BLOOD SOLUTIONS

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***Abstract*—The need for blood is important for various treatments in medical field. For every second someone needs blood to save their life. The task of blood bank is to receive blood from various donors, to monitor the blood groups in the database and to send the required blood during need to the hospital in case of emergencies. In developing countries, especially like India, the blood resource lacks in quantity which is a barrier to the life of someone who is in need of blood.**

This project is named "BLOOD SOLUTIONS". It is a GPS based application available for android users. The application will aim at providing emergency blood facilities to the patient (requester) provided he/she has downloaded the application. Nearby location of hospitals and blood banks near the user can be located as well. Also blood donation record details are maintained on a different server which can be operable only by the admin.

***Keywords*—GPS, Android, Location Based Services, Database.**

I. INTRODUCTION

"Blood Solutions" is an android application which will be used in medical assistance across a list of hospitals of Mumbai. The highlighting feature of this app is the hospital and its blood bank locator service. Using this option one can get information of the nearest hospital and blood banks with respect to his/her current location. When the user registers for the first time he/she has to enter his/her details regarding their blood type, age, name, address, etc. This will help in other users to identify needy patients in their vicinity and can aid them in the times of emergencies. Location Based Services will be used to identify user as well as hospital location. When the seeker opens the app the current location of the seeker is found using GPS. Then using this current location, the nearest hospital/blood bank is located. The admin will have the access to make changes in static data as well as to add or remove hospitals or registered users' data from the predefined list in the database server. A different database server will be maintained for donors which will be a web application and will record the details of the donor(s) and will keep a track of their activities regarding the same.. In spite of the availability of the potential blood donors not more than5% of the total Indian population donates blood. Advancement in medical science has increased the blood demand. Also blood-donors usually don't come to know about the need for blood.

II. RELEVANCE

The approach of the application is user friendly, which will prove to be useful for people relying on their phones for help. The application named "Blood Solutions" is especially design for the users who need medical assistance at the earliest. It also creates awareness among people about blood donation. The basic application provides quick, haste-free, accurate solutions for the users' problem, at the time of emergencies. Since a large number of users use android, this application is sure to be helpful. As the name suggests, the application is developed purely for addressing situations in which one is need of a particular blood type. Since the application can be easily installed on a smart phone it is easily accessible. This application is therefore designed in a manner which will be understood easily by any kind of user. Emergency is a situation that can pop up anytime and will keep happening till the end of time. Therefore this application is of real good use and must be made available to as many users as possible [2].

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

III. Proposed Work

The proposed method is to create an android application so that the blood donors are available easily within the required time .BLOOD SOLUTIONS is an integrated information system whose aim is to manage the blood and blood supply chain.

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.

In the present scenario as depicted in Fig3.a, the donor and acceptor communication is illustrated. The bloods are used in case of emergency such as accidents and major operations.

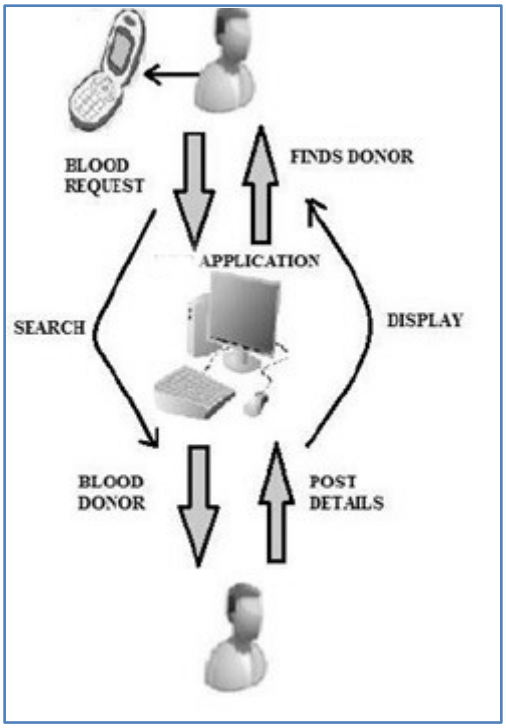


Fig 1 Proposed Work

Communication of various hardware devices in the developing technology has been improved over the last few decades where it enables people to communicate anytime from anywhere by a multiple devices especially via mobile applications. However, this advance technology for communication has hardly been improved in health care industry. The purpose of this system is to develop a blood donation service app and to assist in the management of blood donor records where the ease of controlling the distribution of blood in various parts of the country based on the demands [2].

IV. System Architecture

IV.1. System Design

The aim of application is to update and search the pertinent information regarding the hospitals, blood banks, donors and seeker; so that when it is emergency case they can view other donors, hospitals, blood bank numbers, location and information where it can be accessed through this application. The System Architecture of Blood Solutions application is shown below:

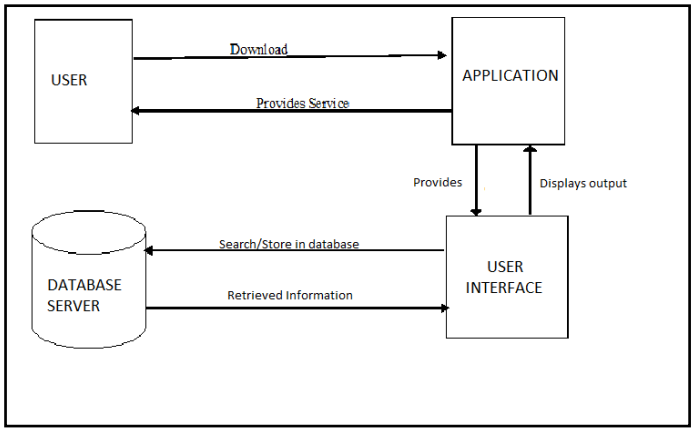


Fig 2 System Architecture

Admin -

This module focuses on the donors, seekers, hospitals, and blood banks. Each registered member i.e. donor/seeker possess a user-id and password, which identifies members uniquely. The application provides the user with login form where they 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, and Maintain details of hospitals, Blood banks and Logout.
- Change Password, Blood type, Mobile number, Email-id and Logout.

Donor -

The donor registers via website and the details of the donor/donor activities are maintained on a web server handled by the admin.

Patient/Acceptors/Seekers -

This context deals about description about Seekers which gives following options:

- Change password; Find nearby hospital or blood bank, Find Donor and Logout.

This module gives information like patient's name, patient's blood group and their contact information. In case of an emergency, the patient requests for blood. Also in emergency cases nearby hospitals and blood banks can be located.

IV.2.Algorithm

Algorithm proposed for the project - Shortest Path Problem for Finding the Blood Donor using GPS and Map Service.

Area of a city tends to be larger. Along with the expansion of the scope of the town, public cruising range will more widespread, so the ability to remember the location of the nearest public facility will be decreased. Another reason underlying the need for information about the locations of public facilities is the requirement to be able to use time efficiently and effectively. Given the information as appropriate, someone will be able to shorten time it can be used to run other activities that are not less important.

IV.3 Location Based Services On Smart Phone Through The Android Application

One of the unique features of mobile applications is location awareness. Mobile users take their devices with them everywhere, and adding location awareness to your app offers users a more contextual experience. The location APIs available in Google Play services facilitate adding location awareness to your app with automated location tracking, geofencing, and activity recognition.

The Google Play services location APIs are preferred over the Android framework location APIs (android.location) as a way of adding location awareness to your app. If you are currently using the Android framework location APIs, you are strongly encouraged to switch to the Google Play services location APIs as soon as possible.

This class shows you how to use the Google Play services location APIs in your app to get the current location, get periodic location updates, and look up addresses. The class includes sample apps and code snippets that you can use as a starting point for adding location awareness to your app.

GETTING THE LAST KNOWN LOCATION

Learn how to retrieve the last known location of an Android device, which is usually equivalent to the user's current location.

Changing Location Settings

Learn how to detect and apply system settings for location features.

Receiving Location Updates

Learn how to request and receive periodic location updates.

Displaying a Location Address

Learn how to convert a location's latitude and longitude into an address (reverse geocoding).

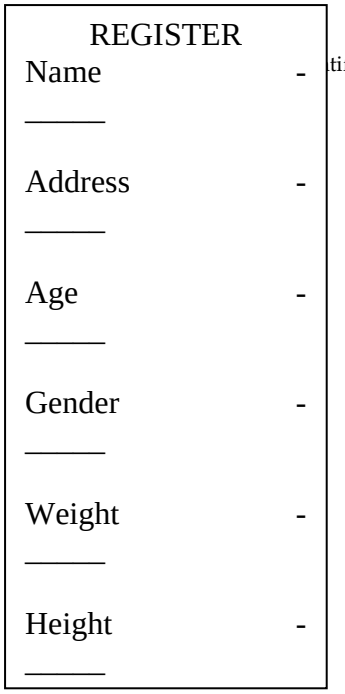
Creating and Monitoring Geofences

Learn how to define one or more geographic areas as locations of interest, called geofences, and detect when the user is close to or inside a geofence.

V.METHODOLOGY

Blood Solutions Application -

- The application will be developed using java programming language, MySQL/SQLite for database handling and PHP as a scripting language for database connectivity.
- 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.
- 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. Options of nearby hospitals and blood banks for donating facilities will be provided.
- Once the user downloads the application the android 4.4.4 version provides the user interface which appears on the screen.
- The database connectivity is done as mentioned in previous topic and operations of the users such as searching for blood types, storing data, locating blood banks, hospitals etc. can be done.
- The application uses Geolocation System for locating blood banks and hospitals.
- An alert message or prompt message is sent to the user about the location of nearby blood banks and hospitals using in-built GPS system.



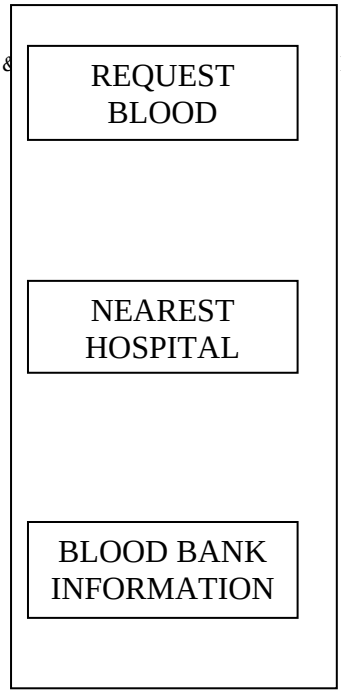
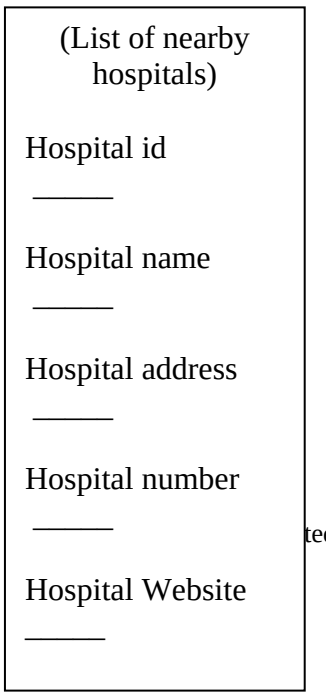
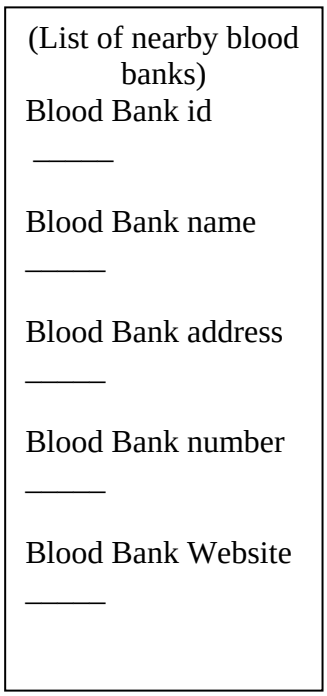


Fig.3 User Reg.Pg.Fig.4 App front interface

- On clicking the first option, the location of the user requesting blood and the nearest hospital's location will be sent to nearby users of this application with the blood type of the requester.
- The second option will enable emergency-struck users to locate nearby hospitals.
- The third option will help donors locate blood banks.

Fig. Hosp. Reg.Pg. Fig.BB Reg.Pg.





and a thorough database search will be done to locate nearby users around the requester/seeker to and the blood type and location of the requester will be sent to them.

VI. System Database

VI.1. Database Structure

It stores all the details about the donors, seekers, hospitals and blood banks. The system will provide a choice for an updating the personal information by the users. This is for tracking and managing information. The system uses MySQL is an open-source relational database management system &SQL Server Management Studio (SSMS) is a software application which is use 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 [3].

Table.1. Details of blood donor registration

Date	Sr.No.	Dn	Da	DID	Age	Gen	W	H	BG	MH
										…

Table.2. Details of admin database

Date	Sr.No.	Dn	Da	DID	Age	Gen	W	H	BG	MH
										…

Note- Dn-Donor number, Da-Donor Address Gen–Gender, W- Weight, H-Height, BG-Blood group, MH- Medical history(if any)

Recent user login time	User logout Time	Name of hosp/BB requested	Hosp/BB address and no.	Promt user using Email, text etc	User's current location

The system provides static databases for hospitals and blood bank registrations. The user can locatethese places through android application where the static places provide locationwhile registering and call to the place is all possible for user in case of emergency. Easy finding the nearest hospitals and blood banks 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.

Table 3. Details of hospital database

Hosp_id	Hosp_name	Hosp_address	Hosp_no.	Website

Table 4. Details of blood bank database

BB_id	BB_name	BB_address	BB_no.	Website

VI.2 Saving Data IN SQL Databases

The blood solutions application will use a readily available APIs for using databases in android application. It will use android.database.sqlite package

Connecting Java Application to System Database :-

The following 5 steps are the basic steps involve in connecting a Java application with Database using JDBC.

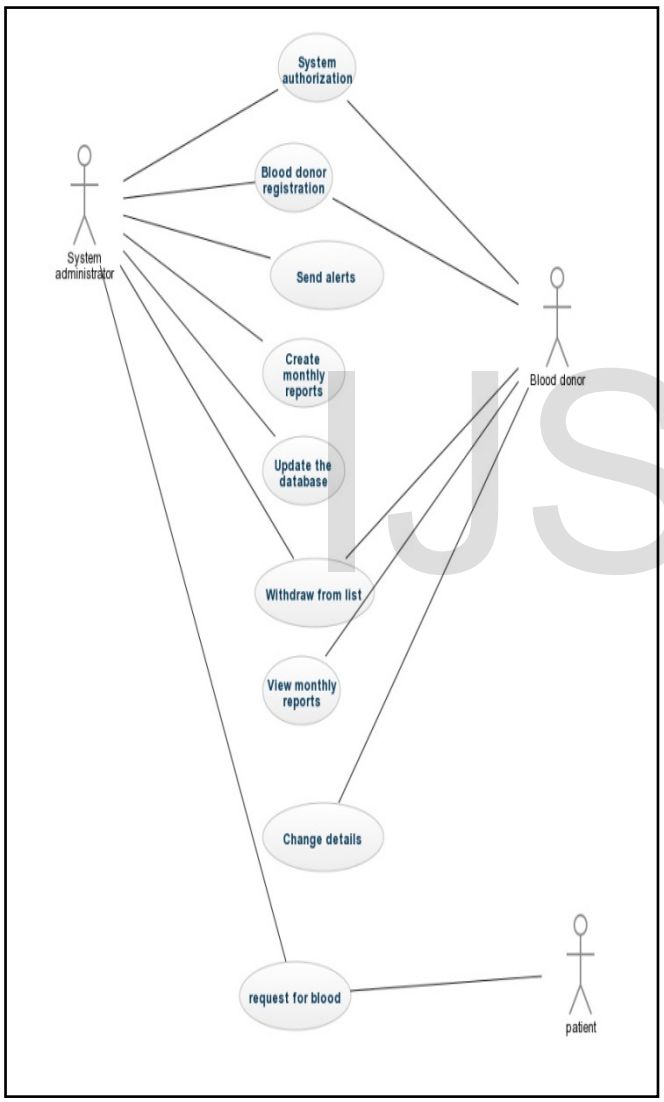
1. Register the Driver
2. Create a Connection
3. Create SQL Statement
4. Execute SQL Statement
5. Closing the connection

VI. 3 Geo-location

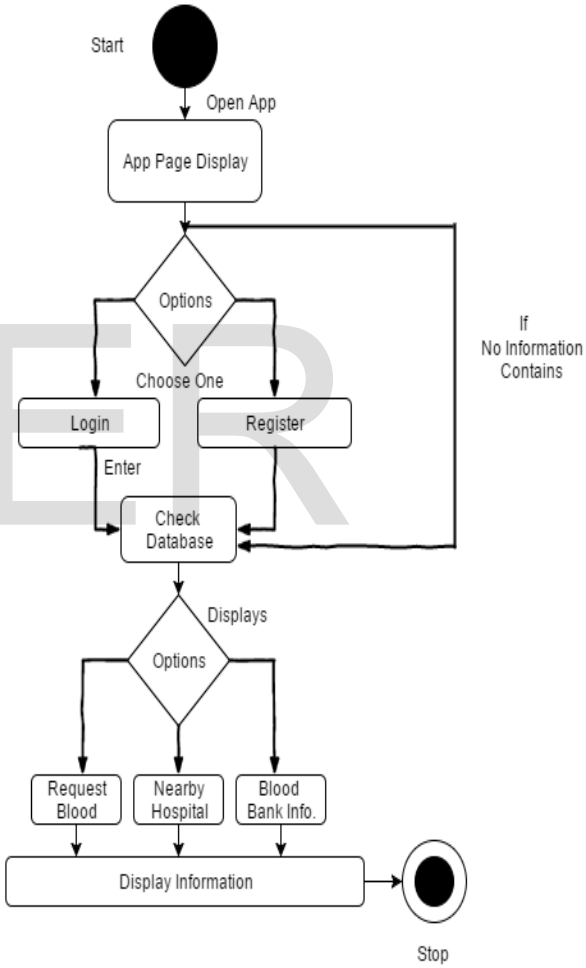
- The static places (hospitals/blood banks) near to the location of the seeker are tracked by the android application by GPS (GOOGLE MAP).
- Most of the Mobile devices/smart phones are equipped with GPS receivers, which help in getting accurate location of the device.
- The GPS satellite situated in 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.
- The system periodically tracks the current location of the registered hospitals, and blood banks using GPS.
- Once the seeker clicks on the REQUEST BLOOD option, the seeker is displayed with the Map which shows the route to reach the static place (Hospitals/Blood banks).
- The Google Map API is used to draw the path on Google map.
- A direction path is drawn from the seeker current location to the requestor's current location, which helps the seeker to reach the hospital and/or blood bank.

VII.UML DIAGRAMS

VII.1 Use Case Diagram



VII.2 State Transition Diagram



VIII. Conclusion

This project aims to create a mobile application known as Blood Solutions for android mobiles. The sole purpose of this project is to develop an electronic system that will link all donors. The proposed system facilitates communication between blood donors and blood donation centers so that the appropriate donor can be reached just on time. This system will help in crisis situation in which there is urgency of blood. Furthermore, people will be able to see the nearby hospitals and the list of patients located nearby using mobile GPS in need of blood supplies via the application. They will be able to register as donors and thus receive a notification from their local clients who needs blood to donate blood in cases of need. The application will help develop public awareness amongst its visitors of the hospitals' need for blood in order to supply the appropriate donors. It also helps establish a blood donation community through social networks such as Facebook and Twitter. Future work will be focused on further enhancing these models to allow integration with blood donor management systems including innovative ways of visualization.

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