

BLOOD AND ORGAN FOR PATIENT USING ANDRIOD APPLICATION

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Abstract

Blood donation is one of the most significant contributions that a person can make towards the society. B.O.P system is a combination of website application and android application made for such noble and great cause. The growing technology in android development has made this possible. The hospitals, blood banks, medical stores, ambulances and users can register through website. And on other hand, the android application provides a way to seeker to search for donors were calling and messaging to friends through app on android kitkat version 4.4.4. This application can also be used by organ donor and seeker where person can register for interested in organ donation .User can get medical stores, hospitals and blood banks location through GPS and calling to them will be present.In B.O.P. there will be use GPS technology that will be used to trace the way to the blood banks and hospitals. The user will get the route to reach the desired location and he does not have to ask manually, therefore time can be saved.

Keywords: Blood & Organ for Patients (B.O.P), Technology, Global Positioning System (GPS) and Android Application.

1. INTRODUCTION

1.1 Background

Blood donation system can be trace from 1936, the first blood bank in U.S.In France, 1667: Human Blood Transfusion was documented by Jean-Baptiste Denis. After 40 year, Dr. Karl Landsteiner discovered blood group. In 1986, NACO and 2004 IBB discovered as Indian organization working for blood donation.In the past, the blood donations systems were not that reliable. They used to find the donors, get blood from them & store. The process is quite slow and most of the people are not aware of the donation camps. If someone needs blood he had to go to the blood bank and to check whether the required blood type is available or not? However blood banks fail to organize voluntary blood donation camps led to blood shortage in most of blood bank. The need of blood is increasing and important for treating various medical conditions.

The yearly requirement of blood in our nation is approximately 5 crore units of blood, out of which maximum 80 lacs units of blood are available. In every two seconds there is someone's needs blood. In India every day 38000 blood donation is required stated by global statistic. We need blood donors to help and save lives of patients [1]. "We don't have to be doctor to save lives, just donate blood".

There are many websites are available on the internet related with the blood banks but, it is not easy to find out which one

is helpful. And security of the user is less. They only show the blood banks available in the area or city. Sometimes it is more difficult to find out the blood donors & blood banks; we hardly know one or two's. Either we found there are fewer possibilities of availability.

In case of emergencies it is very hectic for the patient to search for donors. What happens when someone needs blood & does not understand what to do? For lessen their efforts in search of donors, we are studying a website and mobile application using Android OS. By using some technologies like OTP, CAPTCHA, and Google maps which will help seeker for faster search. The website and Android app helps to find out blood banks & donors who are available in that particular area where the user is looking for with their exact locations. For using this application the user only need to do is register. "When someone signs blood donor form, he is signing a lease of life for someone else".

There will be a web site for B.O.P app for those users who do not have an android phone and those who have android phones gets an easy access to B.O.P by using android app. The android app will be made is on latest OS for providing great user interface. The propose systems consist of OTP technology to authenticate user for his security point. A user distinctively selects weak passwords. Weak passwords are easy to hack. OTP uses user's permanent mobile number and sends a code by using telecommunication service providers.

Another technology in system will be CAPTCHA. Internet security is an important issue. On the web there are many malicious threats. Threats like BOT; it has the capability to work automatically on the network CAPTCHA helps to rotate from such threats.

1.2 Motivation

In India, approximately total blood collected is 7.5 million units in a year, out of which 2 % of blood is thrown away due to several reasons then the total useable blood is 646,000 units in our nation. We have limit of only 25% blood; blood can be separated into component that is 1,365,000 components for patients.

Table1. India blood donation percentage blood type-wise

Country	Population	O+	A+	B+	AB+	O-	A-	B-	AB-
India	1,236,344,631	35.10%	21.70%	30.50%	7.30%	2.00%	1.20%	1.70%	0.40%

INDIAN BLOOD NEED SCENARIO

- India depend upon about 5 Crore units of blood every year but only a 80 Lakh units of blood is available.
- In every two seconds there is emergency call for blood.
- Minimum 38,000 blood donors are needed every day.
- 30 million of blood components are transfused every year in India.
- 3 pints of average red blood cell transfusion takes place.
- Type O most often requested blood type by hospitals is Type O.
- Approximately 8 to 10 accident; a single car accident victim can require 100 units of blood.
- O-negative blood type cannot be transfused to patients of all blood types. It is always in great demand and often in short supply.

Every blood& organ bank starts with a good motive& highest principles in mind. However, personal interest hacks into their high morals and good work which deviates the initial vision and mission of the organization, many a times [10]. They have to come to their selfish motive to earn from the multi billion rupees blood& organ banking industry. This increases the need of the purposed system as it overcomes the problem

1.3 Problem Analysis

The need for blood and organ is great as it is life, as there is no replacement for human blood and organ. Every day blood and organ is required in hospitals and emergency treatment facilities for patients with Cancer, Thalassemia and other diseases, for organ transplant recipients, and to help save the lives of accident/trauma victims. With a growing population and advances in medical treatments and procedures requiring blood transfusions, the demand for blood and organ continue to increase [2]. In India many people are losing their lives every day in emergency situations because we are suffering from lack of blood& organ in blood and organBanks, and they do not receive the blood and organ timely. Their relatives and friends start searching for a donor to help, but there is no guarantee whether he will come or not. On the other hand, there are a lot of people who are willing to help and donate. There are numbers of existing systems have become increasingly tried to activate the blood and organ donation process. However, this is still inefficient up to day. Besides, we propose to use the latest technologies and the available tools to find a modern system which fills the gap and provides an organized solution. Our system has a quick mean to find the donors easily by their nearest location, available time, and same blood type, facilitate the search process for needy people and make it easier than before. Increase number of donors by increasing the facilities provided to them and to increase the awareness of the society about the importance of blood donation. Our system facilitates the donation process in our country.

Table2. Uses of donated blood

Place of blood need	Amount of blood and its component require
1. Automobile Accident	50.00 unit of blood
2. Heart Surgery	6.00 unit of blood/6.00 unit of platelets
3. Organ Transplant	40.00 unit of blood/ 30.00 unit of platelets
4. 20 bags of Cryoprecipitate	25.00 unit of fresh frozen plasma
5. Bone Marrow Transplant	120.00 units of platelets / 20.00 unit of blood
6. Burn Victims	20.00 unit of platelets

1.3 Objective

The objectives of proposed system are as follows:

1. To bridge the gap between blood donors and needy people, through this system.
2. To facilitate the search process for needy people and make it easier than before.
3. To use the latest technologies and the available tools to fill the gap between blood and organ donors and needy people by offer comprehensive system services that make blood donation fastest, safest, most reliable and most cost-effective.
4. To using GPS service for locating the hospitals, blood and organ banks & medical store to know if the seeker is near to or not.
5. To provide fast, easy accessible, safest, most reliable and most cost-effective system for patients and donors.
6. Some blood types are rare so the system can find the required donors with the required blood type easily from the huge database by using search feature in the website and android app.
7. To provide dynamic database that is storing donors Information and can communicate with them easily.

1.5 Thesis outline

The total chapter included in this paper is introduction, objective, literature review; propose work, conclusion and references

Chapter1. Gives the introduction of suggested system with its background study, problem analysis and need for such system; chapter2 explain the objective of system,the aims and goals of system and suggest the overall efficiency of purposed system; chapter 3. Literature review shows the available system and compares this system with propose system with their advantages and disadvantages; chapter 4. Propose system describe the complete system with technology use, the interaction of donor, seeker and static places with the system and the validation and verification technology use to maintain authentication and integrity; chapter 5. Shows overall chapter in paper; chapter 6.conclusioned the system working and its need; lastly chapter 7.shows the references use for research work of system.

2. LITERATURE REVIEW

There are various android applications and web sites which are international and state wise but not for are locality. Here we give you the information of related android application and web sites:-

1. American Red Cross Blood Bank:-Through this application user can schedule appointment, track total donation, earn rewards and invite other to joint them on a lifesaving team. But there are some limitations of this application: In this application, there is no use of GPS. This is website and android application system which work interactively in America for overall blood donation system in its nation. This facility is not available in India.

2. MPlus /Kerala Blood Bank: - An Android application for Keralites with feature of blood donor data bank of Kerala, sending request to MPlus users and respond directly send to needier. This application is only for blood donation and it not use the GPS system.

3. Organ donor ECard: - Irish kidney associations introduce their new organ donor ECard. ECard is more convenient method to convey the message to your family and emergency services. This application is only for organ donation.

4. Life Donor, Saudi Arabia- It is a system based on GIS integrated in android mobile application and website. In case of emergency like rare blood group seeker can request for the blood. The donor who are nearby to location are tracked by the android application GIS. It is based on GIS; the detail into information is given to any user. User login to web application that stores his/her information. There is no proper security for personal details which can lead to misuse by third parties.

5. Web-based information system for blood donation: - This system maintains the record, analyze various parameters for research issue and provide online information. Patients achieve the blood through contacting the donor through internet or phone. It's a Web-site only, donor can not specify the available time to donate blood. To overcome all this limitations, in this paper we show the use of latest technology to fill the gap between patient, donor and hospital. We use the latest technologies like GPS (Global Positioning System) which help to location of the hospital and donor, CAPTCHA (completely automatic public turning test to tell computers and humans apart) and OTP (One Tim Password). This technology is use for the security purpose. This application is not only useful in blood donation but as well as for organ and doctor appointment also. For the benefit of the patient, this application also provides the ambulance in emergency situation. This system is the combination of android smartphone application and website. This application is the merging of all technologies which makes the patient treatment fast and secure.

Table 3. Comparison of various System

Apps\Parameter	Web Site	Android App	Tracking Location	Blood/Organ Donation	Search for BB,Hosp,MS	Verification & Validation
American Red Cross	yes	Yes	No	Blood	no	Email base OTP
MPlus/Kerela	yes	Yes	Yes	Blood	no	Email base OTP
Organ Donor ECard	yes	No	No	Organ	no	No
Life Donor, Saudi Arabia	yes	No	No	Blood	no	SMS base OTP
Web based information system for Blood & Organ	yes	No	No	Blood	no	No
B.O.P Using android app	yes	Yes	Yes	Blood & Organ	yes	Email base OTP & CAPTCHA

3. PROPOSE WORK

The proposed method is to create a website with an android application so that the blood and organ donors are available easily within the required time [1].B.O.Pis an integrated information system whose aim is to manage the blood/organ donation and blood/organ supply chain[8]. The proposed system is used by the patients and/or relatives of the patients to notify their blood requirements and by the living donors to be aware of these requirements.The system consists of two kind of hardware:

- A cell phone with android OS where the android app is installed.
- A server and computer for the website and the database where the information will be stored

3.1: Website and Android Application

The aim of website is to update and search the pertinent information regarding the hospitals, blood banks, medical stores, donors and seeker; so that when it is emergency case they can view other donors, hospitals, blood banks, medical

stores numbers where it can be accessed through this website.

3.1.1 Admin

This module focuses on the donors, seeker, hospitals, blood banks and medical store. Each register member i.e. donor/seeker possess a user-id and password, which identifies members uniquely. The members are given a login form. Members enter their login details like user-id and password. The work done by admin in the interface is

- Change Password, OTP, Manage donor details, Manage seeker details, Update donor details, maintain details of hospitals, blood banks, medical stores & Logout.
- Change password, blood type, mobile number, interested in blood & organ donation, email-id and logout.

3.1.2 Donor

Each member register as a Donor has a user-id and password, which identifies them uniquely. Then member is given a login form. They enter the login details user-id and password. The choice given to a donor is

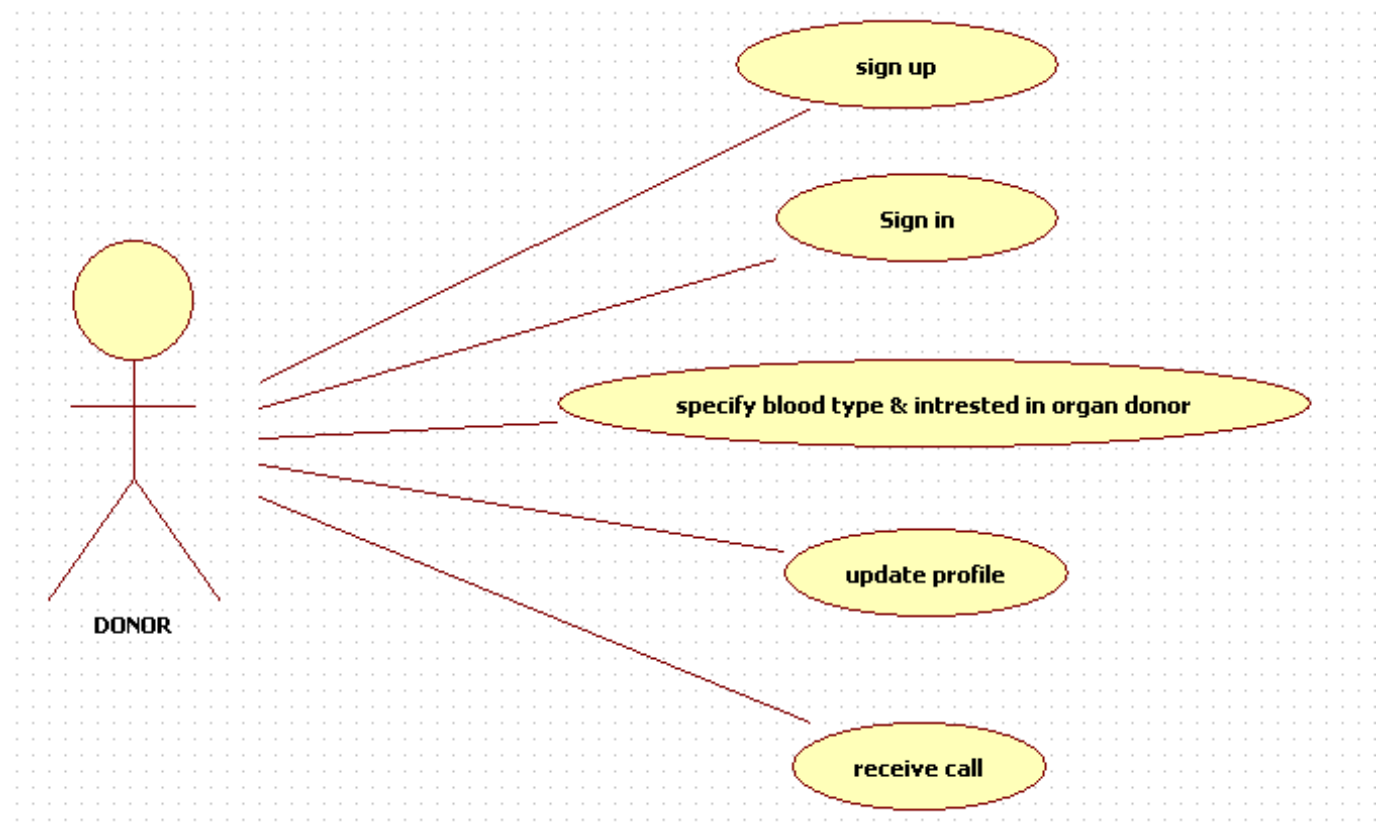


Figure 1. Use-Case diagram for donor.

3.1.3 Seeker

The seeker are given choice in the interface to -

Change password, Find a blood group, location detail, logout. Seekers are the one who needs blood for someone related with them or themselves.

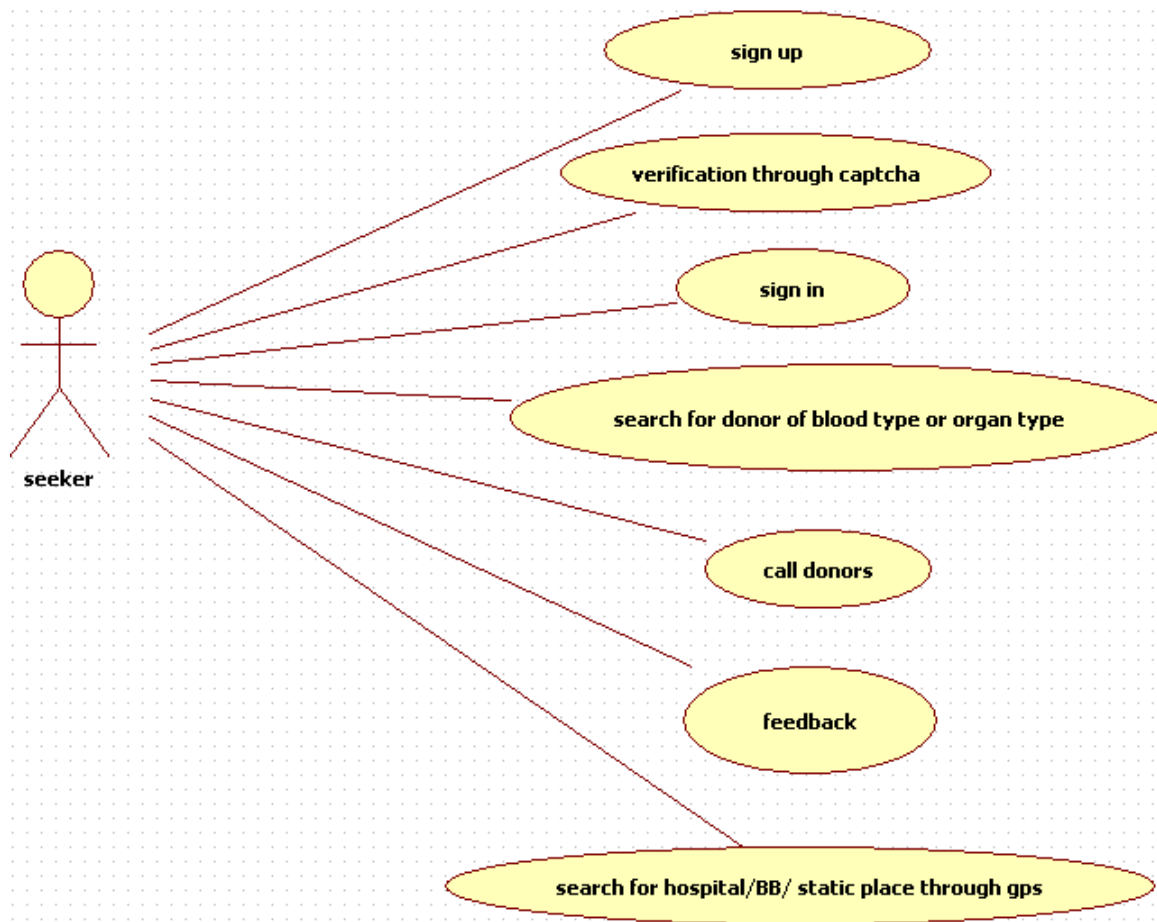


Figure 2. Use case diagram for seeker.

3.1.4 System Database

It stores all the details about the donors, seekers, hospitals, blood banks and medical stores. The system will provide a choice for an updating the personal information by the users. This is for tracking and managing information [1]. The system uses **MySQL** is an open-source relational database management system & **SQL Server Management Studio (SSMS)** is a software application which is used for configuring, managing, and administering all components within Microsoft SQL Server. The tool has script editors and graphical tools which work with objects and features of the server. The database is one and common for both website and mobile app.

3.1.5 Blood Donation App

The system uses the Android 4.4.4 software stack produced by Google. Android 4.4.4 is an open source framework designed for mobile devices that packages an operating system, middleware, and key applications [8]. The Android SDK provides libraries needed to interface with the hardware and make/deploy an Android application. The main duty of the application is to notify the donor's to the seeker. She/he downloads the application into his/her smart phones the process begins with registration as donor/seeker into the system. Then donor is applicable to update profile

and seeker is provided with facilities such as calling and sending message to donor while locating static places.

3.1.6 Static place

The system provides static places as hospitals, blood and organ banks and medical stores registration through website only. The user can locate these places through android application where the static places provide location while registering and call to the place is all possible for user in case of emergency. Easy finding the nearest hospitals, blood/organ banks and medical stores helps in increasing the chance of saving the patient's life especially in rural areas, where hospitals and blood banks are at a far distance.

3.2: Captcha

CAPTCHA is an acronym for "Completely Automated Public Turning Test to tell Computers and Humans Apart" [7]. CAPTCHA is one such protection which can be used as a protection from these malicious programs like Bot. For successful captcha working following must be satisfied.

1. Human user should easily pass the captcha.
2. A machine should easily generate captcha & it should be flexible enough.
3. Hard for a bot to pass.

CAPTCHA is a mechanism which help user’s to protect them for spam and password decryption by taking a simple test. In this test a user will see a text which is normally anamorphic. The user is supposed to enter the figure exactly as shown, if the CAPTCH is based on text. The user fails this test then he/she is considered to be a machine otherwise the user is considered to be an authentic user or a human being. In this paper there is use of an innovative text base CAPTCHA for distinguishing human and computer by embedding versatile characters in the background images.

Text base captcha is a very simple to implement. It is very effective and requires a large question bank. In Text based captcha the number of classes of characters and digits are very small so the problems occur for user to identify the correct characters and digits. The text based captcha is possible to identify the character and digit through Optical character recognition (OCR) technique.

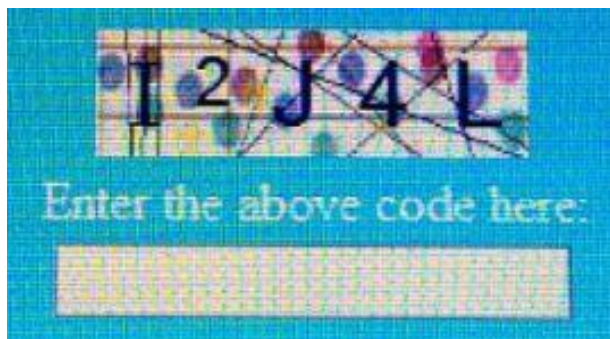


Figure 3. CAPTCHA in website and android application.

3.3: OTP

One Time Passwords (OTP) is utilized for authentication of user as it is valid for only one authorization or authentication request. B.O.P provides OTP by email is convenient, as it avoid password listing. The user must be registered with its email-id for the service that provides email OTPs for authentication or authorization. OTPs are quite popular due to authorization or authentication factor in web-based services.

In the first step the user enters the home page of the system in which he/she has his/her account. He/she then enters his/her user name and password. He/she is allowed to login into his webpage of his personal account, if the user authentication is valid. This is the second level of authentication done to avoid password thefts. The user then authenticates with OTP himself with OTP [6]. The OTP is checked at the server and the process is proceeds if valid. The OTP approach is based on, the one-time password is generated for every transaction or login from a different IP address.

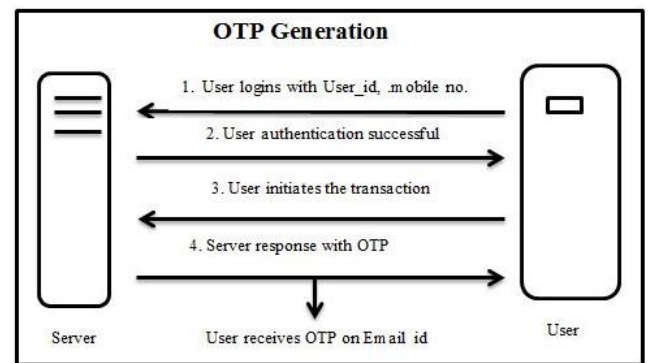


Figure 4. OTP Generations

3.4: Geo-location

The static place nearby location of seeker are tracked by the android application by GPS(GOOGLE MAP). Most of the Mobile devices/smart phones are equipped with GPS receivers, which help in getting accurate location of the device. The GPS satellite situated in the space continuously transmits data containing the location and time details. When the mobile device requests for the location then its GPS receiver receives the data sent from GPS Satellite and displays the current location. Location can also be obtained by mobile cell tower. The cell tower sends its location to the mobile device at first call and as the request increases; the location becomes more accurate. The more number of cell towers around the mobile device will lead to find more accurate location in less time. The system periodically tracks the current location of the registered hospitals, medical stores and blood organ banks using GPS or Mobile Network Location.

Once the seeker clicks on the distress call notification, the seeker is displayed with the Map which shows the route to reach the static place. The Google Map API is used to draw the path on Google map [3]. A direction path is drawn from the seeker current location to the requestor’s current location, which helps the seeker to reach the hospital, medical store and blood bank.

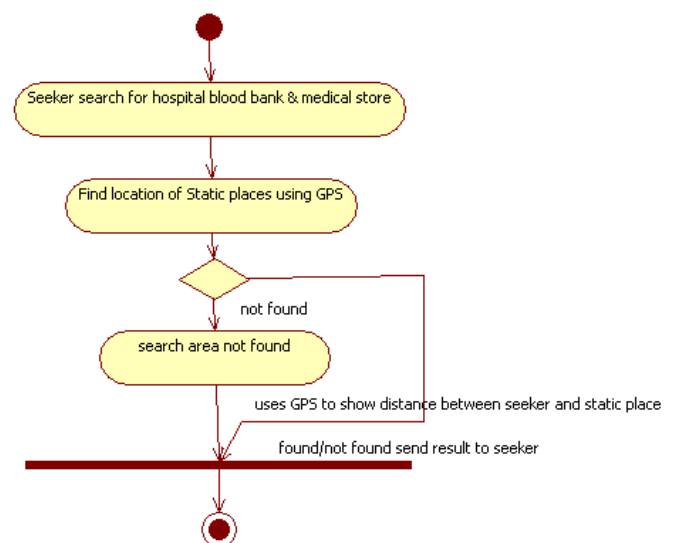


Figure 5. Activity diagram for static place search using GPS

The activity diagram shows the complete flow of the system. The flow is divided in three swim-lens donor, seeker and static places, mobile app & website and control server. The first swimlen shows the activity performed by the seeker, donor, hospitals, blood& organ bank and medical store. The second swimlen show the activity by the mobile app or the website specially design for hospitals, blood banks, medical stores and for non-android users & lastly the work perform by the server. For diagram we can clearly understand the three-tier architecture of B.O.P system.

In the given application we will develop an android application and users will use it free of cost and free registration for the citizens, blood banks, hospitals and ambulance etc. All collected data will store on the centralized database means the web server. For the avoiding of fake accounts we will add the captcha, OTP, and email verification etc. B.O.P stands for blood and organ for patient .The application is for three way purpose

- 1) For blood banking,
- 2) For organs donation system and
- 3) Searching for nearest hospitals, blood banks and medical store.

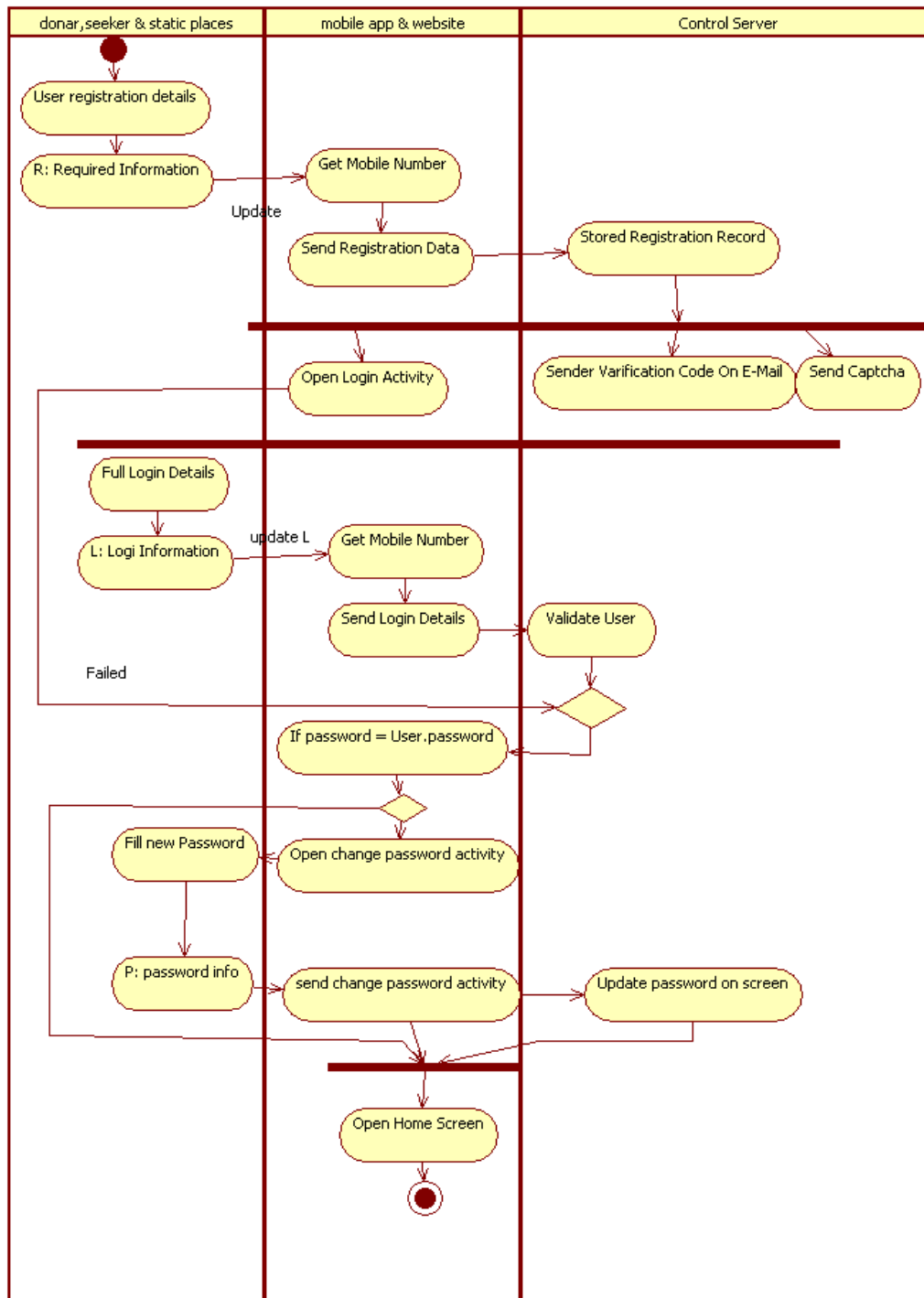


Figure 6. Three-tier architecture of B.O.P system

4. CONCLUSION

The system provides a better, faster and effective way for the citizens to communicate with the blood and organ donor for blood and organ requirement in times of medical emergency. The B.O.P is a web based android application helps to reduce the human mistakes which are done in the existing system. The B.O.P is an efficient and reliable blood donor information and management system based on GPS integrated in android mobile application. Finding the nearest hospital and blood banks through android application helps in increasing the chance of saving the patient's life especially in rural areas, where hospitals and blood banks are at a far distance.

5. FUTURE WORK

We hope that our system will bring a significant change in our locality. A new, updated and expanded edition of our project is to implement the cloud computing function to increase the rise of blood donors, and to translate the system into Regional language because it is local for every state so it can have dual languages. This work is not a one-time job but is a continuous work to be adopted for further research and the system can be used in various "what-if" scenarios. This work may be extended to interconnect all the blood donors societies in the India.

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