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Android Application Development for Convenient Blood Donation

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Abstract: *Blood cannot be manufactured, it's a God gift. People usually use social networking sites for requesting blood. As there is an advancement in technology and the use of cell phones is widespread, so it's better to take advantage of this and build something for social welfare. There are systems developed but have some limitations. They cannot say whether a person is fit for donating blood. The proposed project is an android application for blood donation in which donors will create an account and add several details such as name, contact number, blood group, address, etc., one that needs blood can apply for it through the application. Blood banks and hospitals will also have an account if a blood bank or hospital falls of blood shortages or in case of emergency they can apply for blood. A request is sent to all other available donors who are nearby. The person who accepts the request first will donate it. The donors which are present in the contact list will be highlighted. The person who has donated blood will not be visible in the list for the next 3 months.*
Keywords: *android, application, backend, firebase*

I. Introduction

Blood is an important component of the human body. The deficiency of blood is detrimental to the body and in some cases can lead to death. The scarcity of blood may occur due to accidents, during surgery or in case of genetic disorders such as Thalassemia where the patient needs Blood Transfusion at regular intervals [1]. Finding the blood of required blood group is not easy if hospitals run off shortages. The proposed system enables the user to find blood donors of the requisite blood group who are voluntarily available to donate blood. The user just needs to enter the requirements and the application provides the user with a list of donors available.

Every year our country requires 5 crore units of blood, from which only 2.5 crore unit of blood is available [2]. Even the worse condition is that there are nearly 8 main blood types. This indicates that the right type of blood must be available at the right time and this is hardly possible in highly populated countries like India. So, there is a dire need for the blood and to save life of people, we must encourage maximum number of people to donate blood to improve the situation.

The receiver will open the app and fill the necessary details requested. The 'Find Donor' button will become clickable and then based on the details provided, our app will display the list of available donors of the respective blood group and city. The app will then activate the GPS and will output the list of available donors in the vicinity [3]. The receiver can ask for the list of donors. The receiver can thenselect any one of them. The receiver can contact donor either via the app (donor will be notified from within the app) or by calling (provided the calling feature must be kept active by the donor).

II. Literature Survey

AnnishBrislin, Albert Mayan, AroulCanessane, and Anish Hamlin in their paper "Blood Donation And Life Saver App" proposed the idea of finding a blood donor in the respective city using GPS.Once the app user enters the blood group which he/she needed it will automatically show the donor nearby and send an alert message to the donor. In case if the first donor is not available it will automatically search the next donor, which is present in the queue. If a donor accepts the request an OTP is sent. The name of the donor is taken off the list for the next 3 months [3].

Muhammad Fahim, Halil Ibrahim Cebe, Jawad Rasheed, Farzad Kiani in their paper "mHealth: Blood Donation Application using Android Smartphone" proposed the idea to establish a connection between the requester and donor at anytime and anywhere with an objective to provide the information about the requested blood and number of available donors around those localities. It assists the requester to broadcast the message across the maintained volunteer blood donor network by our application and update the requester at the same time who is willing to donate the requested blood. They created requester-donor profiles to improve timely access to information and rapid response in case of emergencies [4].

Shreyas Anil Chaudhari, Shrutika Subhash Walekar, Khushboo Ashok Ruparel, Vrushali Milind Pandagale in their paper "A Secure Cloud Computing Based Framework for the Blood bank" proposed a cloud-

based blood bank system is to make the blood available on time to the people, even in emergency situations. The project consisted of an Android Application with a GPS module to track the location of nearby hospitals and blood banks. The project has a notification feature which lets the user know about the health check-ups, blood donation campaigns etc [5].

P. Priya, V. Saranya, S. Shabana, Kavitha Subramani in their paper "The Optimization of Blood Donor Information and Management System by Technopedia" have proposed an extended web application to timely update the information regarding the donors, acceptor, and patients where the administrator access the whole information about blood bank management system. Also, it has a Push technology with security, to protect the contact details of the donors in a web application where it can be misused by third parties. It also maintains the amount of each available blood groups, if the stock of a particular blood group is lower than the required amount then the proposed method notifies the donor to donate blood. In addition to a web application, an android mobile application is proposed to search the donors who are available nearby during emergency cases such as accidents [6].

Rehab S. Ali , Tamer F. Hafez , Ali Badawey Ali , Nadia Abd-Alsabour in their paper "Blood bag: A web application to manage all blood donation and transfusion processes" proposed a web application to that is connected to a centralized database to gather and organize the data from all blood banks and blood donation campaigns. The proposed application organizes and controls the whole critical processes related to blood donation, testing, and storage of bloodbags, and delivering it to the patient [7].

LamyaeSardi, Ali Idri, and José Luis Fernández-Alemán in their paper "Gamified Mobile Blood Donation Applications" have analysed the functionalities and explores gamification elements of the existing blood donation apps in the mobile market. They made a search in Google Play, Apple Apps store, Blackberry App World, and WindowsMobile App to select 10 gamified Blood Donation Apps. The results showed that most of theblood donation apps selected did not support multiple languages and that thepredominant authentication methods are traditional and social logins. Moreover,all the apps were intended for more than one purposeamong helping users tofind donors and blood centres,track their records and check their eligibility todonate. Most apps installed included notificationfeatures and built-in geolocationservices to instantlyinform the users of donation need in nearby locations.Badges and redeemable points were the mostrecurrent gamification elements inthe blood donationapps selected [8].

Madhav Erraguntla, Peter Tomasulo, Kevin Land, Hany Kamel, Marjorie Bravo, Barbee in their paper "Data Mining to Improve Safety of Blood Donation Process" proposed a system in which data mining is used to analyse factors influencingthe donor reactions, and the insights are shared withthe community to help blood centre and hospitalmanagers and quality improvement administrators
undertake interventions to improve donor safety.The paper presents the history of the donorhemovigilance development and two data miningefforts performed on the data collected to improvethe safety of blood donation processes [9].

Feyza Güliz Sahinyazan, Bahar Y. Kara, Mehmet Rüstü Taner in their paper "Selective vehicle routing for a mobile blood donation system" proposed a systemconsisting of the blood mobiles and a new vehicle called the shuttle that visits the blood mobiles in the field on each day and transfers the collected blood to the depot. Consequently, blood mobiles can continue their tours with out having to make daily returns to the depot. They proposed a mathe matical model and a2-stage IP based heuristical gorithm to determine the tours of the blood mobiles and the shuttle,and their lengths of stay at each stop [10].

III. Proposed System

The proposed project is an Android Application to search for the available Blood Donors of the requisite blood group. The user needs to enter the blood request including blood group, number of units required and the location/city where blood is required. A list of donors will be displayed with donors' details of the required blood group in the respective cities. The user can either notify or directly call the donor. Also, the shortage alerts and campaign notifications can be created by the registered hospitals and blood banks which will be notified to all the Donors. The Donor needs to build a Donor ID on the app. Also, thehospitals and blood banks need to have their IDs. Once a Donor donates blood, his/her name will be marked unavailable in the list of Donors as he/she can make the next donation only after at least three months. Thus, no unnecessary pop-ups.

Role of Firebase**:** Developed by Google, Firebase has been the most reliable backend database. It provides us with a lot of features like Real-time Database, Authentication, Cloud Storage, Hosting and Crash Report. It's the best alternative to SQL Lite. Here we get a single platform to store and host our app.

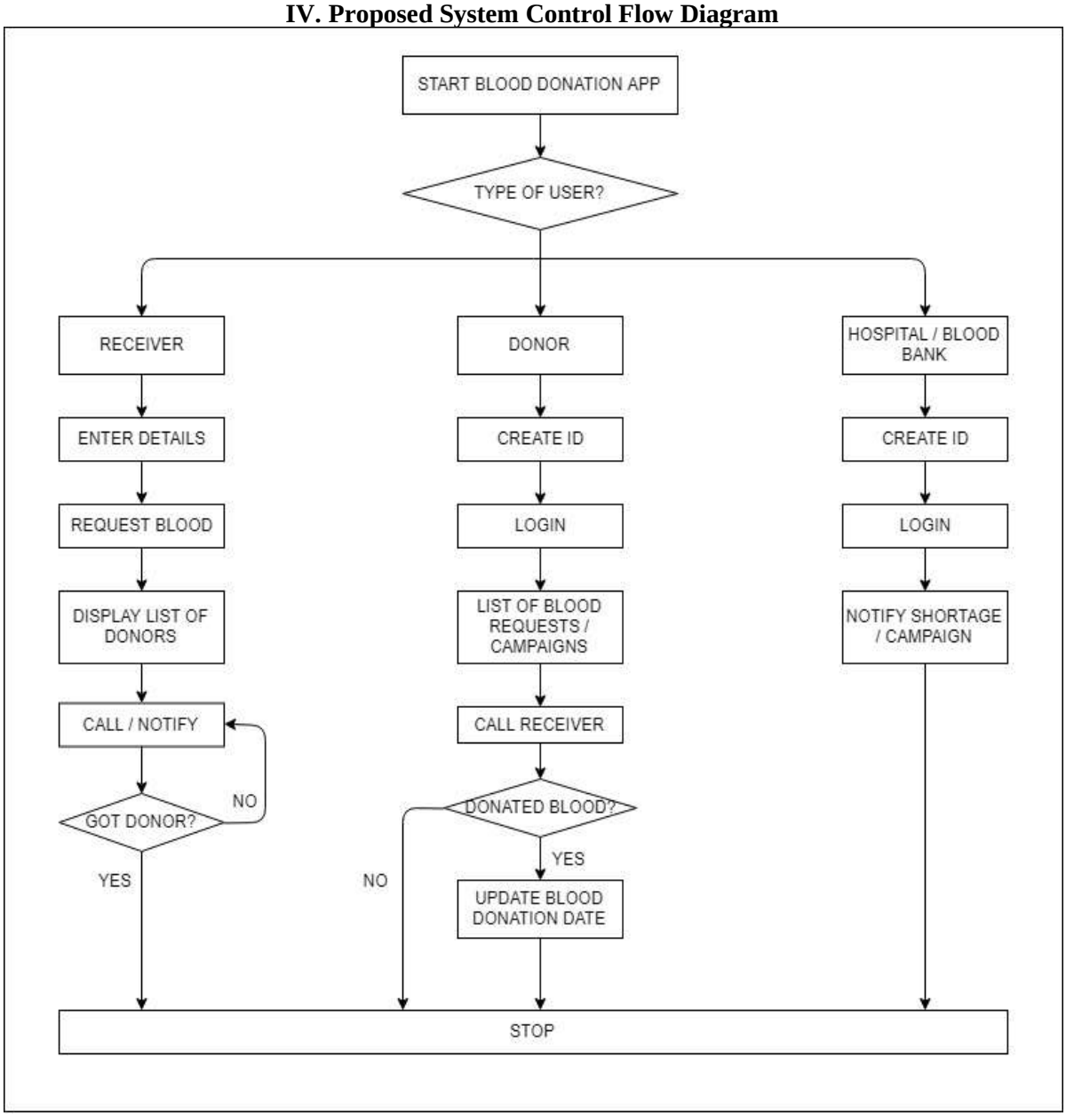
Following are the three main modules of the proposed project:

1. Request Blood Module:
In this module, the user can request blood by filling in the required details like name, blood group, city, number of units, etc. A list of donors will be displayed. The user can contact that is, call or notify donors.

2. Donor Module:
In this module, the donor will first create a Donor ID by filling in the required details like name, email id, contact number, age, blood group, city, etc. After login, the donor will get the blood requests and campaign notifications. The donor can update his/her last donation date so that he/she won't get any unnecessary notifications.

3. Blood Bank/ Hospital Module:
In this module, the Blood Banks/Hospitals can create their IDs on the app by signing up.
They can post notifications about ongoing shortages or upcoming blood donation campaigns which will be notified to all the donors in the cities.

IV. Proposed System Control Flow Diagram



V. Future Scope

The application provides ease of finding a blood donor to the user during an emergency. The application has a friendly user interface and firebase as backend which is a real-time database. The user can easily find a blood donor when needed. Hospitals and blood banks can notify about shortages and campaigns. No need to use social media applications for those. Hence, no unnecessary spam messages.

VI. Conclusion

The project is proposed to help society when they are in need. Providing ease, convenience and making awareness about blood donations in an effective way in this era of digitization. The users will be able to find Blood Donors from the nearby areas in case of unavailability of blood in hospitals. The hospitals and the blood banks can put on notifications about the campaigns and shortages on the app. The donors who are not available to donate blood, that is, they have donated blood within the past three months won't get any unnecessary requests or notifications.

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