



BLOOD DONOR NETWORK

A DIGITAL BLOOD BANK SOLUTION

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Abstract : Blood is the only oxygen transporter in the body and is crucial in saving lives. The number of persons who are in need of blood is increasing in large numbers day by day. To help the people who need blood, our online blood bank site can be used for getting the details of blood donors having the same blood group and within the same city or nearby locations from the patient. People who might want to give blood by registering them and providing all of their personal information on our website, as it will help the person to get them very easily. The purpose of making this website is to help the people who need blood in their emergency cases; it will make them feel easier to find the person who wants to give their blood or is already stored in the blood bank in their nearby location. With the help of this technology, we have enhanced the communication between the patient and the donor or the blood bank to the donor so that communication can be built up as soon as possible so that the patient's life could be out of danger..

IndexTerms - Component,formatting,style,styling,insert.

I. INTRODUCTION

Blood is necessary for hospitals and other medical center treatments, particularly in emergency situations. Every person needs blood in order to save their life. Receiving blood from various donors, screening the database of blood types, and supplying the hospital with enough blood when needed during emergencies are the main goals of a blood bank. The information is managed by the blood bank manager, i.e., factors like the economy, social constraints, global competition, and growing complexity. The blood bank managers make the right decisions to address challenges by using the information system that is available. A suitable and reliable platform that connects doctors and donors is required.

Hospitals can benefit from improved inventory management through data analytics that predict demand trends based on historical usage patterns. The Ministry of Health and Family Welfare of India stated that 10.9 million units were donated, falling short of the required 12 million units. A significant portion of this deficit can be attributed to the absence of a functioning nationwide system for voluntary, non-paid blood donation, as well as an inadequate mechanism for collecting blood. The COVID-19 lockdowns led to a rise in blood shortages throughout the nation. Other factors that have been linked to this deficiency include a lack of social awareness and misunderstandings among the general population about contributions of blood.

for blood donation, in order for each patient to receive the necessary blood in a timely manner. The goal of the Blood Donor Network is to bridge the communication gap between physicians and blood donors. Many people who want to donate blood but are unable to find a suitable platform because of their busy schedules find it easier when a blood donor has an easy and suitable platform to register and donate blood. Thus, using this idea, we generate a concept for establishing the Blood Donor Network website, which allows donors to quickly register and donate blood, thereby saving lives.

II. BACKGROUND THEORY

Blood and blood products help save the lives of patients during medical emergencies and surgical procedures while also helping those with chronic conditions like anemia, cancer, and hemophilia. Blood is an essential resource in health-care systems around the world, but availability does not always keep pace with demand. Roughly a blood donation shortfall is due to various obstacles, e.g. low public awareness of blood donation, inadequate communication between the surgeon and the blood donation units, and storage efficiency of blood storage. Closing this gap is important so that blood is available whenever and where it is needed. This requires efficient systems connecting donors and recipients, alongside the development of a culture of voluntary, unpaid blood donation.

The Access to Blood Help Link is to fill this gap blood donor network .It provides a dedicated blood donor network website for blood donors and people in need of blood. It provides users with an option to register as a blood donor, blood group, contact number, etc. In this way, the platform facilitates the easy and fast finding of potential donors when their blood group corresponds to the needs of the patient in question. This alleviates much of the friction and time delays usually involved in finding compatible donors

in an emergency. In addition, the platform raises online awareness about blood donation, ensuring that more people engage in this potentially life-saving practice.

For the last ten years, digital technology has become a global transformation agent for health systems. Mobile applications, online platforms, and real-time tracking systems have led to a revolution in the delivery and access of services in healthcare. Through enhanced communication between health care providers, patients and the public, these technologies have provided a much-needed boost in efficiencies for health care systems. Digital platforms have also played a crucial role in promoting public health interventions such as vaccinations, teleconsultation, and blood donation. All of these are towards making healthcare systems more accessible so that they can reach a populace faster, while ensuring the process is as efficient as possible.

The Blood Donor Network leverages these technological advancements to use the MERN stack—a modern web development framework that is based on MongoDB, Express.js, React.js, and Node.js. This technology stack provides a solid foundation for developing responsive and interactivity applications. Mongo DB (a NoSQL database) provides the desired flexibility for storing and retrieving donor information efficiently. Its schema-less structure and flexible data model make it very convenient for creating and maintaining different datasets like donor profiles, blood types, or location-centric information. React.js not only streamlines the development process but also creates the perfect environment for high-performance and fun with real-time reflection in web apps. GBM, or Graph-based Matching, is an algorithm that we implement to ensure that donors and recipients do not query the INFO IRM table frequently.

Drawing on the capabilities of the MERN stack, the Blood Donor Network not only solves the immediate problem of matching donors with those in need but also sets up a more robust and responsive blood donation ecosystem for the future. As the platform expands, it may be able to add further functionality, including geolocation services to determine the location of potential donors, alert systems for emergency requests, or analytic tools to track the volume and locations of attempts and report areas with critical shortages. These improvements would further entrench its place as a critical tool in the toolbox of making blood available and saving lives.

A perfect example of how digital technology can be used to solve real-life issues.

III. LITERATURE REVIEW

Many people have improved blood bank management systems in their own ways, and these are some of them:

- G. Muddu Krishna & S. Nagaraju (2016) [1] SMS-based blood bank. They suggested a system that would allow users to access the blood bank's services through SMS. If someone needed blood, they would have to send an SMS requesting it. The system's packet count module would then check to see if there was any blood available, and the data processing module would respond.
- Muhammad Arif; S. Sreevas; K. Nafseer; R. Rahul (2012) [2] Automated online blood bank database. Using an asterisk, they devise a direct call routing method. Each blood bank in this case has a database, which is run by a central server. A donor will be contacted directly when a person in need of blood calls their toll-free number. The donor's name will be placed on hold for eight weeks following the donation.
- HIV transmission through donations that don't contain antibodies 13 individuals who tested positive for HIV and received blood from 7 donors who tested negative for HIV antibody at the time of donation are the subject of an investigation by Ward et al. (1988). According to available antibody tests, these donors were negative at the time of blood donation because they had reportedly only recently contracted the infection. study of European blood collection practices (Healy, 2000). Unlike state and blood bank systems, donations to the Red Cross are linked to religious activities and other volunteer work.
- Mohammad Ismail Z, Tukur Anas Mohammad, and Ibrahim Fawze Akar created the Centralised Blood Bank Repository. On the WWW platform, they have created a centralised web-based system with HTML5/CSS & JSP [6]. They use the H2 Database, which is hosted on Apache Web Server. This facilitates transactions for both the donor and the acceptor; the donor can be compensated for his services, and the acceptor can cover the transfusion fee and centre fees.
- These days, digital blood banks concentrate on files (data) that are kept in blood banks and hospitals, or data obtained through blood donation events. This guarantees that information about blood, donors, and recipients is kept in records and archives. This makes processing data and information challenging and time-consuming. Physical records of every blood donation and transfusion test are also kept. This renders information vulnerable to human error and mistakes, thereby endangering human lives. Destitute productivity is another fundamental issue with this framework. Blood recovery is a time-consuming process that requires a lot of work, whether it is donor or recipient information. Hospitals find it extremely difficult to rescue lives during life-threatening situations because the information retrieval procedure takes so long. Given how easily papers and records can be lost or stolen, information security and backup are also important considerations. It is therefore an unreliable framework.

IV. METHODOLOGY

The life blood, the blood donation registration, and blood availability The all three are constructed in such a way, so that they can possible & able to access by any and all should stay in register & save a life by saving his own blood. This paper begins with a brief introduction that provides background information on the topic. Here's the process breakdown:

1. The development of the "Blood Donor Network" website should start with the basic needs and requirements of the blood donors and blood recipients. This website would need to allow a user to register as a donor, register the blood type they have and ensure users can request blood from donors in their area. This part involved capturing the target audience and the core feature set of the website such as, user registration, blood type match, donor search, and emergency alerts.

2. We decided to use a NoSQL database (MongoDB) for donor information. It consists collections for users (both Donor and the Recipient), users personal information like name & address, blood group & total donation count, and also their emails. MongoDB enables flexible data storage and retrieval – critical for efficient donor-recipient matching.

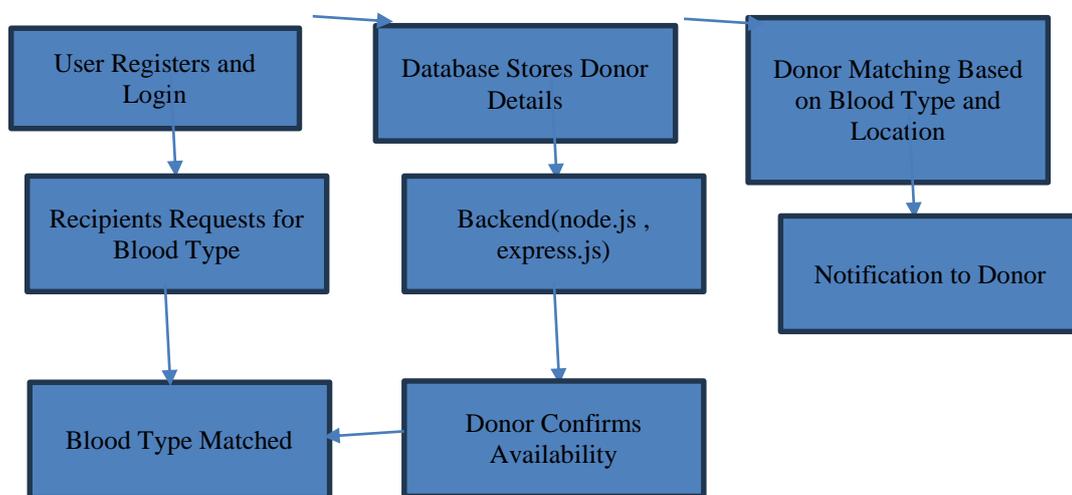
3. Here we built the User Interface (UI) using React.js: the web development tool to produce dynamic, responsive and interactive web pages. React enables continuous user experience by efficiently rendering the UI as per the user's actions. The Frontend portion of the website consists of User Registration, Blood Type Selection, Donor Search, and Dashboard to manage user interaction.

4. The backend is written in Node.js and Express.js, allowing the server to receive requests and interact with the database. The backend is responsible for essential operations like validating user inputs, saving user info, processing blood donors' requests, and creating notifications. APIs for registering new users, matching blood types, and querying the database for potential donors based on the recipient's requirements were all created.

5. Once both frontend and backend are developed, the integration stage takes place. They connected frontend and backend services together. To ensure that the system behaves as desired in production environments, unit tests, integration tests and user acceptance tests were performed.

6. The website is tested, deployed to a cloud server, and continuously monitored for performance, bug detection, and updates to enhance user experience worldwide.

Flowchart



V. CONCLUSION

The main goal of our project is to minimise the problem that we have noticed in our survey. We would like to protect the user data from the public and ensure the proper and current location of the donor so that it could take less time and give the result very quickly. It would help the people to find the donor as soon as possible in their nearby places; patient life could be out of danger.

The Blood Donor Network points out the importance of managing blood bank stock, reducing waste, and ensuring the security of donated blood. Digitalized platforms have been created to speed up the process of matching blood donors with those receiving, as a result of the growing digital technology of healthcare. But eventually, even after digitizing the Blood Donor Network, many challenges remain, such as the availability of the donor at the proper time within the location, protecting the user's data, and building a proper communication channel with rural area people.

The main idea of the literature review is to find conclusions from earlier studies in this area, point out weaknesses in the current systems, and create a more thorough, safe, and user-friendly blood donation network system.

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