

## "RedCap"- A Blood Donation Application

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**Abstract**—Despite increasing demand for blood at hospitals, only about 5% of the population donates blood. Blood donation volunteers are the main supply source, as they feed blood stocks through their donations. In an emergency situation, if the stock is insufficient the only source of the blood supply will be the people who come to health centers for blood donation on voluntarily basis. It is certain that time is an important component in such situations. This paper proposes a new and efficient way to facilitate identification of the nearest available donor along with necessary communication in the emergency situation, where the blood can't be supplied through the blood bank stocks. An android application (redcap) is developed for such scenarios, allowing a communicating platform between voluntary blood donors and those who are in need of blood. Redcap is a blood request system, where a person in desperate need of blood can request for the same through the application. The registered donors will get the notification along with location details (via GPS) for the necessary reach out and communication.

### Introduction

Amid all the technological advances in medical domain, time bound and hassle free means to substitute blood, blood components or blood derived components have not been addressed efficiently yet. Blood can only be supplied by live donors. Volunteer blood donors can save millions of lives each year around the world.

There are three types of donors

1. Voluntary donors
2. Replacement donors
3. Professional Donors

In emergency situations or chronic disease case, when the blood stock of blood banks are insufficient to fulfill the requirements, the information is circulated via public announcements, electronic media or social media etc. so that voluntary donors from the public domain can come forward and donate blood. However the specified ways may not always work specially the time bound reach out of information which is crucial in critical cases is difficult. There are multiple

donors all around, however there lies a communication barrier between those multiple donors and a receptor that needs to be bridged.

RedCap Android application aims to beat this communication barrier by providing an immediate link between the multiple donors and recipient. The main aim of developing this RedCap is to provide blood to the people who are in need of immediate blood. Using this system user can search blood group in the city. Volunteer donors can easily register themselves in the system.

The recipient has to place request in the RedCap, and all donors will get the notification. All the details like who, where and which blood group is needed is provided, using GPS (Global Positioning System). The uniqueness of this application is that multiple donors can communicate with the recipient directly, removing the conflicts that usually occur, thereby saving someone's life. Using this application, those people can register themselves who want to donate blood voluntarily. To register themselves, they have to enter their contact information like, name, cell number, e-mail, address etc.

### **Literature Survey**

An application for blood donor has been proposed by Snigdha et.al[1]. Using this application the donor can find the navigation by using GPS. All the detail of blood donors will be saved. Confidential details are only viewed by the administrator. Methodologies like PHP,MYSQL, Android are used.

An android application has been proposed by Sultan Turhan[2], an application for volunteer blood donor, the main focus of this application is to notify regularly the donor location to Rh++.

Namenda Gupta et.al [3] have proposed a method to create a website with android application. In their application they have proposed, the donor be tracked by Geographic Information System (GIS). A computer for website and database is used to store the information about the donor.

Sayali Dhond [5] has proposed android application for blood donor, in which information is stored in cloud. The users request for blood and the information are sent to nearby hospital or blood donors register on cloud.

### **Inference from Literature Survey on Existing Systems:**

From the above Literature survey, one can infer that in any emergency when the patient is in need of blood the doctors will first check the blood bank and if it is not present all the donors will be alerted via these applications through notification within some range of distance. Although using these applications are a definite help for those in need, yet many patients may not get blood and especially on time. Also there is a certain risk for conflicts between several donors due to lack of communication system. In all the existing systems investigated, the communication gap between the donors i.e. whenever anyone requests for blood many donors can approach for that request simultaneously that has not been handled carefully.

The reason provided above propelled for building a robust and efficient system that provides a communication system between the receptor and multiple donors. The receptors location and the

donor's location are kept under consideration, and a communication system is provided via a chat box with every pending request.

### **Proposed System**

We are providing a better platform from where the receptor can request for blood and the donors who have registered in the application will get the alert and can chat directly with multiple donors to overcome the communication barrier and avoid conflicts.

GPS will help blood seekers to find the donors nearer to the location from where the request for the blood is generated and provide the navigation to reach the desired location.

### **Proposed System Architecture and User Interfaces:**

#### **Modules:**

##### **➤ Admin**

Maintain the application on regular basis and handle the queries raised by the desired users.

##### **➤ Donor**

Donors are the application users who need to register in the system and the requests are finally fulfilled by the donors. During registration donor is verified and has to provide the following fields:

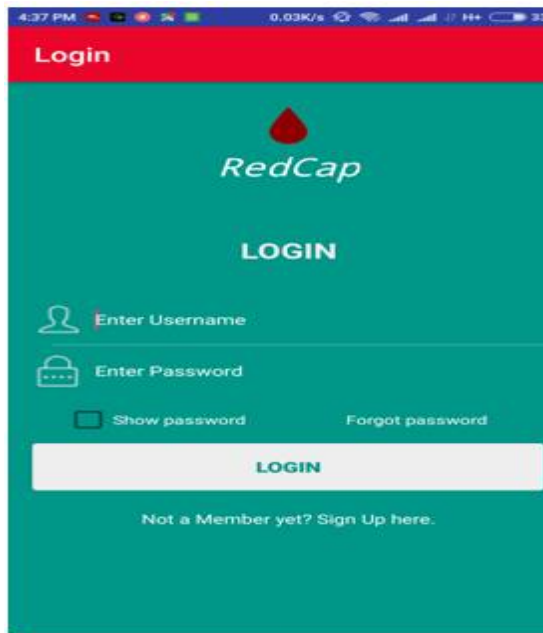
Username, email, contact no and location and for authorization a username and password is set.

##### **➤ Receptor**

Receptors are the application users who mainly are patients and need to register themselves in the system and the requests are raised by the receptors. During registration donor is verified and has to provide the following fields:

Username, email, contact no and location.

### **User Interface Snapshots:**



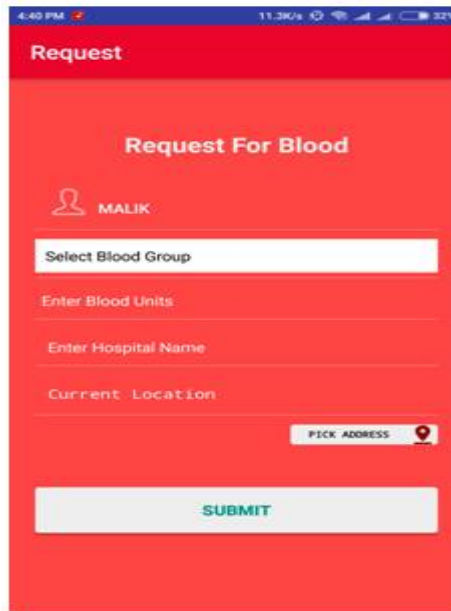
**Fig. 1: Login page for the registered donors and receptors**

Fig.1. is the snapshot of login page which appears for all registered users and those who have not registered are directed to registration page via 'sign up' link. A snapshot of user interface showcasing all pending requests (Fig.2).



**Fig 2. All the pending requests and the donor can call the receptor and view navigation options to reach the desired spot.**

Fig.3. is the page for blood requisition, with requisite information along with current location of requesting registered entity.



The screenshot shows a mobile application interface for requesting blood. The screen has a red background and is titled "Request" at the top. Below the title is "Request For Blood". A user profile icon and the name "MALIK" are shown. There are four input fields: "Select Blood Group", "Enter Blood Units", "Enter Hospital Name", and "Current Location". A "PICK ADDRESS" button with a location pin icon is next to the "Current Location" field. At the bottom is a large "SUBMIT" button.

**Fig. 3. Snapshot to request for blood with prefilled username of logged in user and can select the current location using GPS.**

A searching algorithm is implemented based on requested blood group to search for the available donor and with that the details of selected donor are displayed (Fig.4).



**Fig. 4. Snapshot to search the donor with a particular blood group and after selecting a particular donor opens the details of the donor.**



**Fig. 5.** Snapshot to provide or overcome the communication barrier between multiple users by providing a chat option with every request.

Finally a chat option is provided between the requesting person and the donor thus avoiding multiple donor conflicts and thereby a communication barrier is overcome (Fig.5).

### **Conclusion**

In the proposed system, we have presented an android based application that is fully functional on any smart phone. The application is for the volunteer blood donors to increase the willingness and accessibility with the purpose of providing a continuous blood supply. The RedCap application helps in providing the blood as quick as possible, when the stock of blood banks is insufficient. In this way, Redcap provides an un-interrupted communication between the receiver and the volunteer donor. The distance of the volunteer donor to the destination is very important. Therefore, an optimization is also realized on this process and by virtue of this optimization the system becomes more realistic. The most important task is the communication (chat box), which is lacking in all the blood donation apps. We have added chat box in RedCap, by which multiple donors can chat with the receptor directly.

### **Future Scope**

- In future studies we aim to add evolution of traffic density between donors and recipients.

- The message publication process can be introduced in all popular social media rather than only on social web sites.

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