WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Dynamic Blood Bank Management System (DBBMS)

Pranab Hazra[a], Debdas Mondal[b], Niladri Mallic[c], Baishali Sarkar[d], Tamajit Biswas[e], Deepali Kumari[f]

[a]Assistant Professor, ECE Department, Narula Institute of Technology, Kolkata – 700109, West Bengal, India
[b,c,d,e,f]B.Tech – ECE Student,Narula Institute of Technology, Kolkata – 700109, West Bengal, India
[a]pranabhazra2017@nit.ac.in, [b]debdasmondal9475@gmail.com, [c]niladri.mallik007@yahoo.com, [d]baisho.1997@gmail.com, [e]tamajitbiswas@gmail, [f]deepali843331@gmail.com

A B S T R A C T

Blood is a fluid that carries oxygen and is considered as a connective tissue which carries other elements because it has matrix. Now, as we know the importance of blood, the role of blood is not only to carry the oxygen to the tissues but also it takes away carbon dioxide from the tissues through heart and the vascular system. [3] Almost every day, hundreds of people need blood transfusions due to blood loss through surgeries or injuries, or diseases like anemia, sickle cell disease, hemophilia, cancer, etc. And in majority of cases, there is a delay to obtain required type or amount of blood. Organizing blood donation campaigns by going to the nearest blood bank to inform and get the necessary things is a time consuming and difficult task.[2] Moreover due to the pandemic, blood donation camps are restricted from operating, resulting in a lack of donors. And criteria for being a donor became even more stringent, thus narrowing down the pool of donors. Due to this, we are aware of the hardships people to obtain blood so as responsible engineers we plan to develop a website which aims at being a common platform for communication between the blood donors and recipients. The list of donors will be available on our website. People who require blood will submit their request along with their details and the suitable hospital or organization, i.e., the admin, will contact them within 30 minutes. If there are sufficient units of blood available, the requester would be notified right away.

Keywords: Blood, Website, Application, Assistance, Donor

1. Introduction

We regularly hear incidents of people requiring urgent medical care due to severe injuries or diseases, or due to surgeries[2]. One important aspect of medical care is blood transfusion. In the past decades, transfusion took place by replacing the whole blood that was used but in modern times, during transfusion,only those components of the blood are replaced which were lost such as red blood cells, white blood cells, blood plasma, clotting factor, and platelets.[4]For donating blood, there are NGOs or blood donation camps which take blood from individuals and deposit them into blood banks. When people need blood, they often approach hospitals or blood banks. In many cases, there are no hospitals or blood banks nearby that have the required blood, so they have to communicate a large area to reach them, which is not possible in case of emergencies. Even after that, many times blood is not available. This process is very time consuming and is a huge challenge to the proper healthcare of the citizens. Especially in critical cases, they have to get blood as soon as possible. So, we need a faster communication method to reduce the time to collect the blood. As engineering students, we wish to create something like a website where people can place a request to obtain blood which would work as a third party with the concerned establishments to obtain the list of donors in the vicinity of the recipient. This list will be available on our local database. After checking the list, the recipient will be notified if their required blood type is available or not, along with the location of the donor.

2. Genesis

There are several diseases like sickle cell disease, thalassemia, etc., where periodic blood transfusion is necessary for the survival of the patient. Each year millions of people across the world die of non-availability of transfusable blood. This has triggered the concept of blood donation camps and it has led to reduce the gap of demand and supply of blood. Many people come forward to donate blood voluntarily for storage in blood bank and use for those who are in dire need. It is the perfect way to cater to the demand of blood. The first blood bank was established in Kolkata in March 1942 at the All India Institute of Hygiene and Public Health and was managed by the Red Cross[1]. The tradition goes on. Now, the Indian Red Cross West Bengal organizes blood donation camps with Government blood banks. Majority of this blood is used to help out the underprivileged.

Despite a huge population, the demand-supply gap for blood units persists in many healthcare facilities in the country[7]. According to a 2012 report by the World Health Organization, only 9 million blood units are available annually, whereas the demand is 12 million units. A study conducted in 2009 and 2013 concluded a high rate of non-compliance on the part of blood banks on the quality and safety of transfusion services. Cases of transmission of infective diseases like AIDS due to substandard medical facilities and practice in blood banks continue to be relatively high. The national Blood Policy outlines the requirement for primary healthcare centers to have 24/7 service for blood transfusion, but over 80% of them lack blood storage facility. Disparities in access of donors in regions have led to wastage of blood stock in some parts of the country, while at the same time creating a shortage of blood in some parts. Moreover, documented instances of forced blood extraction have also occurred in India, among other countries, owing to its disproportionate ratio of available supply of blood and high poverty rate.

3. Solution Methodology

Due to everyday road accidents, surgeries, serious blood losing diseases, people are losing their loved ones due to lack of availability of blood. There are many people who are in perfect health conditions and have the ability to donate blood. But unfortunately, they don't have the medium or path of communication to contact the requesters to donate their blood to them. So we as engineering students created a website which connects all the hospitals and blood bank at one place. This website aims to bring the donors to be a part of the donor pool so that they can be contacted when the need for blood arises. People who need blood can communicate on this common platform to fulfill their needs.

3.1. Application Overview

The website will act as a third party medium between the hospitals and blood banks and the acceptors. Basically, the website will accept requests for blood and convey them to the admin who will then contact the donors from the list obtained from the concerned establishments and get back to the requester within 30 minutes. The requester can also place a call to the admin with the phone number provided on the home page.

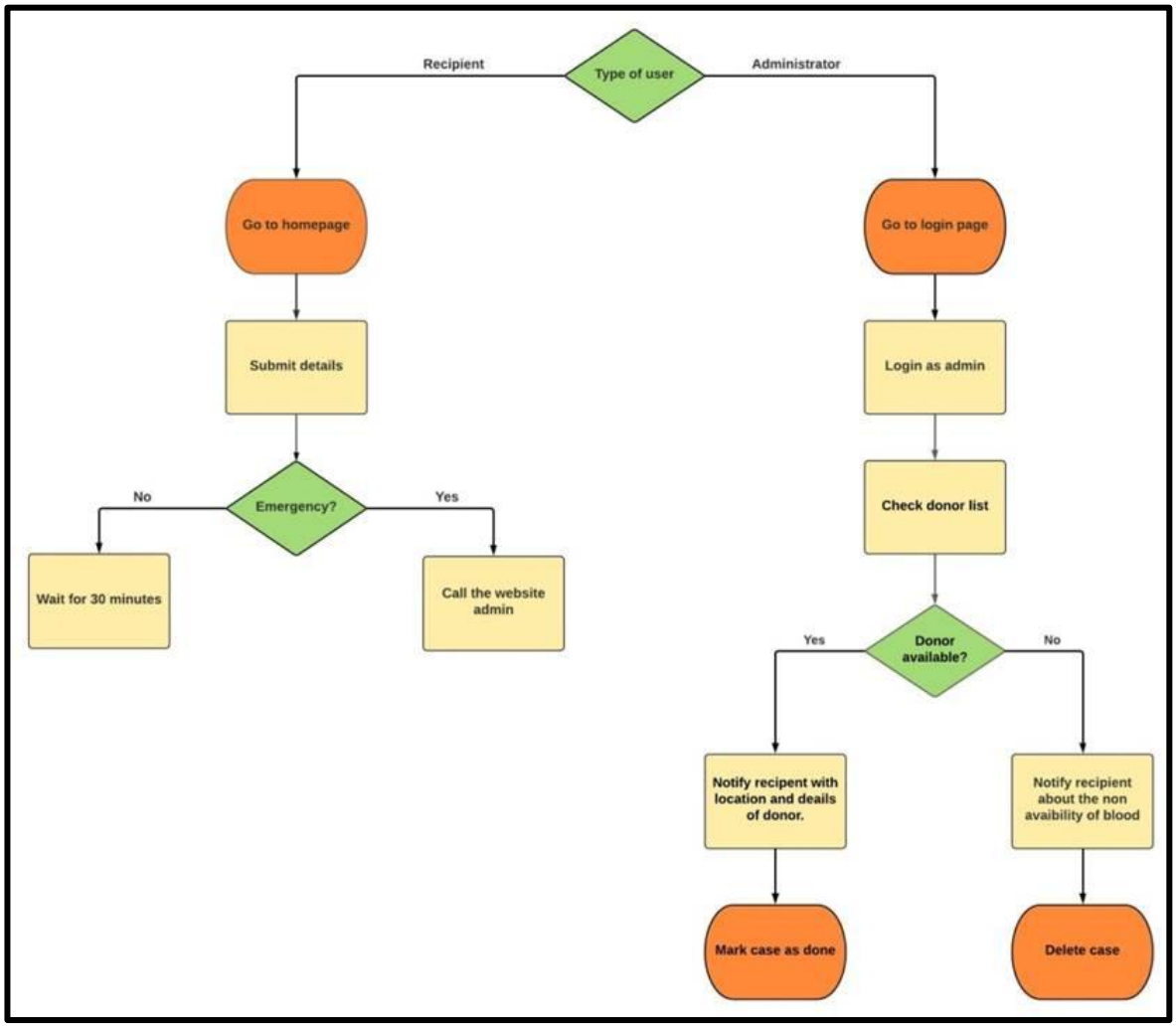
3.2. Features

- Basic Information: After navigating to the website, a requester simply has to enter his name, mobile number, email address and blood group and submit the details. On submitting, the admin will notify him within 30 minutes. He can also call the admin with the phone number provided.
- Registering as a donor: Any person can register as a donor. The admin will get the list of donors from a concerned establishment, which includes the name, parents' name, mobile number, gender, email address, blood group and residential address of the donor. These details would get registered in the local database.

3.3. Salient Aspects

- Records of past donations: All the past requests that have been fulfilled are stored on the website database, along with the complete details of the recipients.
- Contact the admin: After placing a request for blood, the admin's contact number is available on the home screen. The requesters will be notified within 30 minutes or else he can contact the admin in case of an emergency.
- Simple website layout: The website is simple to navigate and place a request. Since it could be an emergency, we have minimized the time required to place a request and provide a mechanism to contact the admin too.

3.4. Flowchart of Operation



Flowchart of Operation

3.5. Languages and Technologies used

The languages and technologies used to implement the blood bank system[6]:

- HTML: Hyper Text Markup Language, its basic function is to create web pages. It is the standard markup language for documents to be displayed in a web browser. Technologies like Cascading Style Sheets and scripting languages like JavaScript can also be used alongside HTML.
- CSS: Cascading Style Sheets, used to describe the presentation of a document written in a markup language such as HTML.
- JavaScript: A programming language used to design interactive websites and web applications. It is one of the core technologies of the World Wide Web, along with HTML and CSS.
- MySQL: An open source relational database management system.
- Java: Java is a high-level, class-based, object-oriented programming language.
- Servlet: A Jakarta Servlet is a Java software component that extends the capabilities of a server. Although servlets can respond to many types of requests, they most commonly implement web containers for hosting web applications on web servers and thus qualify as a server-side servlet web API.
- JSP: Jakarta Server Pages is a collection of technologies that helps software developers create dynamically generated web pages based on HTML, XML, SOAP, or other document types.
- Apache Tomcat: Apache Tomcat is a free and open-source implementation of the Jakarta Servlet, Jakarta Expression Language, and WebSocket technologies. Tomcat provides a "pure Java" HTTP web server environment in which Java code can run.
- Eclipse IDE: Eclipse is an integrated development environment used in computer programming. It contains a base workspace and an extensible plug-in system for customizing the environment.

3.6. Database Structure

3.6.1. Tables in the website

- DonorsAvailableNearby
- DonorList
- PendingBloodRequests
- CompletedRequests
- CompletedRequests
- BloodStock

3.6.2. Columns in each table

Table 1 -DonorsAvailableNearby

Column Name	Data type	Constraints
ID	INT	PRIMARY KEY
Name	VARCHAR(50)	NOT NULL
Father Name	VARCHAR(50)	ALLOW NULL
Mother Name	VARCHAR(50)	ALLOW NULL
Mobile Number	VARCHAR(10)	NOT NULL
Gender	VARCHAR(6)	NOT NULL
Email	VARCHAR(50)	NOT NULL
Blood Group	VARCHAR(4)	NOT NULL
Address	VARCHAR(200)	NOT NULL
Edit	VARCHAR(10)	NOT NULL
Delete	VARCHAR(10)	NOT NULL

Table 2–DonorList

Column Name	Data type	Constraints
ID	INT	PRIMARY KEY
Name	VARCHAR(50)	NOT NULL
Father Name	VARCHAR(50)	ALLOW NULL
Mother Name	VARCHAR(50)	ALLOW NULL
Mobile Number	VARCHAR(10)	NOT NULL
Gender	VARCHAR(6)	NOT NULL
Email	VARCHAR(50)	NOT NULL
Blood Group	VARCHAR(4)	NOT NULL
Address	VARCHAR(200)	NOT NULL
Edit	VARCHAR(10)	NOT NULL
Delete	VARCHAR(10)	NOT NULL

Table 3 –PendindBloodRequests

Column Name	Data Type	Constraints
Name	VARCHAR(50)	NOT NULL
MobileNumber	VARCHAR(10)	NOT NULL
Email	VARCHAR(50)	NOT NULL
BloodGroup	VARCHAR(4)	NOT NULL
Done	VARCHAR(4)	NOT NULL
Delete	VARCHAR(6)	NOT NULL

Table 4 - CompletedRequests

Column Name	Data Type	Constraints
Name	VARCHAR(50)	NOT NULL
MobileNumber	VARCHAR(10)	NOT NULL
Email	VARHCAR(50)	NOT NULL
Blood Group	VARCHAR(4)	NOT NULL

Table 5 - BloodStock

Column Name	Data Type	Constraints
Blood Group	VARCHAR(4)	NOT NULL
Units	INT	NOT NULL

Acknowledgements

The authors acknowledge with thanks the support from Head of The Department of Department of Electronics and Communication Engineering for encouraging in research work and giving scope in this regard. We are also thankful to the Head of the Institute of Narula Institute of Technology, for carrying out this study.

Authors acknowledge the massive help which is received from the different scholars whose articles are cited and included in references of this manuscript.

REFERENCES

[1] The Indian Red Cross Society, West Bengal State Branch, http://indianredcrosswestbengal.org/blooddonationcamp.html

[2] E. M. S. S. Ekanayaka, , and C. Wimaladharma. "Blood bank management system." (2015). Proceedings of the Research Symposium of Uva Wellassa University, January 29-30,2015

[3] Mange, Manali, and Bilal N. Shaikh Mohammad. "Online Blood Bank Management System Using Android Application." Proceedings of the 3rd International Conference on Advances in Science & Technology (ICAST). 2020.

[4] Kayode, A. A., Adeniyi, A. E., Ogundokun, R. O., & Ochigbo, S. A. (2019). An Android based blood bank information retrieval system. Journal of blood medicine, 10, 119–125. https://doi.org/10.2147/JBM.S197350

[5] Ali, I. Jahan, Md. A. Islam & Md. A. Parvez (2015). "Blood donation management system". American Journal of Engineering Research, 4(6), 123-136.

[6] Hashim, S. A., Al-Madani, A. M., Al-Amri, S. M., Al-Ghamdi, A. M., & Nahla, B. S. B. (2014). Online blood donation reservation and management system in Jeddah. Life Science Journal, 11(8), 60-65.

[7] Maria Cohut, "Blood Donation: Completely altruistic, so much benefit to so many people", 2020