VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION
ANNUAL RESEARCH JOURNAL
ISSN(ONLINE): 2581-7280

BLOOD AND ORGAN INVENTORY MANAGEMENT SYSTEM

Meena Perla[1], Suraj Ambekar[2], Dipak Gaikwad[3]
[1](Viva institute of technology, virar)
[2](Viva institute of technology, virar)
[3](Viva institute of technology, virar)

Abstract: *The need for blood and organ donations has been an integral part of healthcare for decades. Historical records highlight the development of blood transfusions and organ transplantation techniques, which have saved countless lives. With the rapid advancements in medical science, there has been a growing demand for blood, organs, and related components such as platelets and white cells for use in surgeries and treatments. In light of this, hospitals are increasingly seeking effective and efficient ways to manage donor information, inventory, and requests in real time. The modern-day challenge lies in efficiently managing these medical resources in a manner that bridges the gap between hospitals and donors. This project focuses on developing a mobile-based Blood and Organ Donor Inventory Management System, which aims to address these challenges. By utilizing the Android platform, this system offers a user-friendly interface for hospitals to post real-time requests for blood or organ donations. It also enables donors to easily search and find donation opportunities nearby, ensuring a streamlined and responsive process that is critical in emergency scenarios. The core architecture of this system leverages mobile development IDEs such as Android Studio, along with various APIs to facilitate real-time interaction between donors and hospitals. The app ensures data security and privacy for donors while providing hospitals with the functionality to search for and request specific blood types or organs as needed. The backend is designed to store, update, and retrieve inventory data efficiently, ensuring that hospitals always have access to accurate information on available donors. This system was developed with hospitals, clinics, and donors in mind, enhancing their ability to communicate and share vital information quickly. The testing and implementation phases of this application demonstrated its potential to be scaled further, improving the availability of critical medical resources. By providing a platform where hospitals can manage their donor inventory, this application serves as a crucial tool for enhancing the medical donation and supply chain.*

Keywords - *Blood Donation, Donation Tracking, Organ Donation , Health Care System Integration, Real Time Availability*

I. INTRODUCTION

In today's world, health technologies are advancing at an unprecedented rate. In many regions, the lack of a well-coordinated system results in delayed response times, mismatches between donors and recipients, and inefficient resource allocation. Moreover, traditional methods of blood and organ donation management often suffer from outdated communication practices, lack of real-time tracking, and difficulties in donor-recipient matching, which can cost precious lives. To address these challenges, this project presents a comprehensive **Blood and Organ Donation System**, designed to streamline the donation and transplantation process by leveraging modern technologies. The system aims to provide a unified platform where donors and recipients can interact in real-time, enabling quicker matches and improving accessibility to life-saving donations. The platform offers functionalities such as donor registration, recipient requests, real-time availability tracking, and location-based matching, along with seamless communication between hospitals, donors, and recipients.

The application integrates secure user authentication and data management processes, ensuring that sensitive medical information is handled in compliance with privacy regulations. The system also includes an intuitive user interface, making it easier for donors to register and for recipients to send requests and track their progress.

Furthermore, by incorporating smart notifications and automated alerts, the platform enhances the efficiency of organizing appointments and managing donations.
This paper will discuss the design, implementation, and benefits of the proposed system, as well as the impact it can have on reducing the gap between supply and demand in blood and organ donations. By fostering better coordination and minimizing delays, this platform aims to make a significant contribution to improving healthcare outcomes in the field of transfusion and transplantation services.

II. LITERATURE SURVEY

A Mobile-Based Blood Donation System: An Innovative Approach, International Journal of Computer Science and Mobile Computing, 2018. This paper discusses the development of a mobile application that connects blood donors and recipients. It highlights the importance of mobile technology in enhancing communication between hospitals and potential donors, improving the overall efficiency of the donation process. The app provides real-time donor information and alerts for urgent blood requests. [1]

Design and Development of a Real-Time Blood Donation System Using Machine Learning Journal of Artificial Intelligence in Healthcare, 2021.. The authors present the design and development of a blood donation system that incorporates machine learning algorithms to predict donor eligibility and automate the matching process. The paper focuses on how machine learning can improve the accuracy and speed of donor-recipient matching. [2]

A Smart Blood Donation System Using Mobile Applications and Cloud Computing, International Conference on Mobile Applications in Healthcare, 2018. This paper presents a smart blood donation system that combines mobile applications with cloud computing for enhanced data management and donor coordination. The system allows donors to register, update their status, and respond to urgent donation requests through a mobile app. [3]

Blood Donation Management System with Real-Time Data Analytics, International Journal of Data Science and Analytics, 2020.. The authors propose a blood donation management system that integrates real-time data analytics to provide insights into donor behavior, donation trends, and inventory levels. The system uses cloud-based analytics tools to optimize the management of blood supplies and ensure timely donations.[4]

Organ Donation System Using Blockchain and IoT: A Case Study, International Journal of Healthcare Technology and Management, 2021. The paper presents a case study on the successful integration of blockchain and IoT technologies in an organ donation system. The authors focus on how blockchain ensures secure and tamper-proof records, while IoT devices monitor the condition of donated organs during transport.[5]

A Review of Machine Learning Algorithms for Blood Donation Systems, Journal of Healthcare Informatics Research, 2020. This paper provides a comprehensive review of various machine learning algorithms that can be applied to blood donation systems, including classification, clustering, and predictive modelling techniques. It highlights how machine learning can improve donor selection, matching, and forecasting of donation needs.[6]

A Cloud-Based Organ Donation System with Real-Time Matching, International Conference on Cloud Computing and Healthcare, 2019. The authors propose a cloud-based platform for managing organ donation, focusing on real-time matching of donors and recipients. The system uses cloud computing to store donor and recipient data and performs real-time organ compatibility analysis to ensure efficient matching.[7]

Enhancing Blood Donation Systems with Real-Time Notifications, International Journal of Computer Applications, 2018. This paper discusses the use of real-time notification systems to alert donors of urgent blood needs, donor drives, or eligibility status. The system integrates with a mobile application that sends push notifications to encourage timely participation in donation drives and reduces response times during emergencies.[8]

Predictive Analytics in Blood Donation Systems: A Data-Driven Approach, Journal of Big Data in Healthcare, 2021. The authors present a predictive analytics model that uses historical donation data to forecast future blood

demand and identify donation trends. This paper emphasizes how predictive analytics can help blood banks manage inventory more effectively and avoid shortages during critical periods.[9]

Blockchain-Based Organ Donation System for Privacy and Security, IEEE International Conference on Blockchain, 2020. The paper examines the implementation of blockchain in organ donation systems to improve privacy, security, and transparency. Blockchain ensures that sensitive donor and recipient data are securely stored, while smart contracts automate the matching process based on compatibility factors.[10]

A Smart Organ Donation and Transplantation System Using IoT, Journal of Medical Internet Research, 2019. This paper explores the use of the Internet of Things (IoT) to monitor and track the status of organ donations and transplantation processes. The proposed system uses smart sensors to track donated organs during transport, ensuring they reach recipients in optimal conditions. The authors highlight the potential of IoT to enhance organ tracking and reduce risks during the transplantation process.[11]

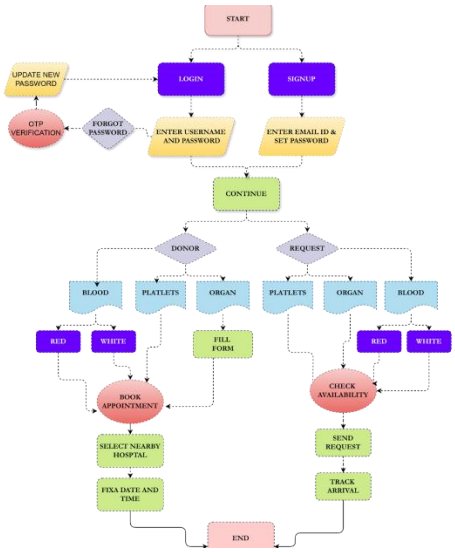
Real-Time Geolocation-Based Blood Donation System, International Journal of Engineering Research & Technology, 2018. The authors propose a geolocation-enabled mobile platform that allows users to locate the nearest eligible blood donors in real-time. This paper demonstrates the use of GPS technology to enhance emergency blood donation requests, enabling hospitals to find donors within proximity and speed up the collection process.[12]

Machine Learning Approaches for Predicting Blood Donation Eligibility, Journal of Healthcare Information Systems, 2020. This paper presents machine learning algorithms that predict donor eligibility based on historical data, medical records, and demographic information. It shows how supervised learning models can optimize the selection of eligible donors and reduce waiting times by quickly identifying suitable donors for emergency needs.[13]

Cloud-Based Blood Bank System Using Mobile Technology, International Conference on Advances in Cloud Computing, 2017. The authors introduce a cloud-based system to manage blood bank operations efficiently. This system integrates real-time donor data collection, cloud storage for inventory management, and automated notifications for donors, enabling faster response times during emergencies. The paper addresses the scalability and flexibility offered by cloud computing in healthcare applications.[14]

Blockchain for Secure and Transparent Blood Donation, IEEE Transactions on Healthcare Informatics, 2019. This paper explores how blockchain technology can secure the blood donation process by ensuring the authenticity of donor data, preventing fraud, and enabling a transparent and immutable ledger for tracking blood donations. The authors propose a decentralized system to record transactions securely, thus reducing risks associated with traditional centralized systems.[15]

III. METHODOLOGY



The flowchart represents the methodology of a blood and organ donation system, showcasing the process from the user's entry point to the final stages of donation or request. It begins with the user's option to either log in or sign up for the system. If the user chooses to sign up, they are required to enter their email ID and set a password, whereas existing users can log in using their username and password. In case users forget their password, they can opt for an OTP verification process to update their password.

Once logged in, users can choose between two primary options: donor or request. If they select the donor option, they can choose to donate blood, platelets, or organs. After selecting the donation type, they choose between two categories for blood: red or white, and then book an appointment. This appointment can be scheduled by selecting a nearby hospital and fixing the date and time for the donation process.

On the other hand, if the user selects the request option, they can request blood, platelets, or organs. After choosing the required item, users will fill out a form and check availability. Once availability is confirmed, the request is sent, and the user can track the arrival of the requested blood, platelets, or organ.

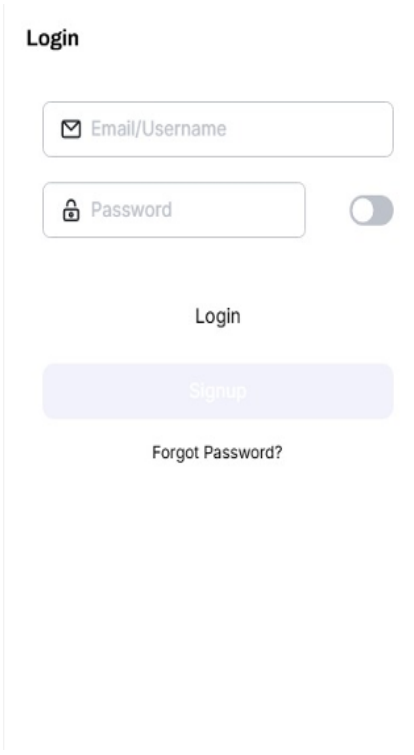
The entire process is structured to ensure ease of use, enabling donors to efficiently schedule appointments and helping recipients to easily request donations and track their status in real time. The final stage of both processes leads to the conclusion of the request or donation, ensuring a smooth workflow from start to finish.

IV. RESULT

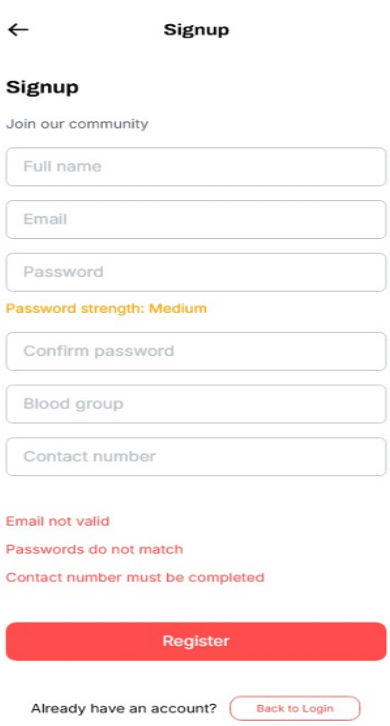
The app is designed to facilitate blood and organ donation by connecting donors with recipients in need.It aims to streamline the donation process, making it easier for users to contribute to saving lives.

- **Login Screen:** A visually appealing login screen with a soft red-white gradient background, featuring user-friendly input fields for email/username and password, along with options to signup or reset passwords.
- **Signup Screen:** A clean and minimal signup screen that guides users through registration, collecting essential information like full name, contact details, and blood group.
- **Home Screen:** The central hub of the app, offering easy navigation with prominent buttons for "Donate" and "Request" options, alongside quick access to donation and request histories.
- **Donor Section:** A user-friendly interface for donors to register their availability, select their preferred donation type, and choose from a list of nearby hospitals or view them on an interactive map.
- **Request Section:** Allows users to easily submit blood, platelet, or organ requests, specifying their requirements and checking for available donors or hospitals.
- **Profile Screen:** A personalized screen for users to view and edit their profile information, access their donation and request histories.

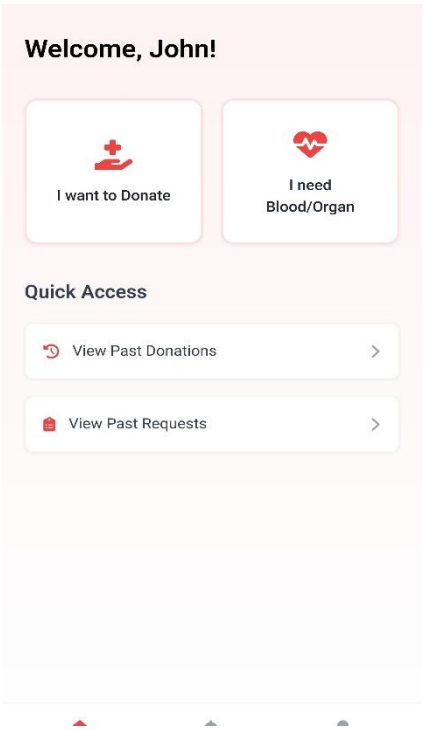
- **Admin Page:** A dedicated page for administrators to manage user accounts, review and approve/reject requests, and generate reports



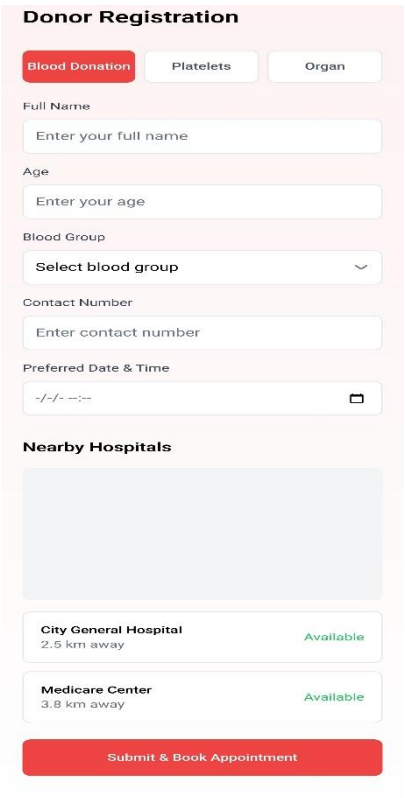
Login page Fig.1



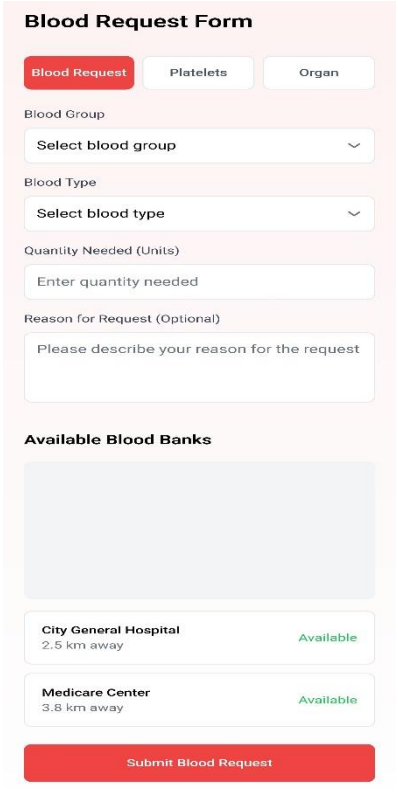
Signup page Fig.2



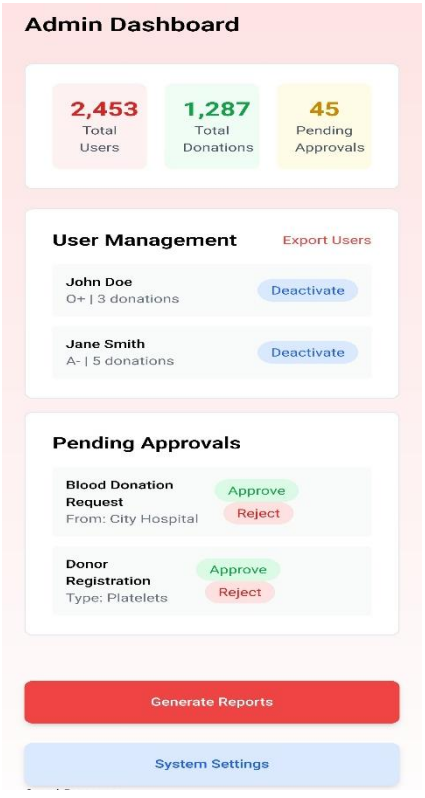
Home Page Fig.3



Donor Section Fig.4



Request Section Fig.5



Admin Page Fig.6

V. CONCLUSION

The Android application aims to revolutionize the way blood and organ donations are handled through mobile platforms. It is designed to address and overcome the challenges faced by both donors and recipients in current mobile donation systems. By providing a more efficient, reliable, and user-friendly experience, this application will simplify the process for donors and collectors alike, ensuring that donations are arranged smoothly and securely. It offers a solution that enhances accessibility and reliability for all parties involved in the donation process. Through the integration of Firebase for real-time database management, user authentication, and notifications, the app allows hospitals and users to interact seamlessly. Additionally, features such as appointment booking, user verification, and emergency alerts make it easier for hospitals to manage donor resources effectively while providing recipients with the necessary help in a timely manner. The project not only demonstrates the potential of mobile applications in healthcare but also encourages community engagement by making the donation process simpler and safer. It contributes to saving lives by ensuring that essential medical resources, such as blood and organs, are available to those in need when they need them most.

REFERENCES

[1] ALSAYEGH, M. ALSULAMI, "A SECURE CLOUD-BASED FRAMEWORK FOR BLOOD DONATION MANAGEMENT SYSTEM," JOURNAL OF HEALTHCARE ENGINEERING, 2018.
[2] K. Lee, H. Park, "Organ Transplantation System: Matching Donor and Recipient with Artificial Intelligence," IEEE Access, 2020.
[3] S. Kumar, P. Rathi, "Blockchain-Based Blood Donation Management System to Ensure Transparency and Security," Future Internet, 2021.
[4] N. Abdulkader, "Real-Time Blood Donation Monitoring System with Geolocation Tracking," International Journal of Computer Applications, 2019.
[5] Y. Chen, A. Liao, "A Smart Healthcare System for Organ Donation and Transplantation," Sensors, 2020.
[6] P. Singh, N. Gupta, "Blood Donation System Using Machine Learning for Donor-Recipient Matching," Journal of Biomedical Informatics, 2019.
[7] H. Baig, M. Ali, "Internet of Things-Enabled Smart Blood Donation System," International Journal of Electronics and Communication Engineering, 2020.
[8] D. Li, Z. Chen, "Mobile Cloud-based Blood Donation System with Real-Time Analytics," Journal of Cloud Computing, 2017.
[9] J. Wang, M. Wu, "Cloud-Based System for Organ Donation and Transplantation," Healthcare Technology Letters, 2019.
[10] T. Ramanathan, S. Patel, "Secure Data Transmission in Blood Donation Systems Using Cryptography," Journal of Information Security and Applications, 2021.
[11] Blood Donation And Life Saver App (ICCES 2017) IEEE Xplore Compliant - Part Number:CFP17AWO-ART, ISBN:978-1-5090-5013-0
[12] BloodBank PH: A Framework for an Android-based Application for the Facilitation of Blood Services TENCON 2018 - 2018 IEEE Region 10 Conference (Jeju, Korea, 28-31 October 2018)
[13] Technical Session - Computer Science and Technology & Industrial Information Technology of the Research Symposium of Uva Wellassa University, January 29-30,2015
[14] LifeCycle: A Blood Donation Management App by STAMFORD UNIVERSITY BANGLADESH November 2017