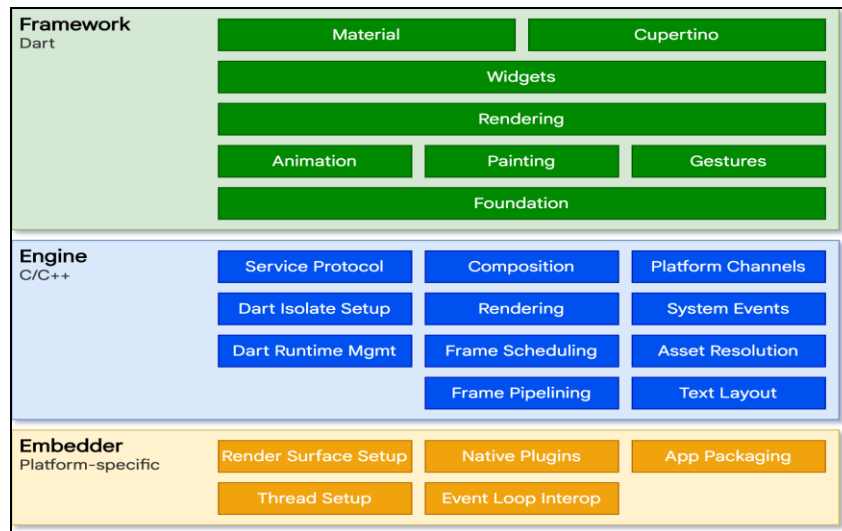


Figure 3. Flutter Construction

DART

A general-purpose programming language for open-source software is Dart. It was initially created by Google and then approved as a standard by ECMA. Dart is a programming language for both servers and browsers. The Dart SDK includes the virtual machine and compiler for Dart., which is offered by Google. The SDK also offers a -Dart2js tool that converts Dart scripts into their JavaScript equivalents.



Figure 4. Dart

FIREBASE

For both online and mobile apps, it serves as Google's one-stop shop. It began as a stand-alone business in 2011. Later, in 2014, Google bought the platform, and it now serves as the entity's primary software development platform. It serves as the web, iOS, and Android back-end application. It provides internal databases, a number of APIs, hosting services, real-time database and several means of authentication.



Figure 5. Dart

ORERATING

The E-Blood app is built via Visual Studio Code and includes features like:

- Signing up/Registration for the Blood Bank and Users
- Location identification using Google Map
- Blood Invocations
- Blood Endowment
- Secured Operator Account
- Instant Account Creation
- Contributor Integrity
- User Approval from Web Portal

Figure 6 depicts the order of operations diagram for the blood door application, and Table # 1 provides its fundamental

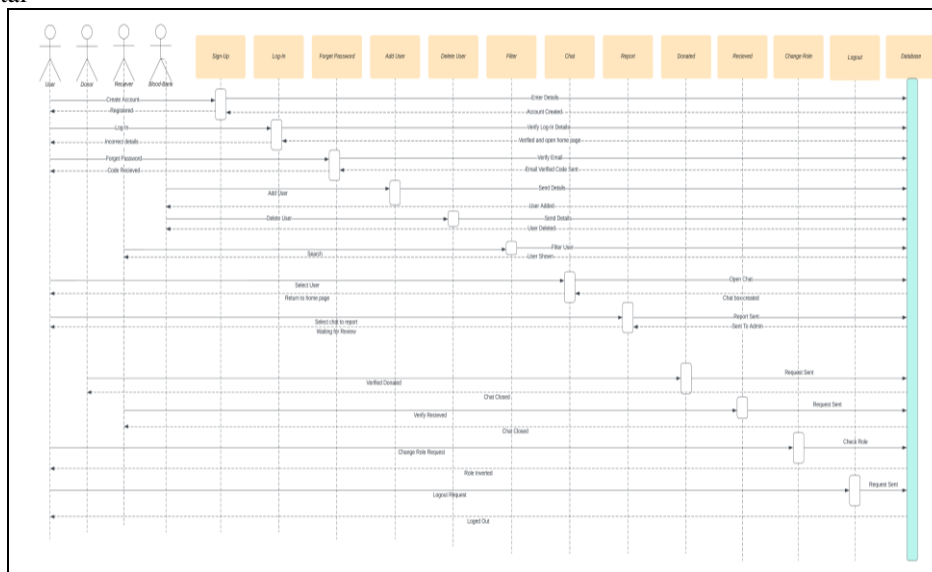


Figure 6. Sequence Diagram

TABLE 1- E-Blood App's PRINCIPLES OF OPERATION

Step 1	If a user wishes to utilize the E-Blood application, they must first register.
Step 2	Admin must provide permission via the web portal before donors may register.
Step 3	The user may manage his or her account as conveniently as possible after registering.
Step 4	The app administrator will provide an ID to each recognized blood bank.
Step 5	Through their login ID, these authorized blood banks can conduct a donor search.
Step 6	According to the donor's wishes, they can inform and communicate the donor.

SERVICES FOR FIREBASE VERIFICATION

This provision seeks to make it easier for users to sign up and log in. In addition to mobile phone numbers, Firebase Authentication supports Google, Twitter, Facebook, and GitHub. The system that will be developed leverages mobile number authentication. The decision to utilize a cell phone number was made so that the user may be called right away if another user is willing to give blood. This information is also used when the user requests blood.

REAL-TIME DATABASE

It is a structured query language-free cloud-based database that users from all over the world may use to sync and manage their data.. As a result, if information is changed in the database, the user side is frequently updated as well. All application-related data, such as user data, blood demand data, bloodstock data, and blood donor scheduling data are kept in this database.

CLOUD MESSAGING

Users receive updates using this service. The user's smartphone will receive notifications for fresh blood requests and new PMI mobile donor plans, among other things. Geofencing can initially be used to screen current blood needs based on range.

Table 2 compares the BDoor Application and the E-Blood Application.

TABLE 2 ANALYSIS OF E-BLOOD VS. BDOOR

Parameter	BDoor App	E-Blood App
Native App	Yes	No
Admin Portal Authorization	No	Yes
In app chat	No	Yes
Chat Report	No	Yes
Donor mode disable	No	Yes
Real-time Location	No	Yes
Blood Type Filter	No	Yes
Radius Adjustment	No	Yes
Gmail Login	No	Yes

TABLE 3- M-HEALTH [8] AND E-BLOOD COMPARISON

Parameter	M-Health App	E-Blood App
Admin Portal Authorization	No	Yes
In app chat	No	Yes
Satisfaction with Blood Donation Norms (During Account Creation)	Partially Yes	Yes
Real-time Location	No	Yes
Blood Type Filter	No	Yes
Verified Donor	No	Yes
Gmail Login	No	Yes

RESULT & DISCUSSION

AUTHENTICATION MODULE

- Sign Up
To be able to utilize the blood donor application, a new user can register an account and generate a password for account verification and establish their identification. They can sign up through their Gmail id.
- Sign In
User to edit of location information as well as any other personal data, sign in to the account.
- Forgot Password
Users have the opportunity to reset their password if they lose it. They can update the password by clicking the link they get through email.
- Change Password
Users, hospitals, and blood banks have the opportunity to change their passwords in the settings.
- Account Verification
We must use mail verification to confirm the user's account if they change their password or if they forget it.

VERIFICATION MODULE

- Sign In
Admin has credentials to sign in to the web portal
- Password Forgotten
Admin will get password resetting link on their email
- Sub-admin
Admin can add other Sub-admins, they can do all the same work as admin except adding new sub-admins.
- Pending Users

- Admin can check information of users and authorize them as legit after verifying their information
- Approved Users
Here are the approved users shown for admin to see
- Reported
Here admin can see the users who were reported and ban them based on the evidence provided
- Blocked Users
Here admin can see the users who were blocked due to their behavior.

SCREEN DESIGNS

The app's Welcome page is a tribute to Shaheed Prof. Ajmal Sawand. Figure 8 has Sign In and Sign Up options.

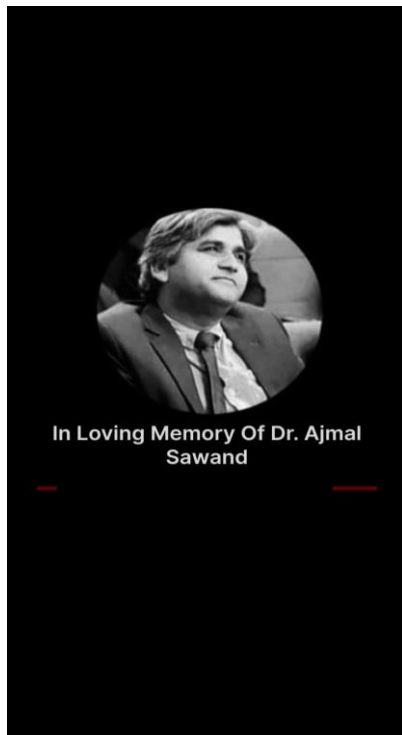


Figure 7 Welcome Page

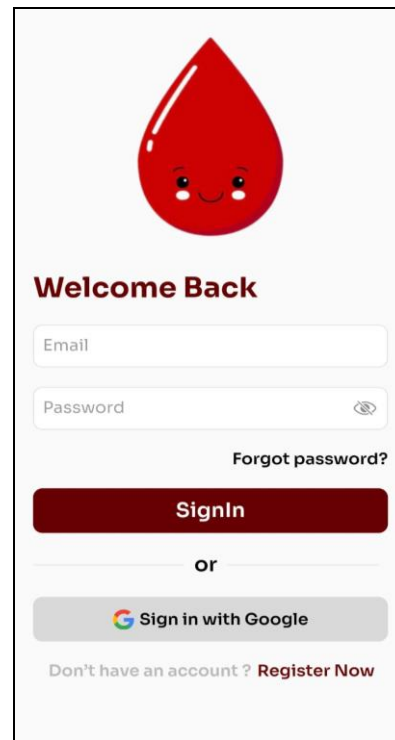


Figure 8

Users can register their account by providing their Name (As per their ID), Address (As per their ID), Government ID, Phone Number, Blood Type, Gender, Birthday, Email, and Password. Blood Banks can register their accounts by providing their Name, Phone Number, Registration Number, Address, Email, and Password.

A blood bag in time saves a life

Name as per nic

phone number

NIC

Address as per NIC

Select you Blood

Select you Gender

Birthday

Email

Password

Sign Up

Arleady have an account ? Login

Sign Up as Blood Bank

Figure 9

Lets Register Account

A blood bag in time save a life

Name

phone number

Registration No

Address

Email

Password

Sign Up

Arleady have an account ? Login

Sign Up as User

Figure 10

Figure 11 shows Home allows user to go back to main page on map screen where user can see all the active donors. Chat box will show users all the old chats they have had. Change to donor will allow user to change from receiver to donor. Setting allows user to see their profile information and also change their current password. About us gives the information about the developers of the application. Logout signs you off. Figure 12 shows filter option on map has two choices where user can sort donor based on the blood type needed and adjust the radius of area in which the search should happen.

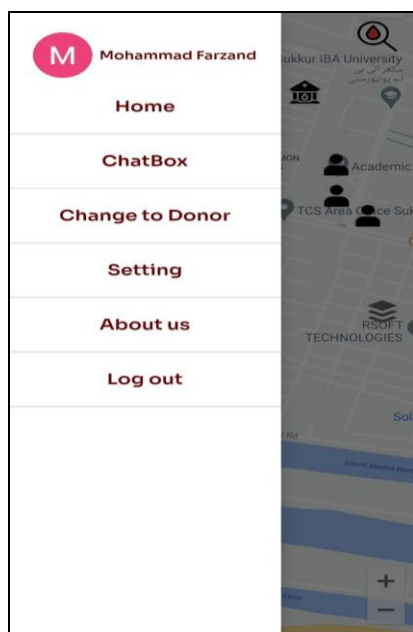


Figure 11

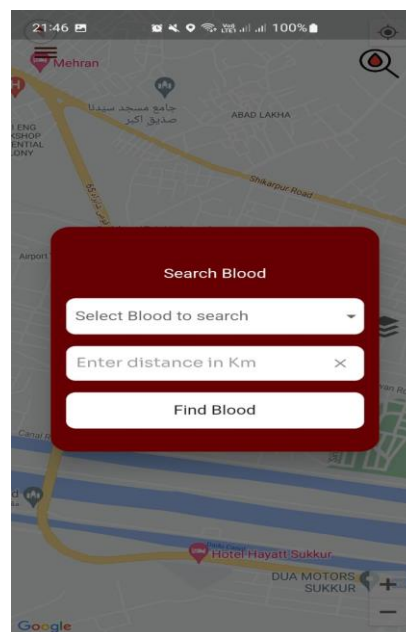


Figure 22

The figure13 shows the Name, Email and Blood Group of the donor on the map. The figure14 shows the Name, Email and Available Blood Types in blood bank on the map.

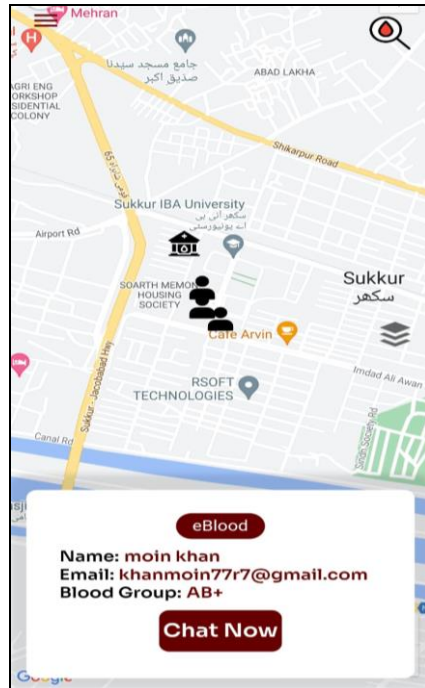


Figure 13

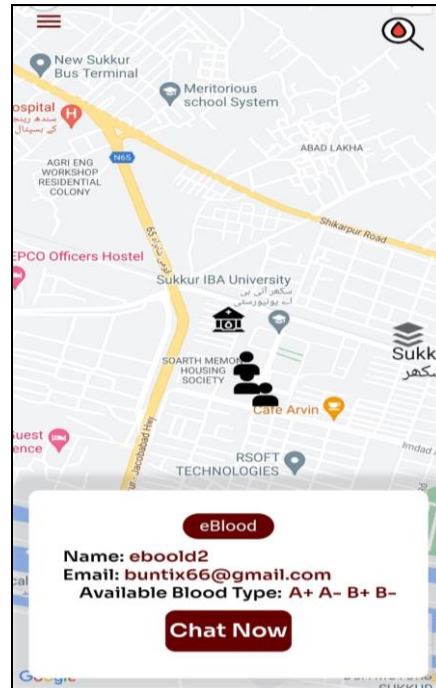


Figure 14

Figure 15 shows all the old chats of the user. Figure 16 shows user can also report each chat by choosing the predefined options and also providing the evidence of it.

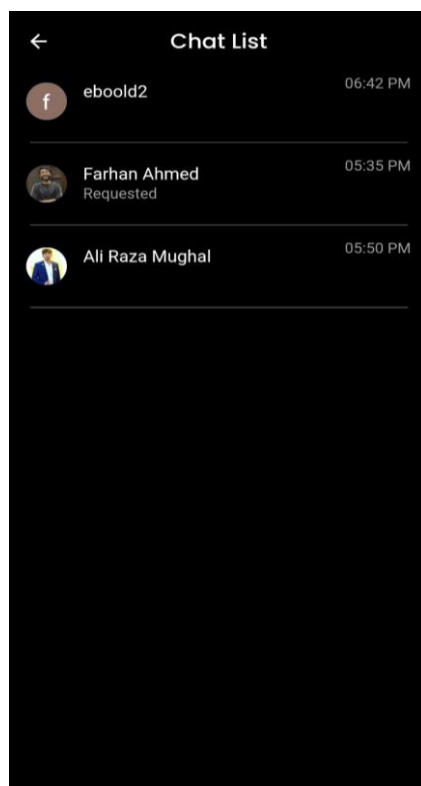


Figure 15

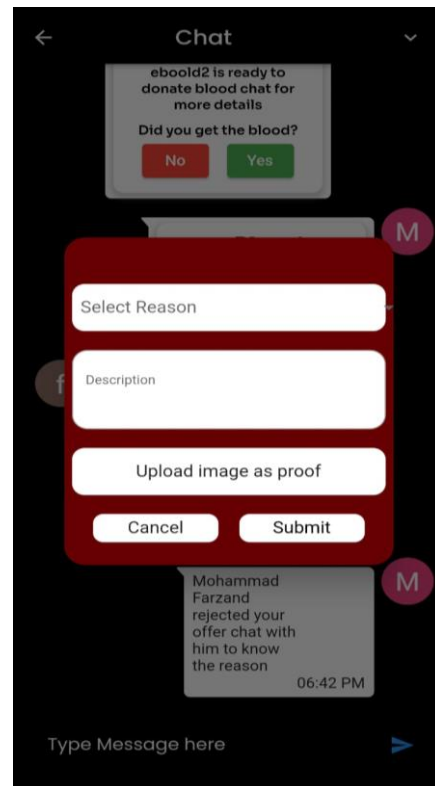


Figure 16

Figure 17 is the login page where admin will use credentials to log in web portal. Figure18 shows pending user who are awaiting to be authorized. Approved shows all the authorized users. Reported shows all the reported

users with the evidence provided. Blocked shows all the users blocked due to their behavior. Sub-admins show all the sub admins added by the admin.

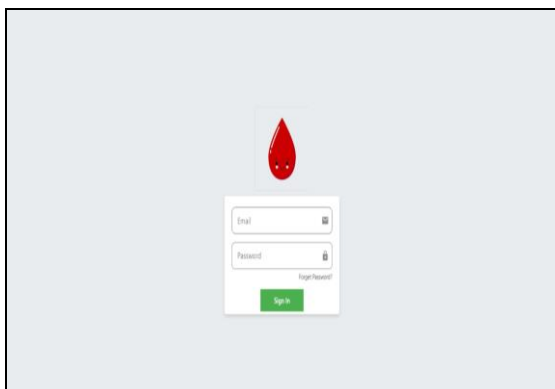


Figure 17

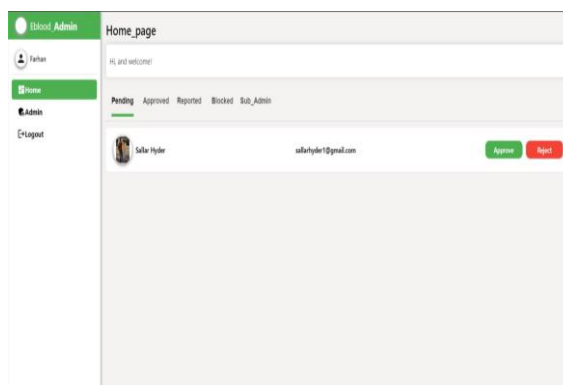


Figure 18

CONCLUSION

Blood endowment is a form of civic duty in which an individual can voluntarily give blood using our app. This is a crucial development in our study since it enables a donor and authorized service operator to maintain their account. This approach ensures the safety of both the receiver and the donor. The approved user will search for a number of blood donors in their native area or other particular regions, and will then contact them via phone, message, and in-app chat requests. We have used a small number of people to test our application. Applications that provide a superior alternative remove the obstacle to blood donation immediately. In order to make sure that the donor gives blood to the community, this application was designed. The ease of usage of this model enables anyone to download it while maintaining their account.

The E-Blood app will disorder the blood supply system and assist the underprivileged in finding a free donor. This program aims to assist the original blood banks improve their services and transitioning to modern, user-friendly frameworks.

FUTURE SCOPE

In the future, our algorithm will be more accommodating with new features such as:

- Social Media integration will be there for more precise bio data.
- Government affiliation required for user approval.
- Deep learning algorithms and artificial intelligence can be implemented in E-Blood so that it can behave on its own without human intervention.
- Notification of the closest blood donation camp to donors through AI implementation.
- Incentive for donors so that they have the motivation to donate blood.
- In-app Advertisement to generate revenue.
- The application could provide information on NGOs and NCC Units Accessible

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