

Blood Comfort - A Universal Blood Sharing Android Application

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ABSTRACT: The surge of mobile applications to solve problems for us is not new to us in today's world. One of the major problems in the field of medicine today is to find a convenient way to look for blood donors in case of an emergency. Blood Comfort is an android application developed in order to solve this major problem. It helps you look for blood donors of the specific blood type in your city and also connects you with them instantly in need. Blood Comfort also allows you to volunteer for blood donation in your city. In order to make sure the application is widely used even in remote areas the user interface has been kept extremely simple and also allows you to register in a single click using a Facebook account. The application has a vision towards making the most important fluid running in our body available to everyone in the world. Blood Comfort runs on the latest Android OS and has an extremely small size of 2.5Mb.

KEYWORDS: Operating System (OS), Blood Comfort, Android OS, Blood Donation, Mobile Application

I. INTRODUCTION

Mobile technology has been helping us to tackle almost every problem that humans face today. Evidently since the start of mobile applications their usage has been tremendous. So much so that more than 80% of human activities on smart phones has been on applications. Mobile applications have been an integral part of our life in several ways starting from helping us to connect to people, making money transactions to keeping us healthy by exercising. The expanding use of the android based smart phones makes the reach of a problem solving application easy even to people who cannot afford huge medical bills.

Due to such boundless usage, mobile application technology definitely provides us with a platform to solve a major problem faced by everyone in the world and that is the need of blood. It may be required by a person suffering from anemia, or an accident it may also be required by a pregnant mother in case of emergency. In such situations it is not always feasible to reach out to blood banks as they need to maintain a stable supply, in some over populated countries like India the patient has to register in a waiting list for specific blood type even in cases of emergency. Surprisingly no such mobile applications have been developed on such a platform in order to solve such a major problem on a global scale. Existing applications on Android provide such features locally within a country or a specific city. These applications allow you to post an advertisement for the need of blood however, the need of blood is during an emergency and a patient cannot wait until a donor responds to the request.

The main goal of blood comfort is to ensure that the vital fluid required by everyone is available to all without any boundaries.

The input to the application is the profile information to validate the user and the system outputs the specific results depending on the request made by the user, whether they want to donate blood or they need blood. If the user wants to donate blood he can simply then enter his blood type and his location and will be notified by a person who is in need. If the person needs blood then after entering the specific blood type request and location he/she can see a list of donors in that city. The user can then select a specific donor in the list and can notify the donor with an email by sending his own

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contact information easily. After sending the email the requesting user can then see the Email Id and contact number of the donor as well.

II. LITERATURE REVIEW

Several android applications have been developed to provide an efficient solution for blood donation.

Blood Donor by American Red Cross [1] Blood Donor is an initiative taken by American Red Cross to help user's register for blood donation drives and camps which are conducted in their nearby area. The application creates a great medium to create a user's profile and reward the donor with points in order to encourage blood donation among people. The application strives towards promoting blood donation however does not solve the problem of a user in case of an emergency.

Indian Blood Donors [2] is another user-friendly blood donation application build to exchange information between blood donors and receivers. One can have direct access to the donor or receiver by making a phone call. The feature in this app allows you to directly contact the respective donor. This can be efficiently used within Indian boundaries. But blood emergency can take place any part of the world, and to give equality beyond boundaries is necessary. Keeping an app universal can bring great aid.

Friends2support [3] is a unique application made by JJ F2S team. The mobile app is developed based on a website Friends2Support.org which brings voluntary donors and those who need blood at the same platform. It allows its services to be used in India, Sri Lanka, Bangladesh, Nepal and Yemen. This app adds great value by providing facts that are required before or after donation.

Blood For Sure [4], a blood donation application that detects the user location and nearby donors. The features provided by this application include first aid tips, finding the nearest ambulance and blood bank service around the user. The application provides an upper hand in the facilities provided to the user because of this reason many resources are available at the same time making the interface slow and less user friendly. An Android Application for Volunteer Blood Donor [5] proposes an effective method to validate a every donor through a web portal system after which the donor has to pass the health checks conducted by blood recruitment center's staff only after which he/she is given the user Id and password to the proposed application. This technique minimizes user intervention however makes the entire process tedious and lengthy.

The Optimization of Blood Donor Information and Management System by Technopedia [6] proposes another effective approach, which provides an example for management of information and relevant data of blood donors. However, this service is still limited within the country.

Blood Comfort [7] application is available on Google playstore. It allows easy connectivity and exchange of personal information between donors and receivers. This keeps no boundaries for the good cause allowing worldwide users to acknowledge help. Keeping the app simple and to the point makes it user friendly.

III. DESIGN OF THE APPLICATION

1. Module Design

Blood Comfort contains two major modules, which allow the end user can use the application accordingly. The application consists of the following:

- a) *Login/Register*: To enable users to register and login to the application. This module also contains the Facebook Login feature to allow the users to login using a single click without filling up the entire registration form.
- b) *Donate Blood*: To help the user to register in the application as a donor. Later displaying and receiving a Thank you message.
- c) *Need Blood*: Enables the user to make a request for a specific blood type in a particular location. After this the user can then select any donor from the list.
- d) *Email Donor*: This allows the requesting user to send an email regarding his own information alongside a personal message to the donor. After sending the email the requesting user will then be allowed to see the donors contact information as well, thereby providing two-way authentications.

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2. Flow Chart.

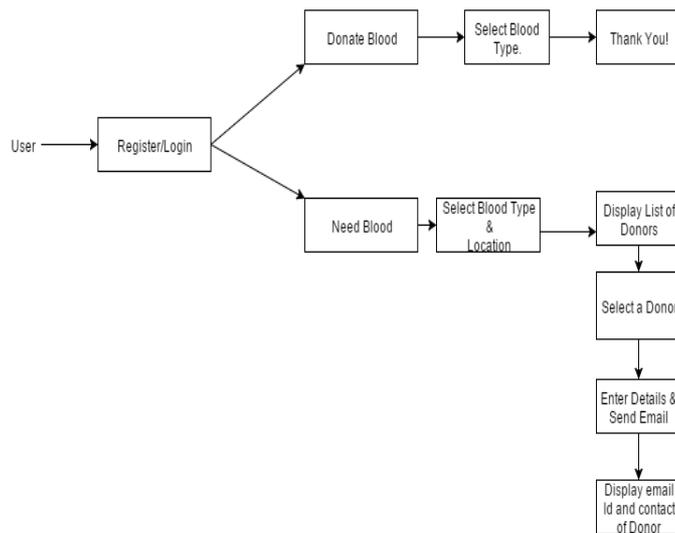


Fig. 1. The working of the application

The flow chart briefs us on the working of the application. Once the user is registered or logged in he/she is directed with great ease to the next section of the app. The app provides features according to the user requirement.

3. Use Case Diagram

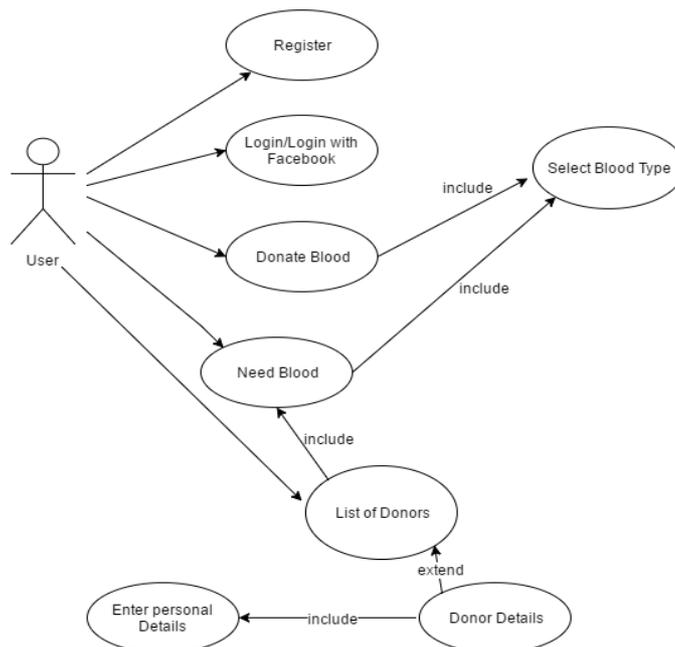


Fig. 2. Use Case diagram

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The Use Case diagram is used to represent all the use cases along with their relationships. The use cases are Register, Login/Login with Facebook, Donate Blood, Need Blood, List of Donors, Select Blood Type, Donor Details, Enter personal Details and the the include and extends relationship is as depicted in the figure above.

IV. IMPLEMENTATION

Blood Comfort Android application is developed using JAVA programming language and the programming interfaces are implemented on XML. Android is an open-source operating system used in smart phones and tablet computers. Blood Comfort is an application where the user's can get the list of donors in a particular city with a given blood type, users can also register to donate blood, if anyone wants that particular blood type he/she can contact the user by providing necessary details. Blood Comfort uses a web server to send and receive data of the user. The database is built using MySQL and is responsible for storing information about the users who want to donate blood or users who need blood. Data stored inside the database is in the form of text. Also the application uses PHP programming language to access the values inside the database. The reason for using PHP is that the data present inside the database, which is residing in the server, is processed into a text file, which can be accessed by the application. Blood Comfort also uses JSON programming language to display the list of donors in the application.

The application also uses a Facebook SDK to access the basic profile information of the user who wants to register with a single click. The application also makes use of Google Cloud Messaging Server to help send push notifications and greetings to users. The application also uses a Java Mail API to establish communication between the requesting user and the donor.

V. WORKING OF THE APPLICATION

The workflow of the application along with its image-based description is given as follows:

Step 1: The logo on the splash is designed using adobe illustrator as shown in Fig.3 (a). The user after opening the application can login or register depending upon whether the user is new or existing. The user can register by filling the form Fig.3 (c) or simply clicking on login with Facebook to register in a single click Fig.3 (b).

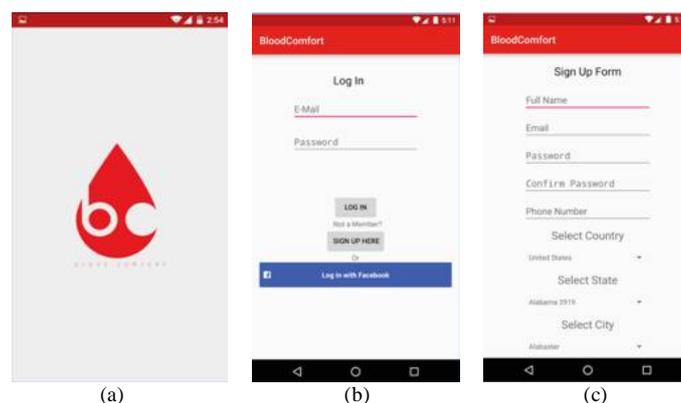


Fig. 3. Initial screens of the application (a) Splash Screen (b) Login Page (c) Register Page

Step 2: After a successful registration process the user can then login and select the desired option to donate blood or need blood Fig.4 (a).

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Also the user can access the menu option. The menu options comprise of a share, about us, how to use button and a logout button as shown in Fig. 4(b).

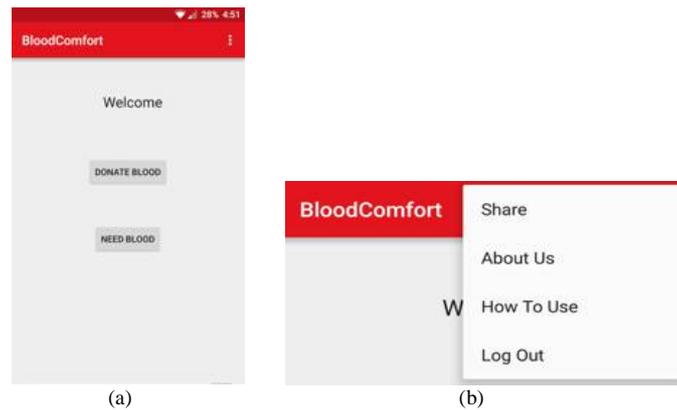


Fig. 4. Core operations in the applications (a) Home Page (b) Help Drawer

Step 3: If the user opts for donating blood, he/she can fill in the required details, which are then stored in the database. The details to be enrolled by the user contain their blood type i.e. A+,A-,B+,B-,O+,O-, AB+, AB-,country, state, city and the personal contact number. Which on submission delivers a confirmation message to the user Fig.5.



Fig. 5. Donate Blood Page

Step 4: If the user is in need of blood and selects the 'need blood' option he/she is directed to the page shown in Fig 6. Here, the user can enter the details according to his/her requirement i.e. desired blood type and the desired city after which the user has to simply press submit.

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Fig. 6. Need Blood Page

Step 5: Once the form is submitted in step 4, a list of donors with the required blood is displayed on the screen. The recipient can select any donor of his/her choice Fig.7. This brings the user to the next step i.e. step 6.



Fig. 7. List of Blood Donors

Step 6: The screen shown in Fig.8 is a contact detail form that will be mailed to the selected donor (in step 5) from the recipient. The recipient will enroll his/her details such as name, email-id, and contact number for contacting the donor through an email. After sending the email, the recipient will then get access to the selected donor's email-id and contact number; thereby providing two-way authentication, i.e. the recipient as well as the requested donor has each other's legitimate contact information.



Fig. 8. Contact Donor Page

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Step 7: If required then the recipient can go back to the list of donors and contact multiple donors at the same time (as in step 5 followed by step 6)

VI. FUTURE SCOPE

1. Blood Comfort has a vision towards solving the problem of blood need internationally and without boundaries. Applications like these can help promote blood donation by giving away rewards like coupons and gift cards to people who register for blood donations in their city.
2. Applications like these can be made more useful by providing more relevant information about health issues and emergency information.
3. A donor's profile can be added and can be rated/rewarded thereby promoting the act of blood donation.

VII. CONCLUSION

Blood Comfort application provides a greater reach to all the people due to its development on Android as major percentage of phone and tablet users are Android users. Blood Comfort has an extremely simple user interface thereby making it easy to use by a novice phone or tablet user in any part of the world. Due to its extremely small size and simple user interface the application has received more than one hundred downloads all over the world

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