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RAKTSETU: Blood Management System

Sumit U. Mali[1], Rutuja Bhosale[2], Nikita Yadav[3], Vaishnavi Shinde[4], Mahesh Chaudhari[5]
Assistant Professor, Computer Engineering[1]
Students, Computer Engineering[2-5]
NBN Sinhgad Technical Institutes Campus, Pune, India

Abstract: *The timely availability of blood is crucial in medical emergencies, yet many regions still face challenges due to inefficient blood donation and management systems. This paper presents RAKTSETU: A Blood Management System, a centralized platform that connects donors, hospitals, and blood banks to streamline the blood donation process. The system enables real-time tracking of blood availability, facilitates emergency blood requests, and notifies potential donors instantly, ensuring rapid response in critical situations. It also includes features for managing blood donation camps, donor profiles, and locating nearby blood banks and hospitals. An interactive chatbot further enhances user experience by assisting with navigation and providing guidance on blood donation and health. By improving communication, transparency, and accessibility, RAKTSETU aims to address the limitations of traditional systems and contribute to a more efficient and life-saving healthcare infrastructure.*

Keywords: Blood Request, Blood Donation, Blood Management System, Blood Camp

I. INTRODUCTION

Blood is essential for saving lives during accidents, surgeries, childbirth complications, and serious medical conditions like cancer or anemia. Every day, hospitals need blood to treat patients, but finding the right blood type at the right time is often a big challenge. In many cases, the delay in finding donors or arranging blood can lead to loss of life. This happens because of poor coordination between donors, hospitals, and blood banks, as well as a lack of proper systems for managing blood-related data.

In many places, the blood donation process is still manual and unorganized. People who want to donate blood are not always aware of when and where their donation is needed. At the same time, hospitals may not be able to quickly reach out to the right donors during emergencies. There is also no proper way for users to search for blood availability or nearby facilities easily.

To solve these real-life problems, we developed RAKTSETU: A Blood Management System. It is a digital platform designed to connect all key participants in the blood donation process including blood donors, hospitals, and blood banks on a single network. The system helps in sending emergency blood requests, notifying eligible donors, locating nearby hospitals and blood banks, and organizing blood donation camps. It also allows users to maintain their donation history and receive guidance on blood donation through an interactive chatbot.

RAKTSETU aims to reduce the communication gap, provide better support during emergencies, and build a more organized and responsive blood donation ecosystem. It makes the entire process of donating and requesting blood faster, easier, and more efficient, helping save more lives when time is critical

II. RESEARCH METHODOLOGY AND SYSTEM ARCHITECTURE

2.1. RESEARCH METHODOLOGY

- **Requirement Analysis:** We began by identifying key issues faced in the blood donation process, such as poor communication and delays during emergencies.
- **System Design:** The system's structure, interface, and navigation flow were carefully planned to ensure ease of use and efficient interaction between users and other stakeholders.
- **Module Development:** Major features were developed, including blood request management, blood camp coordination, location-based hospital search, and chatbot assistance.

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Technology Stack:
Frontend (React.js) – Provides a responsive and interactive interface.
Backend (Node.js) – Handles server-side operations and API management.
Database (MongoDB)—Efficiently stores and retrieves all application-related data.
APIs (Twilio, Custom RESTful APIs) – Handles automated SMS notifications and tracking.
Testing: Each component underwent thorough testing to detect and resolve any bugs, ensuring the application runs smoothly.

2.2. SYSTEM ARCHITECTURE

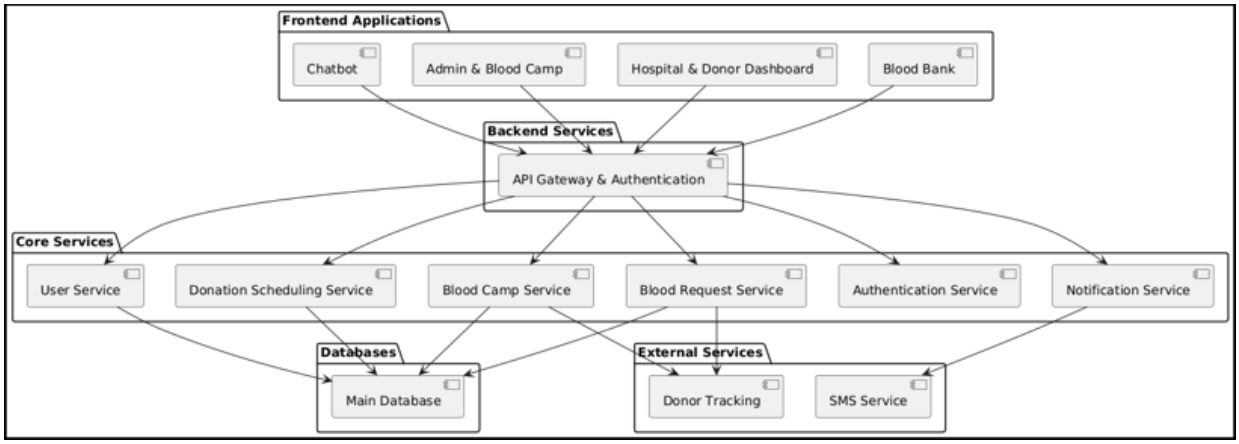

Figure 1 : System Architecture

III. RESULTS

The RAKTSETU: Blood Management System was successfully developed and tested. Emergency alerts can be sent to registered users when needed. The system also helps in arranging blood donation camps and locating nearby blood banks. The chatbot feature assists users in navigating the system and provides answers to common queries
All modules worked as expected during testing. The user interface was found to be simple and responsive. The system reduced delays in communication and improved coordination between users, hospitals, and blood banks.

Figure 2: *Home Page*

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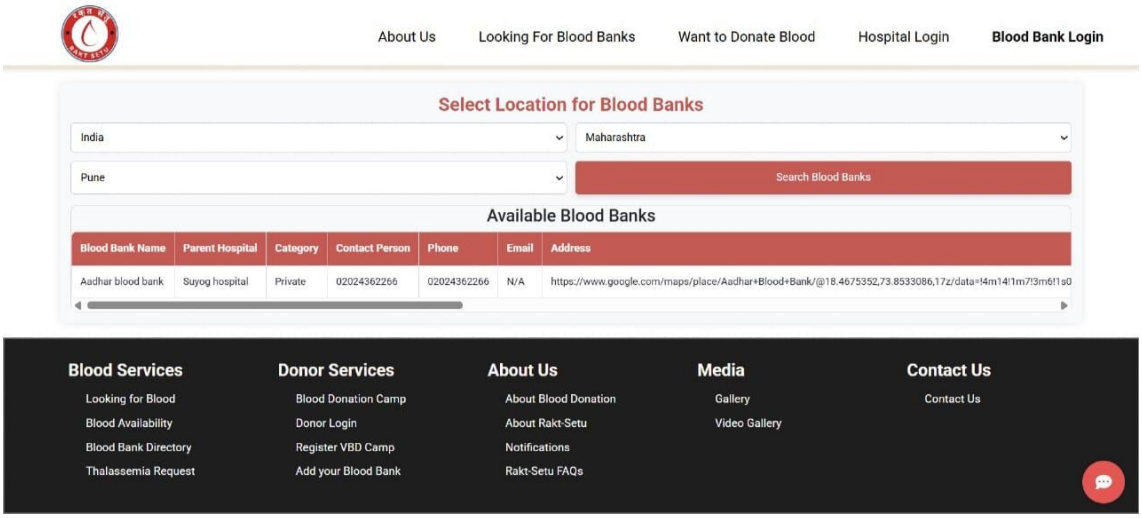

Figure 3: Find Blood Bank

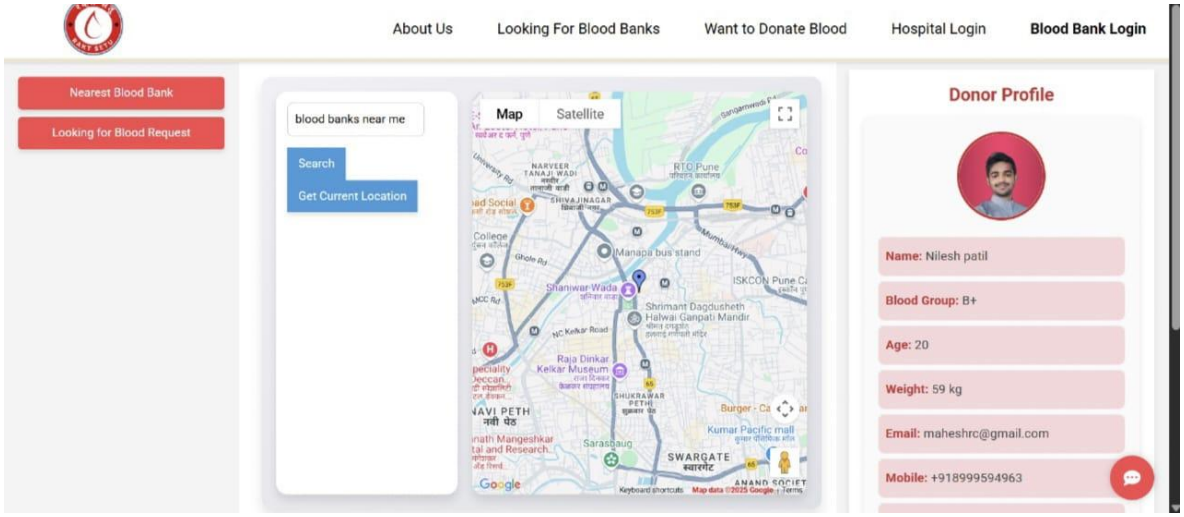

Figure 4: Donar Dashboard

IV. CONCLUSION

The RAKTSETU: Blood Management System aims to simplify and improve the process of blood donation and management through a digital platform. It effectively bridges the gap between users, hospitals, and blood banks by enabling faster communication and organized handling of blood requests. The system includes essential features such as emergency alert notifications, blood camp arrangements, donor registration, and location-based search for nearby blood banks.The chatbot support enhances user experience by providing guidance and instant responses to common queries. During testing, all modules performed reliably, and the platform proved to be responsive and easy to use. Overall, RAKTSETU contributes to building a more connected and prepared healthcare environment. It encourages more people to donate blood and helps ensure that blood units reach those in need on time. The project has the potential to be expanded further and integrated with more hospitals and blood banks on a larger scale.

V. ACKNOWLEDGMENT

We're pleased to present our final time design," RAKTSETU Blood Management System," which has been a significant part of our academic literacy. This design allowed us to gain hands- on experience and apply our specialized knowledge

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to address real- world challenges. We express our sincere gratefulness to our design companion, Prof. Sumit U. Mali, for his nonstop guidance, support, and stimulant throughout the design. His perceptivity and feedback were extremely precious in shaping our work. We'd also like to thank our head of department, Prof. Shailesh P. Bendale, along with all the faculty members, for their constant support and stimulant. Eventually, we extend our sincere thanks to our musketeers, classmates, and families for their provocation.

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