

The Optimization of Blood Donor Information and Management System by Technopedia

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Abstract – Blood is a saver of all existing lives in case of emergency needs. During the blood transfusion process, the acceptor receiving blood should be considered before donating the blood. The blood donor information should be checked before displaying their details on the website. Technopedia is nothing but web service with a mobile application. In this paper, we propose 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 the proposed work has a Push technology with security, to protect the contact details of the donors in 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 web application, an android mobile application is proposed to search the donors who are available nearby during the emergency cases such as accidents. Further we include Geographic Information System (GIS) in the mobile application where the data is transmitted between mobile application and the website through wireless network. The web based android application is readily scalable, efficient and adaptable to meet the complex need of blood bank who is key facilitators for the healthcare sector. Hence the life at threat can be saved by this optimization technique.

Keywords— Technopedia, Geographic Information System, Blood bank, donors, acceptors, administrator, Push technology.

I. INTRODUCTION

The need for the blood is important for treating 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 database and to send the required blood during the 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 others life. The Southern regions of

Asia are weak in regulation of BTS and sometimes transferring the real time data are difficult. There are many shortcomings like decentralized nature of donor and required blood is needed at serious times. Manually is difficult in the current existing system and tracking the database for particular blood group is complicated. The aim of serving an efficient quality of blood to the patient.[1] The last minute update of information are done in bidirectional way. So the information regarding the Blood Transfusion Services(BTS) is explained as entering the details about the blood groups, members, contact details, etc. and finding the donor with GIS. The update about the information after the donation of the blood by a donor is not entered in the system. The online blood bank management system helps to maintain the database and quality of blood. This increases reliability, fault tolerance and availability. The online blood bank management system with integration of GIS is important because when the lives are at stake then using the mobile application searching for nearby blood donor is done where it is based on nearby location. Further, these details are accessible by anyone, so a strong authentication mechanism is needed. The services used in the proposed system are web services and domain services. Web services are used for transferring the data entered by the users to the data storage.

This paper is organized as follows: Section II the related work of the paper is illustrated. The problem faced in existing system is explained in Section III. The introduction to the proposed system is stated in Section IV. At last, the conclusion and the future work is stated in the final part.

II. RELATED WORK

Bidirectional way of communication is a problem in pull technology; communication between server and client using push technology is solved by push server seen here[1]. Communication process between the blood centre department and hospitals using Geo-location RVD Scoring Algorithm is proposed [2] with an easy-to-organize database of contact details and their blood groups are displayed for acceptors. Large amount of time is taken to analyse the data of donor in online is solved here [3].So extract knowledge of blood donor's

classification to aid clinical decisions in blood bank centre is retrieved. [4] Medications for patients are often packed with reminder systems to remind about the day and/or time to take the prescribed medicine as per their health conditions. Some of these reminder systems has integrated with portable telecommunication devices especially like the mobile phones.(SMS System);m-technology and Patient Compliance methodology is proposed to process dosage adjustment of medication and other general information that highlights correction of life styles, changes in diet and physical exercise and to live in a better way. Previously we could not implement large dataset classification and separation [5] classification, clustering, association, prediction and sequential patterns to store all the important details. The Advanced Data Mining Techniques with KDD are used to implement data mining techniques for predicting the blood donor's behaviour and attitude on blood donor's data set, which have been collected from the blood bank centre. In recent years, smart phone applications could not open directly in emergency time. An Emergency Panic Button [6] can be used to provide facility to the customer who suffers from the accident. We can more implement this application using android operating system since it is open source software which says that the collection of the blood donor data from the smart phone application is not safer. Using cloud with data mining techniques, the implementation of blood donor recruitment strategies are recorded, where the information about the recruitment is to be considered by focusing on social networks and community rather than intrinsic altruism [7].

To improve data confidentiality using Novel Techniques by data mining where this novel technique in blood donor recruitment information and management system for smart phone app user is seen here[8]. In the developing countries, the rate of population is regarded to increase public relations and effective communication between each other, blood donor issues in disaster management, the donor interest is discussed in this paper. Most of the app could not provide location and spatial search for geographical Location for blood donors. By using GPS and GSM with blood donor app in smart phones they are tracked [9]. It can provide the location of the donor and spatial search for geographical location for blood acceptor.

Discovering the knowledge behind all data blood stock from the databases are separated where it consumes more time. Using Data Mining with Interactive Knowledge Discovery, the discovery of new and interesting patterns in large datasets in blood donors is proposed here [10]. In some places like where there are more than 50 hospitals and only 6 blood banks are available then the problem of low stock is maintained.[11]

Then there should be recruitment of voluntary blood donor, retaining and recognising them. But the problem is the information while retrieving fails in this system.

III. EXISTING SYSTEM

The recruitment of blood donor when compared with other countries is very less in overall blood donating percentage annually. [14] Besides this recruitment, the screening of donor and the management system is not well maintained. The details of the information of donors are given for the usage of the users for contacting them when in need of blood in case of any emergency. The problem which currently exists in the medical field is that blood is needed immediately for an injured person or for any major operation, it is not easily available even though blood banks are present. [3] There are some websites present for donating blood were the phone numbers of the donors are present which are not reliable since they don't get often updated. At present there are no proper websites.

The primary disadvantage of BTS is that there is a concern of many discomforts in immediately following the process. Discomfort in the process is typically minor. However, the users feel weak and light-headed for several hours following the procedure. [4] There is no proper care of person who donates blood to patients. That is the medical history about the donor is not available with the website. If a donor has or had any medical problem comes forward to donate blood to a patient then it may lead to threat.[13] Medical history like:

- A person who have anemia or are underweight for height from their height should not donate blood.
- People who have diseases that are transmissible via blood are disqualified from donating.
- Donors who have had ear, tongue, or other body part piercing are allowed to donate blood as long as the needle used in the piercing was sterile. If it was not or if this is unknown, the potential donor must wait 12 months from the time of the piercing.
- Being positive for the AIDS or hepatitis viruses ruled out as a blood donor.
- Pregnant women and recent childbirth ruled out as a blood donor. This is because considering the safety of donating during and shortly after pregnancy has not been fully established. There may be medical risks to the mother and baby during this time.

Thus the above following reasons are not considered in any websites. These kinds of information

are not provided by the current system where it may lead to dead in person. Because the main reason is that the donor and the patient's body condition will not match all the time. There are short comings in web based application in the blood donation system:

- Difficulty in handling emergency situation,
- Slow internet access in some regions.
- No proper security for personal details.
- Misuse by third parties.
- No proper update about recent details.
- Needs a intermediate to work manually on information update.
- Time consuming (call or SMS to reach the donors).
- Leads to error prone results.

IV. PROPOSED WORK

In the present scenario as depicted in Figure 1, the donor and acceptor communication is illustrated. The bloods are used in case of emergency such as accidents and major operations.

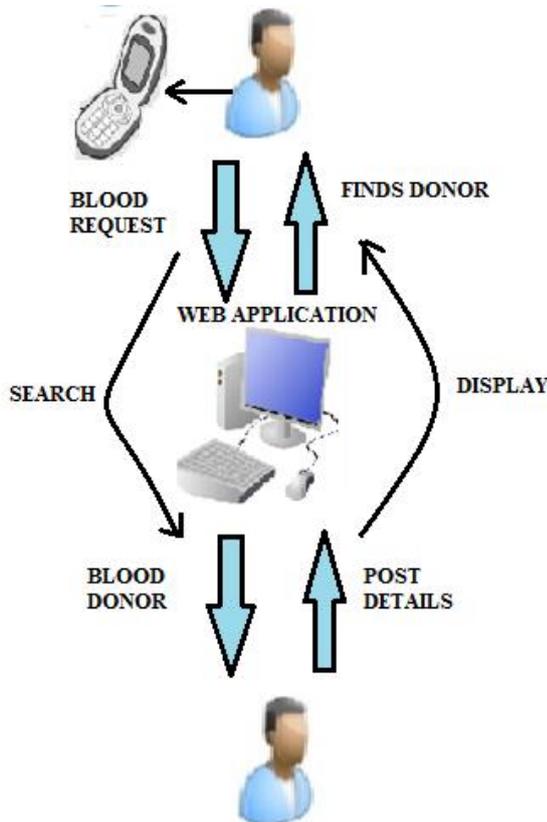


Fig. 1 Scenario of the proposed method

The proposed method is to create a website with an android application is developed so that the blood donors are available easily within the required time. The donors who are nearby location are tracked by the android application by GIS. The purpose of website is to update the relevant information regarding the donors who have already donated blood in various hospitals, so that when it is needed for any others they can view other donors where it can be accessed through this website. The proposed system functionalities are described as follows:

- The Blood donor app notifies the latest news or information about blood donation camp details.
- A better connection via the mobile application at places where there is slow internet connection.
- The appointment can be fix by the volunteers are reserved for the day and session that they want or free to make blood donation.
- The system provides authenticated and authorized features to the current system where private and confidential data can only be viewed by authorized user.
- The system provides the recording function for every process of the blood in order to keep track of the blood stock accurately.

By this there will be no need for updating the information manually. 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 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.

The high growth in numbers of people and capacity of mobile devices to communicate such as mobile phones are coupled with widespread availability of inexpensive range of web services presents an opportunity for helping other lives in mobile health care application. The communication between the donor and requestor are done by hardware devices. The proposed system consists of two device types:

- 1) A Mobile phone with android operating system where the android app is installed.
- 2) A Server (usually a pc) for the website and the database where the information are stored.

The proposed system is used for maintaining whole information about blood. In this proposed system there are mainly 6 modules there-Admin, Donor, Acceptors, Patient, System database and Blood donation app.

A. Admin

This module focuses on the both donors & acceptors. Each member in a donor & acceptor is given a user id and password, which identifies him uniquely. The member is given a login form. He enters the login details user id and password. The options given to administrator in the interface are -Change Password, Maintain donor details, Maintain acceptor details, Update donor details, Update acceptor details, Logout.

B. Donor

Each member in a Donor is given a user id and password, which identifies him uniquely. The member is given a login form. He enters the login details user id and password. The options given to a each member in a system are - Change password, Find a Blood group, appointment for donating blood, logout.

C. Acceptor

Description about acceptors. The acceptors are given options in the interface to - Change password, Find blood group, Who needs blood, Logout. Acceptor is the one who needs blood for someone related with him.

D. Patient

In case of emergency like rare blood group can request for the blood. This module gives information like patient's name, patient's blood group, required date and their contact information. The type of blood needed as per the health condition of patient. Since this is a critical phase where the donated blood is split up into different blood where it should be suitable for the patient.

E. System Database

Stores all the details about the donor, acceptor and patients information. There will be an option for updating the personal information by the users. This is for tracking and managing information.

F. Blood Donation App

An android application created for searching the available donor nearby location in a smart phone where it has GIS functionality.

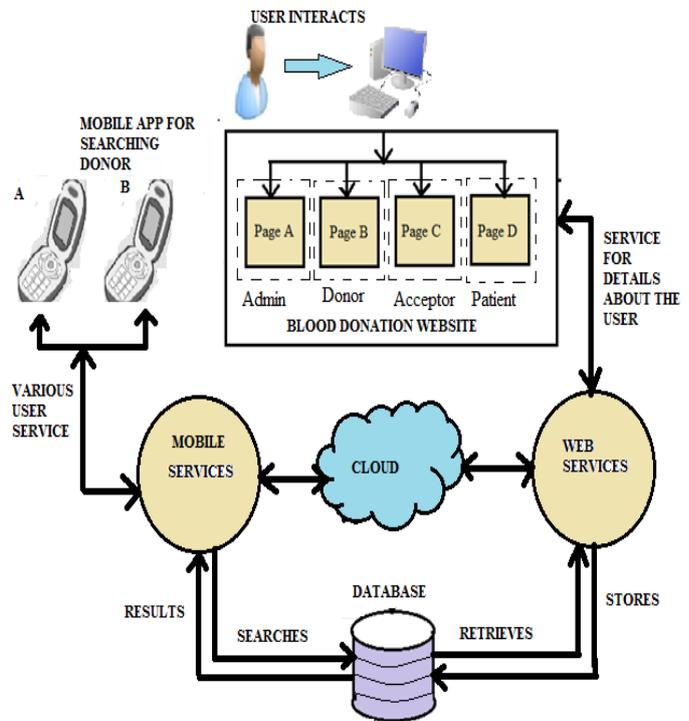


Fig. 2 Framework of the Blood Donation Management System

The Figure 2 illustrates the overall architecture where the user can be admin, donor, acceptor or patient. The user login into the webpage to store their information like name, age, blood group, contact details, etc where they are stored in the database via web services. The web application is to maintain the network through the internet.

The network means the community of blood bank where the management system completes all the jobs such as BTS and managing the information through the web application where the service goes to the blood bank. This helps to maintain the information of patient details, donor details and acceptor details. The system assist the admin to recruit the donor, update the stock information, displays the information about the donors medical history. The details of the user are the name, age, contact detail, blood group, locality, mail id and information about previous donation where the system records this information as a reference for someone who is in need of blood.

The update function which is done by the admin is that regular checking of expiry date of blood and request the donor to replace it with the new sample blood, donor who already donated the blood is informed to the

admin where he deletes that donor information from the system. [13]The web application has a system database where it consists of the information regarding existing and new donors and acceptors. The main problem is related with the information about knowing the details of donors in the city.

The android application uses the GIS where the function is called as Geocoding which creates a point on a map to find the nearest locality of donor. A function of GIS is Onscreen digitization where the acceptor or patient who need the blood from donor for entering the data on the screen of the mobile phone.

In Figure 3, the proposed system explains the working of the system where the operation starts with opening the website which is hosted in the cloud. The website gives option to the admin for either to login or sign up to update or to modify the details of the other users. The admin chooses the option where the admin should already provided his details to the system where it is stored in the database. The admin can view all the details regarding the donor, acceptor and patient.

The process before and after of the blood donation by the donor to the acceptor should be modified regularly by the admin where he is known as the intermediate to donor and acceptor.

The regular update process by the admin to the system can make the system to use in an efficient manner. The details given by the donor is checked manually by the admin for the correct information to be presented on the system so that when there is a need of blood should be available from the donor who has posted the details. The system provides efficient processing of design that helps the application to maintain the records of all users such as blood request, camp details, and appointment for transfusion. This provides enhanced functionality where all the information are having an link with each other in the database. Thus the demand for the blood is covered by the mobile application and locating the donor quickly.

Thus the proposed system can help everyone who is need of blood anytime and anywhere. The information given by the donors are completed true so that there will availability of donor at emergency situation.

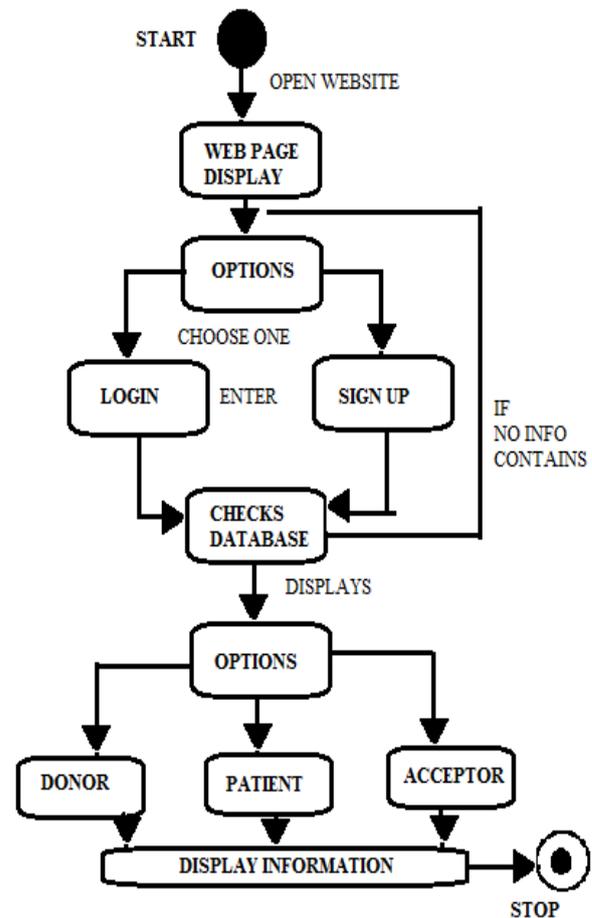


Fig. 3 State Transition Diagram for the propose system

V. CONCLUSIONS AND FUTURE WORK

In this paper, we have proposed an efficient and reliable blood donor information and management system based on GIS integrated in android mobile application. The service provided by the proposed system is needed and valuable to health sector where a quality of the blood is considered for the safety of the patient through a systematic process by the blood management system. This system will be the solution for the problems such as wrong information of donors, misuse by third parties and updating the donated blood by the donor which replaces the older systems. The proposed system is a web based android application helps us to reduce the human mistakes which are done in the existing system. The wireless internet technique enables the flow of data to work more rapidly and conveniently. This is integrated framework which has a cloud-based application on mobile devices. The future work of the system is to extend this application to process through SMS services. By this the contact detail is hidden from other members. Some other text or

number will be generated on behalf of the original phone number or email. This can be done without using the internet service where the acceptor sends blood request to donor by web but whereas the donor receiving the request is just a simple SMS in mobile. By this there will be secure BTS where strangers can't misuse the details of donors and where strangers can become helping hand for life at emergency situation.

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