B7-1A3E : IDEATION PHASE - LITERATURE SURVEY

Plasma Donor Application

RESEARCH-BACKED IMPLEMENTATIONS:

1. **COVID-19 Convalescent Plasma: from donation to treatment - A Systematic Review & Single Center Experience:**

   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7861598/

   The coronavirus disease 2019 (COVID-19) pandemic caused the analysis of convalescent plasma to reemerge as a possible treatment. This paper covers the topic in 2 aspects. First, a systematic review summarizes the available research examining the use of convalescent plasma for the treatment of patients with COVID-19. Second, it describes the team's experience in establishing a single-center convalescent plasma donation program.

   While this research program was not implemented via any software, it explains the need for plasma programmes through well-established statistics, gives a clear idea of the challenges faced in involving the public for such a large scale program and stresses the development of a simple and hassle-free experience to donate plasma.

2. **Developing a plasma donor application using Function-as-a-service in AWS:**

   050140.pdf (ijiird.com)

   Plasma therapy is a process where blood is donated by recovered patients in order to establish antibodies that fight the infection. This project is a plasma donor application developed using AWS services like AWS Lambda, API gateway, DynamoDB, AWS Elastic Compute Cloud. The use of these AWS services eliminates the need of configuring servers, reduces infrastructural costs and helps achieve serverless computing.

   For instance, during the COVID-19 crisis, with plasma therapy the recovery rates were high but the donor count was very low and in such situations it was very important to get the information about the plasma donors. Saving the donor information and notifying about the current donors would be a helping hand as it can save time and help the users to track down the necessary information about the donors.

   Scope for improvement in terms of making the UI more user-friendly and using elastic load balancer to handle multiple requests simultaneously, which will maintain the uptime of the website with negligible downtime.

3. **Blood donors appointment booking and managing system using PC and mobile web browsers in current pandemic (COVID-19):**

   https://www.researchgate.net/publication/353485434_Blood_donors_appointment_booking_and_managing_system_using_PC_and_mobile_web_browsers_in_current_pandemic_COVID-19

   Blood and plasma transfusions are vital in the case of pandemics like COVID-19. This paper proposes a donation system that manages the appointments between donors and the patient in the case of fresh blood donation.

   The website is designed using Bootstrap technology to provide suitable access using a web browser on PC and smartphones. It contains a large database in MySQL containing information about the donors, their blood group, available time, and other personal information to facilitate the donation process. The webpages are created using Java, Java server pages (JSP) technology, hypertext markup language (HTML) and bootstrap tech. The site gives additional options for recipients to request blood and report abusive users.

   The system is built for blood donation and assumes further plasma donation is possible, The UI/UX has scope for improvement.

4. **Blood Bank Management System:**

   https://www.irjet.net/archives/V8/i6/IRJET-V8I668.pdf

   This paper proposes a Blood Bank Management System (BMMS) which can be used by laboratories, clinics, hospitals, or anyone who is in need of blood. The proposed system would be able to connect the requester and donor through a safe web-based platform with a simple registration process. This study found out that this system puts an end to the fear caused during an emergency period and reduces the hassle of manual paper-based data entries.

   The methodology that has been chosen to develop BMMS is the Rational Unified Process (RUP), consisting of four phases, namely Inception, Elaboration, Construction, and Transition. Some important modifications to this methodology include admin access to registered user's data and a personal notification alert system.

   GPS tracking via registration and Cloud Storage for scalability can further improve the feasibility and data processing of the presented system. It could also support various regional languages for better reach. The size of the database may increase exponentially, so this BBMS is made such that it is scalable and can be deployed on

cloud storage systems like Amazon Elastic Compute Cloud (EC2) or Google's Kubernetes Engine (GKE) after containerizing the application.

5. **A Cross-Platform Blood Donation Application with a Real-Time, Intelligent, and Rational Recommendation System:**

   https://www.researchgate.net/publication/357234718_A_Cross-Platform_Blood_Donation_Application_with_a_Real-Time_Intelligent_and_Rational_Recommendation_System

   In the case of voluntary blood donation, several mobile applications are available to establish initial communication between donors and receivers. Recommending the right potential donor during a blood search can save the life of a critical patient with an immediate response from the donor. However, the requirement of an advanced recommendation system is yet to be addressed.

   This research paper focused on designing a real-time, intelligent, and rational recommendation system using sentiment analysis of the user's feedback, the response rate of the donor, and the current geo-location information and developed a cross-platform application for blood collection and distribution system. It uses a Bi-directional LSTM-based deep learning model to process and generate features from the user feedback.

   Although rigorously tested, there is still scope for improvement in recommendation accuracy and the app's UI/UX.

6. **Android Blood Bank:**

   https://ijarcce.com/wp-content/uploads/2015/12/IJARCCE-20.pdf

   The major problem faced by a blood bank is not an insufficient number of donors, but finding a willing donor at the right time. This application carries out timely updates of the information regarding donors and the administrator accesses the entire information system.

   Donors are prompted to enter contact details and their blood group. When there's a need for blood, a requester can quickly check for blood banks or hospitals matching the blood group requirements and reach out to them through the route to the blood bank. The user will get the route to reach the desired location and he won't have to ask manually, therefore time can be saved.

   Focus is not on plasma but on blood. There is a scope for scalability and better UI/UX design.

7. **Android Based Health Care App:**

   https://www.jetir.org/papers/JETIR2205390.pdf

   COVID-19 shed the spotlight on various issues in the medical space such as lack of oxygen, lack of blood, lack of plasma, and other medical facilities. The purpose of this android application is to help people find all the medical facilities such as information related to COVID-19, faster vaccine access, blood donation, plasma donation, oxygen cylinders with proper location of donor and recipient using Google Maps.

   The app also provides an end-to-end encrypted messaging facility that uses the AES Algorithm at its backend so that people who want to receive or donate blood, plasma, oxygen can securely interact with each other.

   In the future, the app can be developed to make it more closely linked to additional features such as regular site or hospital, Donor Number, Frequently Asked Blood Group, Age Group of Patients in Need of Blood etc. The Health Care Application can be implemented using Artificial Intelligence and Deep Learning Algorithms. Details of NGOs and NCC Units can be made available on request. Last donation details can be updated automatically in the App. Notice to Donors regarding the nearest ongoing Blood Donor Camp could also be implemented.

POPULAR EXISTING SOLUTIONS:

1. An online initiative by the Delhi government to maintain a plasma bank for registering plasma donors - https://delhifightscorona.in/donateplasma/
2. During the COVID-19 pandemic, the UK National Health Service introduced a special scheme under the banner of its blood and plasma collection portal for donating plasma to plasma banks - https://www.blood.co.uk/plasma/
3. The US Red Cross foundation's portal offers an app-based means of registering for plasma donation. However, the plasma is not solely dedicated towards the treatment of COVID-19. The site also has a list of plasma banks allowing those in need to reach out - https://www.redcrossblood.org/donate-blood/how-to-donate/types-of-blood-donations.html