Title:	**Prototype Design and Development of Android App for Blood Donation and Tracking Donors**
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Prototype Design and Development of Android App for Blood Donation and Tracking Donors

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Abstract

The population of Pakistan is increasing rapidly and so is the ratio of blood borne conditions, and diseases. To further aggravate the situation, the furthermost alarming threat is the fact that the ratio of blood donors in Pakistan is just less than 10% of the whole population. This is clearly insufficient to meet the high rising medical demands of the blood in emergency situations. In majority cases, the cause of patient demise in Pakistan is merely due to the sole reason that the blood donor cannot communicate with the recipients properly from any platform. The aim of this research project is to create awareness and motivation for people through a "Cost Free" blood donation application to donate the blood on just one click. The *blood bank tab* will provide the perfect path to find a potential person willing for the donation. By using maps, everyone can trace the blood banks according to the required need. Likewise, the recipients and the donors can be accessed from the application to find the nearest blood banks and the hospitals via using search bar. This application specifically targets age group ranging from 20 to 50 years; and encourages youth to participate in blood donation. This app enables individuals as well as larger organizations to create profile so that the community may benefit from donors. All blood banks and the hospitals can join the application for best services. This prototype app will be designed and developed according to the required needs; and will be presented through advertising techniques that includes: branding, poster, standees, billboards and an installation for understanding.

Index Terms: android app, blood donation, blood bank, prototype design, tracking donors, vector-art style.

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I. Introduction

The rapid increase in Industrialization has led 21st century to the digital era where the foremost choice of youth is to opt mobile operating system and different phone apps. Android mobile system is a step further that enables its users to find anything according to the need [1]. The need to develop a blood donation app is to facilitate blood donation in Pakistan as the blood donation rate is very low [2]. According to the current statistics, the number of donors is insufficient to cover the whole population of blood receptors in Pakistan. With the passage of time, the rate of blood donation in Pakistan is growing on a very slow rate because the blood donors do not have a proper platform to donate the blood or spread the information. Moreover, most people in this region are not aware about the importance of blood donation. On June 14th, people celebrate the *Blood Donation Day* worldwide; and donate the blood in abundance in order to store into blood banks for the emergency situations [3].

Unfortunately, in rural areas of Pakistan, it has been reported that some of the blood banks do not check the screen test (like HIV, Hepatitis A, B and C and AIDS) of the donor before the blood collection. Such blood banks are initiated merely as a business to gain profit at the expense of human lives. As indicated by the *Punjab Blood Transfusion Authority* (PBTA 2006), that various blood banks operating in Pakistan are unregistered. According to this report, only 34 out of 500 blood banks in Punjab are registered and have license. In addition, nearly 72% hospitals in rural and urban areas of Pakistan does not have the blood transfusion committees, due to which the unscreened blood banks are operating widely and hence preying on patients' lives. This is, in turn, contributes to be one of the biggest causes of spreading viral diseases like HIV, Hepatitis B, C and AIDS in the country [4].

A. Historical Background

In 1492, the first attempt of blood transfusion was tried by the physicians for a girl named Pope. Unfortunately, this attempt became futile as the girl couldn't survive. After that various attempts were made during 1818s. A British man, James Blundell, took the risk of blood transfusion for his mother upon the delivery of her newborn. The doctor transferred the blood via injection and it became the first ever successful attempt. In 1900, the Australian scientist, Karl Landsteiner, discovered astounding human

blood groups and identified three main categories A, B and O. Mr. Karl got the noble prize for that study in 1930s. In 1935, the American founded the *International Society of Blood Transfusion* (ISBT) and stored first blood bottle in 1936. The practice of blood transfusion continued successfully through the years, but later during the year 1981, the American doctors found first AIDS patient. After that the American Medical Unit implemented a law for the blood donors to pass the AIDS and HIV test before undergoing through blood donation/transfusion [5].

B. Contribution

We have based our application on International standards, keeping it simple and easy to use. Innovative ideas have been collected for elements, color scheme and the campaign of the application project. Initially we made the sketches of the user's experience for the application project.

These steps were followed for the completion of the project:

- The collection of the relevant information/data for the project.
- The most suitable software usage, for example, Adobe Photoshop, Adobe XD, and Adobe Illustrator to design using various techniques.
- The designing of the print media products has been created to advertise the project.

C. Project Objectives

In order to obtain the designed phone application, the donor will download the application from Google Play Store and the install into their smart phones [6]. Both the donor and the receiver will register with the application through the app path. By enabling this application, the donors are will be available 24/7 and receptors can contact the donors according to their needs.

The chief motive to design this application is to increase the number of the blood donators; and to create and maintain the data base that can be accessible according to the rising transfusion requirements in our country. Here is the plan to understand the application path.
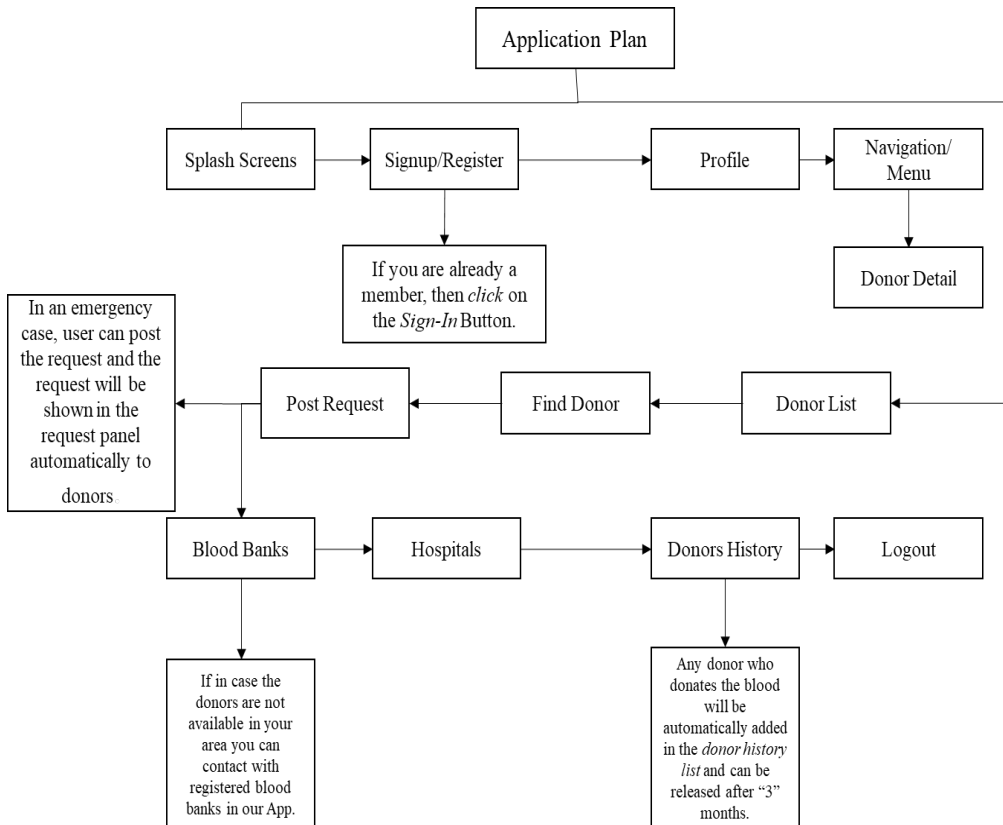
Fig. 1. Application plan of the designed app

II. Literature Review

In Pakistan, several organizations like NGO (Non-Governmental Organization) or BDO (Blood Donation Organization) are playing a significant role in blood donation in order to build a responsible community. Since 1978, these organizations are working as a fundamental component in Pakistan. Despite their significant role they had not been able to provide a platform to join or engaged the public for blood donation [7].

In addition, few independent NGOs/BDOs are providing social services in Pakistan. Following are few examples.

A. Aman Blood Organization

Mr. Rashid has established *Aman Blood Organization* (ABO) in 2006, to provide the services of blood donation to humanity. They are working as

an independent unit. They are working as a complete team; and find ways to engage the volunteers without the aid of electronic media [8].

B. Call for Rise Blood Donation Society

Mr. Mohisn Maqbool established this organization in 2008. It's registered in the blood welfare society with the *Registration Act 1860*. The organization has a very professional staff with president and a volunteer team that mostly works with the *Shokat Khanam Hospital*.

C. Sundas Foundation

Sundas Foundation is founded in 1998 in Gujranwala, Pakistan. The foundation was built to obtain healthy blood from volunteers. The aim of the foundation is to protect the poor's and under privileged Haemophelia patients; and children suffering from Lukemia, Thalassemia etc. [9].

D. Pakistan Red Crescent

The *Red Crescent* Blood Transfusion Service (BTS) build the community for the blood donation purposes; and try to produce a cost-free blood for the poor. It is registered under GOP.

III. Methodology

A. Overview

The method of the design is very important in the whole project. The current discussion will be on a brief overview, conceptual frameworks, historical research, design techniques, prototype, methods of research, design mood etc. The visual concept and the sketches will give the idea of final display solutions of the project.

B. Conceptual Framework

The concept of the project is to help people suffering from blood borne diseases; and to create awareness regarding blood donation. The framework is based on the android application that will create a platform which connects the public to meet the needs of blood donation. With this application, the needed person could find the location of donor through google map; and they can directly communicate with each other. Meanwhile, the awareness will be created through posters and other promotional things.

The poster designs with quotations acts as a catalyst to promote public interaction and make them aware regarding the importance of blood

donations. As mentioned in the previous sections, that there were no designs or campaigns to cover this domain. The *Shaukat Khanum Hospital* for the first time carried out the campaign about blood donation; and the team spreads the awareness to people by providing door-to-door facility with the help of flyers but the designs were average.

C. Posters References

Fig. 2. Banner for social media advertisement

Fig. 3 (a & b). Poster design to promote blood donation activity on the bases of outdoor and indoor activities.

Fig. 4 (a& b). Applications

Fig. 5 (a & b). Posters
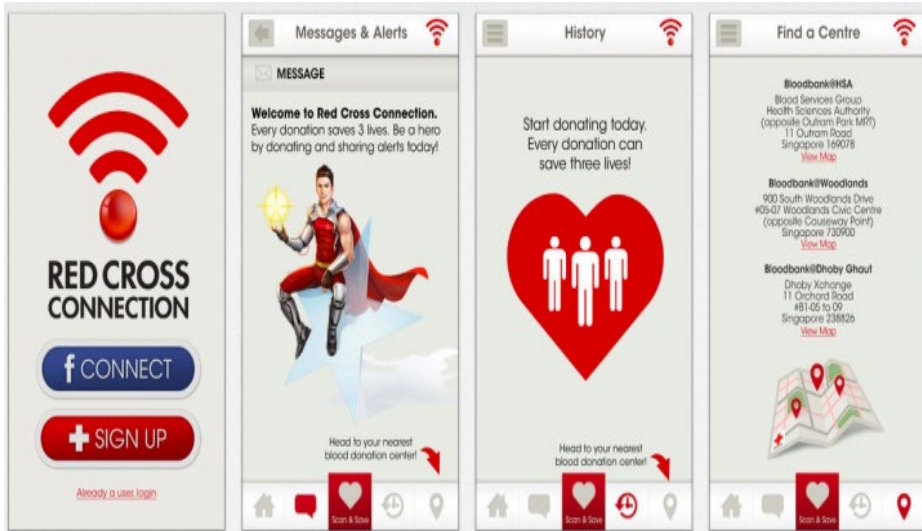
Fig. 6. Application prototype I
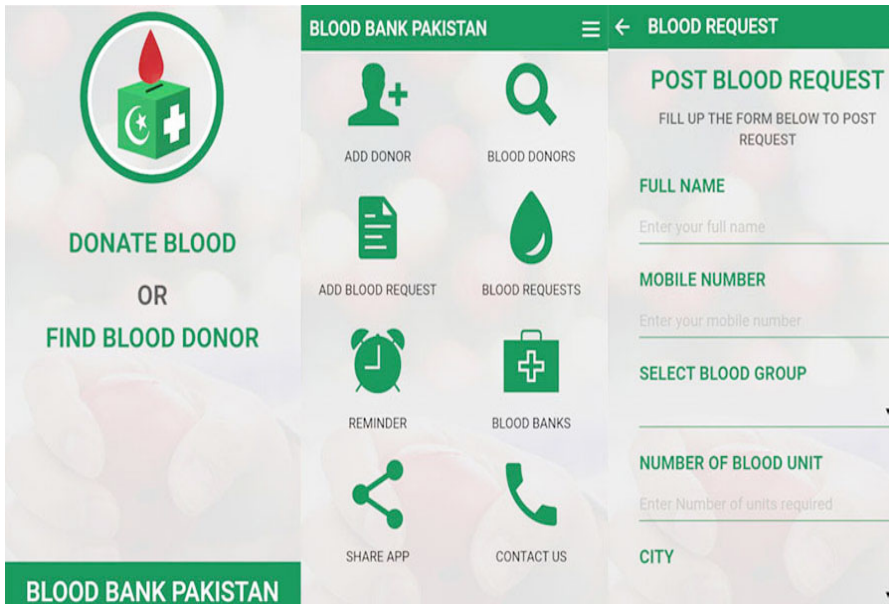

Fig. 7. Application prototype II
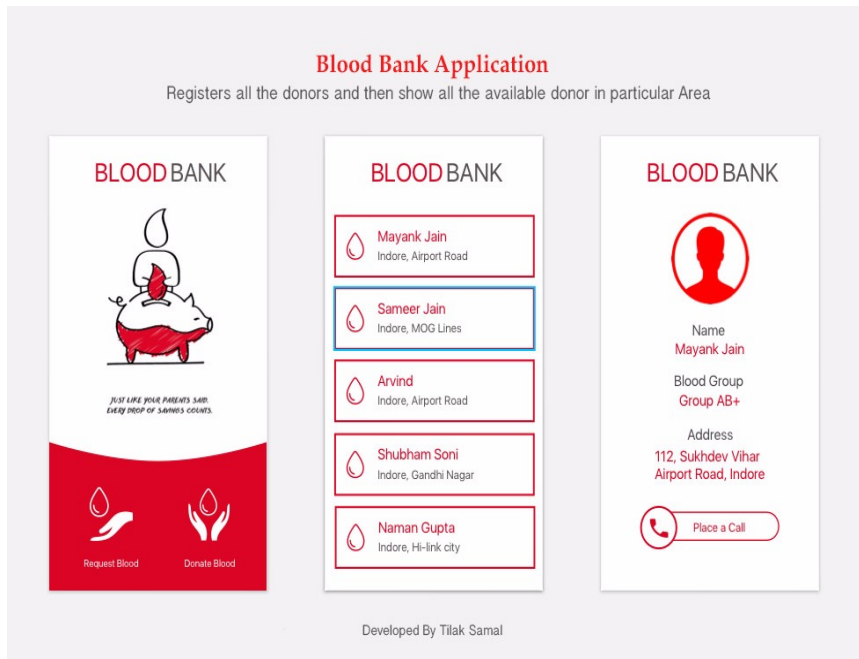
Fig. 8. Application prototype III

Fig. 9. Application prototype IV

Very few blood donation applications are working donation as digitally, but they are unattractive and not user-friendly designs due to which the users abandon the app.

D. Prototype

The process of designing the prototype started from the sketches; and afterwards the application for the UI (User Interface) was developed. When the the user click on the app icon, it starts with the splash. On the main screen, registeration shows up where the user can create the profile and login. Then the navigation will provide the exact path to the user that enables him/her to find blood donors or receptors.

1) Application Sketch Prototype

The UX pattern is used to check the application prototype its relation between the screens Following sketches of the UX pattern shows the details of our application prototype.
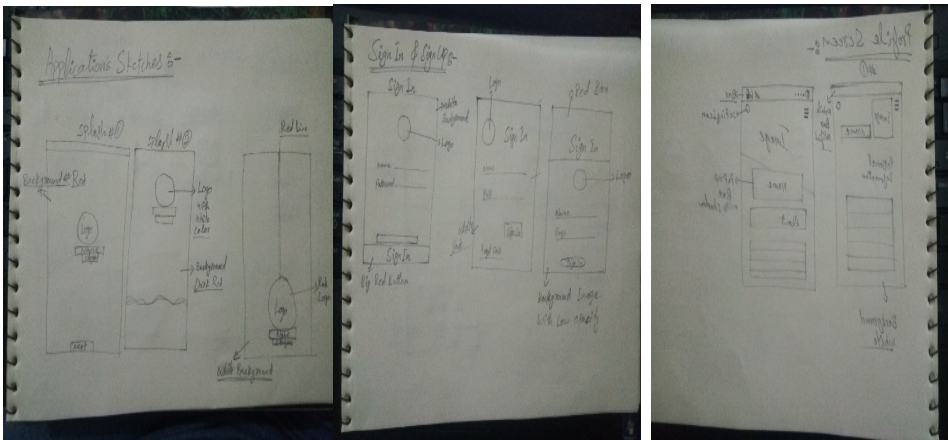

Fig. 10 (a,b and c). Sketch prototype

2) Research Board

Through the research board, we obtained different ideas and creative designs: including, vector poster, 2D shape posters, user interfaces; and to understand the category of graphics that I will incorporate in this project.

My theme is based mostly on social issues and taboos due to people hesitate or refrain to donate blood. In addition, I opted for a rythmetical layout for the posters [10].

Fig. 11. Research Board

3) Mood Board

In our research project, we have used red, white, black and grey tones as our color schemes. This will enhance the blood donation art in the posters layout and the application. The typography was created according to the mood that emphasized on the public interaction; and understanding the graphical message in the poster. Following are some mood board images.

Fig. 12 (a & b). Mood board

4) Design Techniques

In this project, we are using the vector illusrtation art work we made the sketches and designed the structures of the poster; made some UX designs sketches for the application. After the innitial process, we chose the softwares like Adobe Photoshop, Adobe Illustrator and Adobe XD to develop these sketches digitally and for printing. The design elements and the principles were used to make the final shape of app design [11]. In order to create the vector and the persons illustration in the posters, mostly the pen tool, selection tools, text tools and the color penal tools were used.

IV. Results / Executions

Adobe Photoshop and Adobe Illustrator is used while creating the whole project designs. In production, the most difficult thing is to manage the layout style with using the images, vectors, colors, text, symbols etc. Through the visual research method, the medium was selected for the procedure of the work scenario. During the project, we build a clearer concept through visual research; and research may be subject to change according to the project situation. The visual research, enables us to realize many existing concepts that are related to our topic. This provided us with the perfect and innovative ideas to be used in the project; and to accomplish it through varying colors, and objects.

We created the sketches of the ideas and then converted them digitally; and for printing solutions, we choose the Adobe Photoshop & Illustrator software. Finally, I drew the modified sketches and scanned them digitally with the help of Adobe Photoshop and Illustrator.

A. Philosophy Behind the App Design

The idea behind this research is purely based on philanthropic motivation to structure a campaign of blood transfusion importance and awareness.

B. Layout Samples

Layouts are a very important part of the design. Numerous sketches were created rigorously and continued until the best layout for the poster design or in the vector illustration were selected. Following are some layout samples from the initial stages that were later modified into more clear and appealing form.

1) Development Effects

After the complete research and fulfill the sketch base ideas to move to the final creation to develop the design with the help of the mood board. The sketches and the mood board research methods, all explained the complete story of the idea concept. The poster and the installation perfectly explained through the posters because every poster has a social message. The final output of the posters and the application styles shows the purpose/message of the project clearly.

The inspirational images got from the research, I get the color scheme and illustrations ideas. The idea and the concept thought by the social circumstances because people usually don't accept this kind of the project in awareness point of view to the effect it will be created to the inspiration to the public to encourage to donate the blood. After the completion of all data collection then design the poster according to the selected theme.

2) Color Theme

According to the topic, 'Blood Donation', the color scheme plays a vital role in creating the design using the vector art style. We selected the combination of 3 colors (Red, Blackish-Grey and White) for the entire project. whereas, the red color is symbolic representation of blood in our particular project. On the contrary, 90% of the world uses red color as it represents emotions such as love, anger, happiness, sacrifice, passion, activity, joy, etc. While, the White color signifies purity and cleanliness in the designs. The grey color is mostly used for sadness, depression, loneliness, communication, etc. The black color is one of the richest colors in all palettes, so we use a little bit in the whole project to give a contrast between positive and negative aura circulating around blood.

Fig. 13 (a & b). Color theme

IV. Final Designs

Fig. 14 (a, b, c & d). Standee and flyer designs

Fig. 15. Billboard Design
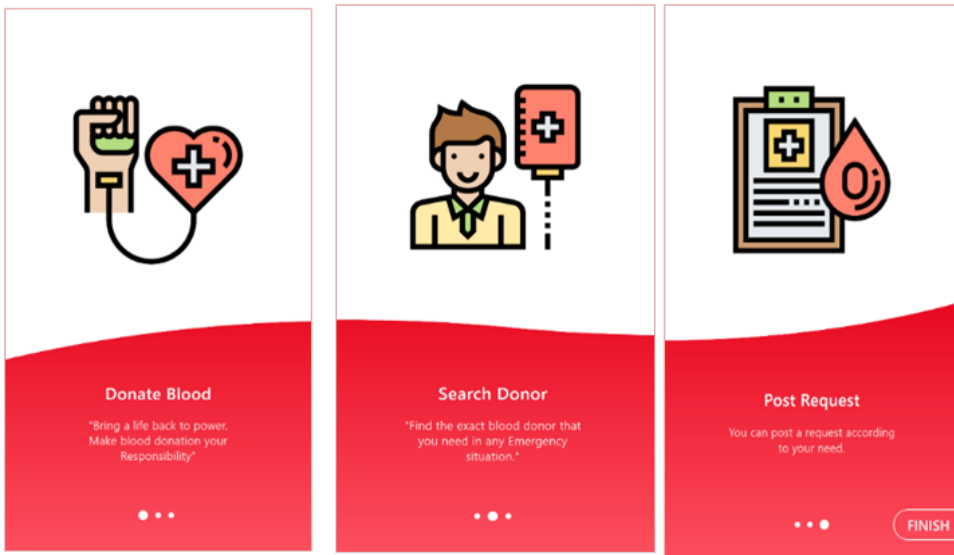
Fig. 16. Facebook Page Layout

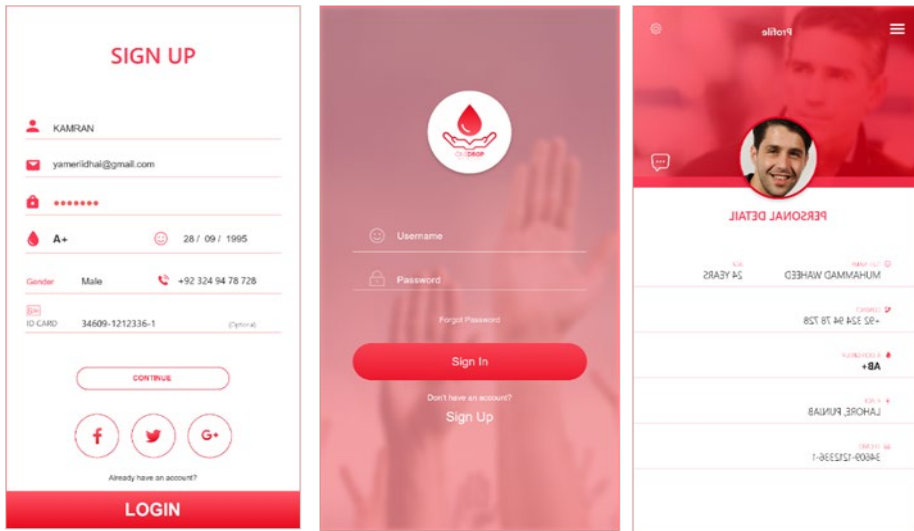**Fig. 17** Application Splash Screens

Fig. 18. Sign up, sign in, profile screens
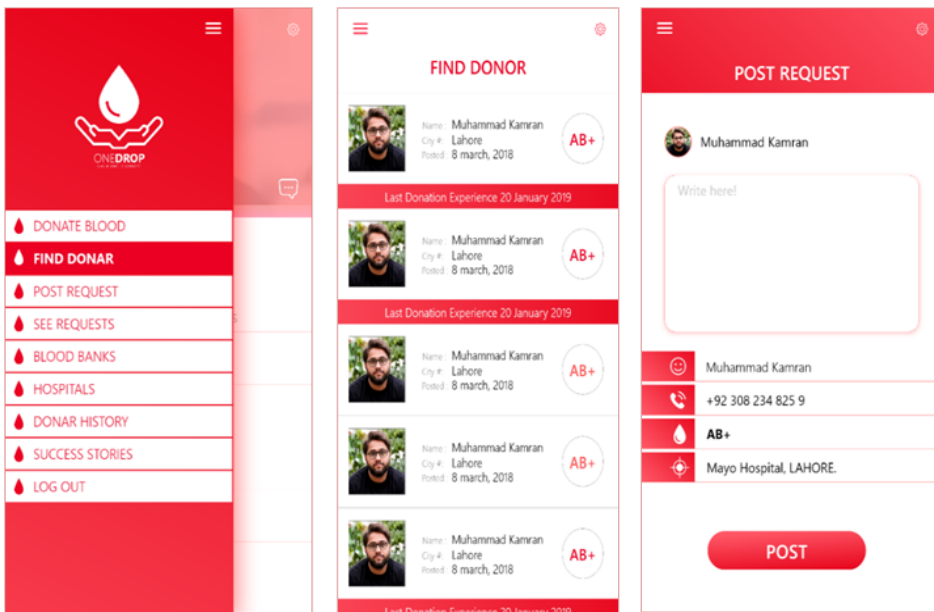

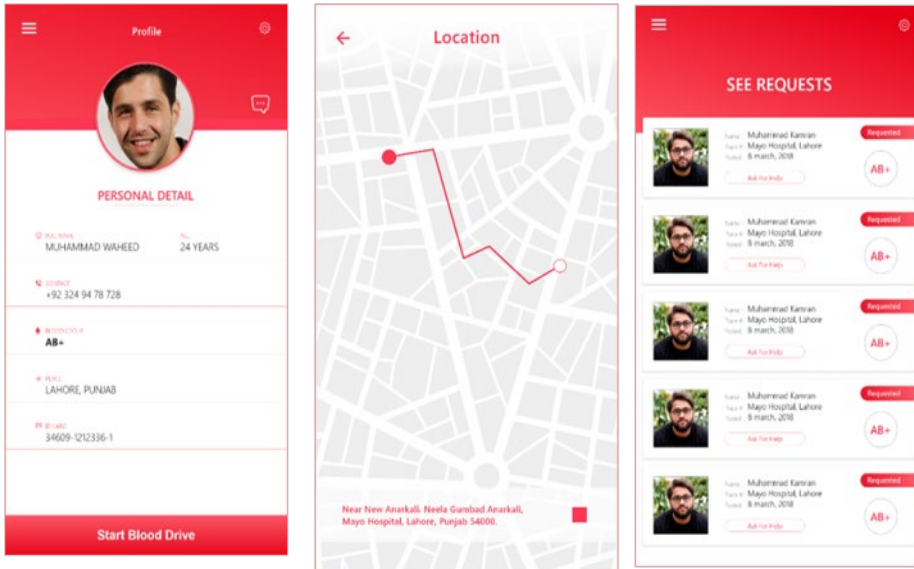**Fig. 19.** Navigation, find donor, post request screens

Fig. 20. See requests, donor profile, location screens
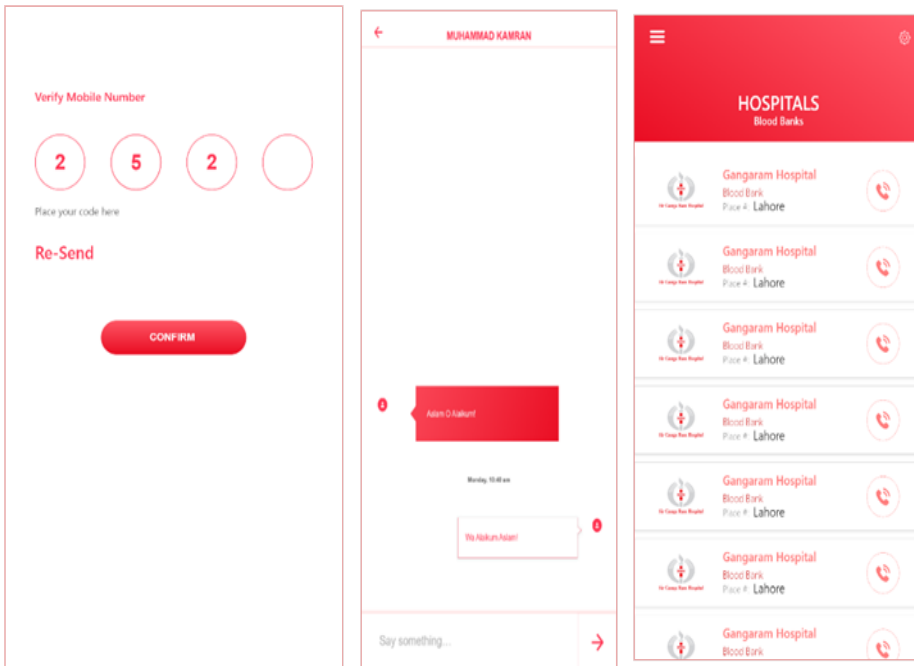

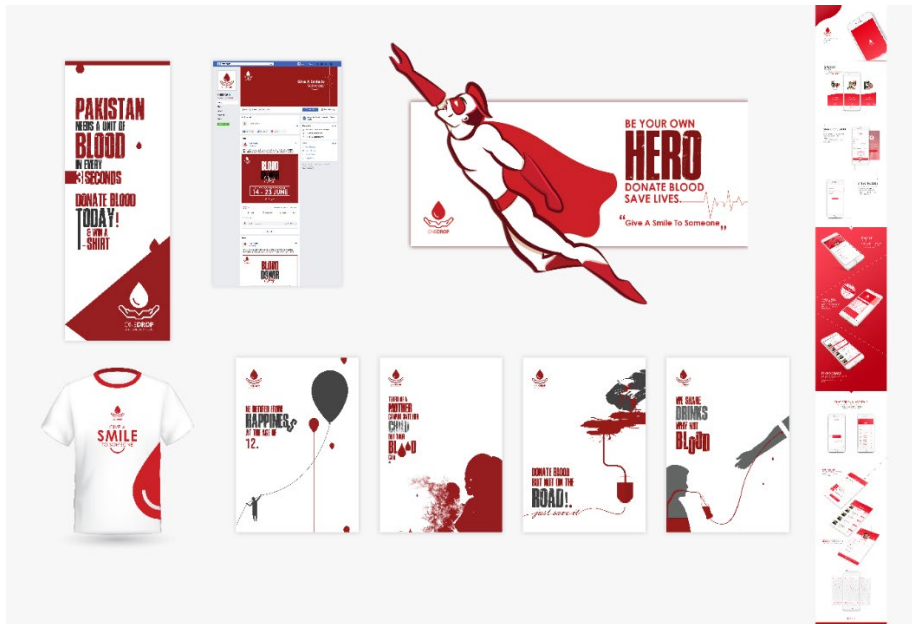**Fig. 21.** Code verification, message, hospital screens

Fig. 22. Final products

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