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# AI-Powered Blood Donor Finder System

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**Abstract -** *Timely access to blood is critical in emergency healthcare, yet many existing systems still rely on manual coordination or outdated records, which often leads to delays. This project presents an AI-based blood donor finder that improves response time using location-based filtering techniques. The system allows users to search donors based on blood group while prioritizing nearby donors using geographic data. A request mechanism notifies multiple donors through web and mobile platforms, and once a donor confirms, further notifications are controlled. The system is developed using React.js, Node.js, and MySQL, providing an efficient solution for connecting donors and recipients during emergencies.*

**KeyWords - Blood Donation System, Geolocation-Based Matching, Real-Time Donor Search, Web and Mobile Application, Notification System, Emergency Response**

## 1. INTRODUCTION

Blood plays a vital role in healthcare, and its timely availability is essential in emergency situations. However, finding a suitable donor quickly remains a challenge. Many people still depend on personal contacts or social media, which may not provide reliable results when immediate action is required.

With the advancement of technology, digital systems can improve how donors and recipients are connected. However, many existing solutions focus mainly on storing donor information rather than helping users find nearby donors in real time.

To overcome this issue, the proposed system provides a web and mobile-based platform that uses location data and filtering techniques to identify suitable donors quickly. It also includes a notification mechanism to contact multiple donors and manage responses efficiently, making it useful during emergencies.

## 2. Problem Statement:

In emergency situations, finding a suitable blood donor quickly is often difficult. Existing methods depend on manual communication such as phone calls or social media, which are time-consuming and unreliable. Blood banks may store information, but they do not always provide real-time access to nearby donors through web or mobile platforms.

Another issue is the absence of proper location-based filtering, making it hard to identify donors who are closest and available at that moment. This leads to delays and confusion.

Therefore, there is a need for a system that can quickly identify nearby donors, filter them based on blood group and availability, and manage communication efficiently using modern technologies

## 3. Objectives

The main objective of this project is to develop an efficient system that simplifies the process of finding blood donors during emergency situations. The system is designed to reduce delays and improve communication between donors and recipients through both web and mobile platforms.The specific objectives of the proposed system are as follows:

- To develop a web and mobile-based blood donor finder system
- To identify donors based on blood group and location
- To provide real-time notifications to donors
- To reduce response time in emergency situations
- To manage donor responses efficiently
- To maintain an updated and organized donor database
- To ensure accurate and real-time availability of donors
- To provide a simple and user-friendly interface for easy access

## 4. Literature Survey

Several systems have been developed to improve the management of blood donation and availability. Early approaches mainly focused on maintaining records of blood donors and blood banks using database systems. While these systems helped in organizing data, they lacked real-time communication and efficient search capabilities.

Later, web-based applications were introduced to allow users to check blood availability and register as donors.

Although these systems improved accessibility, they did not consider the location of donors, making it difficult to find nearby donors quickly.

Recent research has explored mobile applications and notification-based systems to improve communication. However, many of these systems do not effectively prioritize donors based on proximity or manage multiple responses efficiently.

The proposed system addresses these limitations by combining location-based filtering, real-time notifications, and controlled request handling through both web and mobile platforms. This approach improves response time and provides a more practical solution for emergency situations.

## 5. Proposed System:

The proposed system provides a fast and efficient way of connecting blood donors with recipients during emergency situations. It works on both web and mobile platforms to help users find suitable donors in real time.

When a user searches for a specific blood group, the system filters donors based on blood type and availability, and uses location data to identify nearby donors. This helps in reducing the time required to arrange blood and improves response efficiency.

A request mechanism is used to notify multiple donors simultaneously. Once a donor accepts the request, the system updates the status and prevents further responses, making the process more organized and reliable.

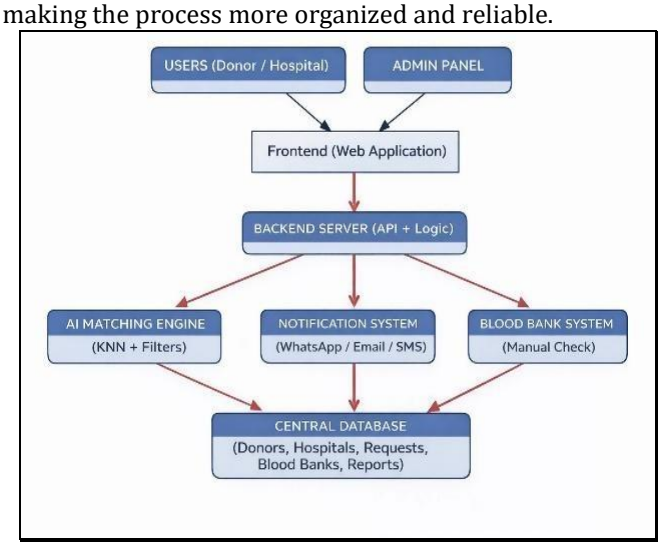


**Fig. 1:** Proposed System

## 6. Methodologies:

The proposed system follows a structured workflow for identifying and connecting suitable blood donors. The process begins with donor registration, where user details such as blood group, contact information, and location are stored in the database.

When a hospital or user places a blood request, the system queries the database to identify eligible donors. The selection process applies filtering based on blood group, availability, and location. Additionally, ranking is performed to prioritize the most suitable donors based on proximity and reliability.

After identifying top candidates, notifications are sent through web and mobile platforms such as SMS, email, or application alerts. If a donor accepts the request, the system updates the request status and notifies the hospital for confirmation.

If the request is confirmed, the system records the donation details and updates donor history. In case of rejection or timeout, the system automatically notifies the next set of donors and repeats the matching process.

This methodology ensures efficient donor selection, proper response handling, and continuous processing until a successful match is achieved.

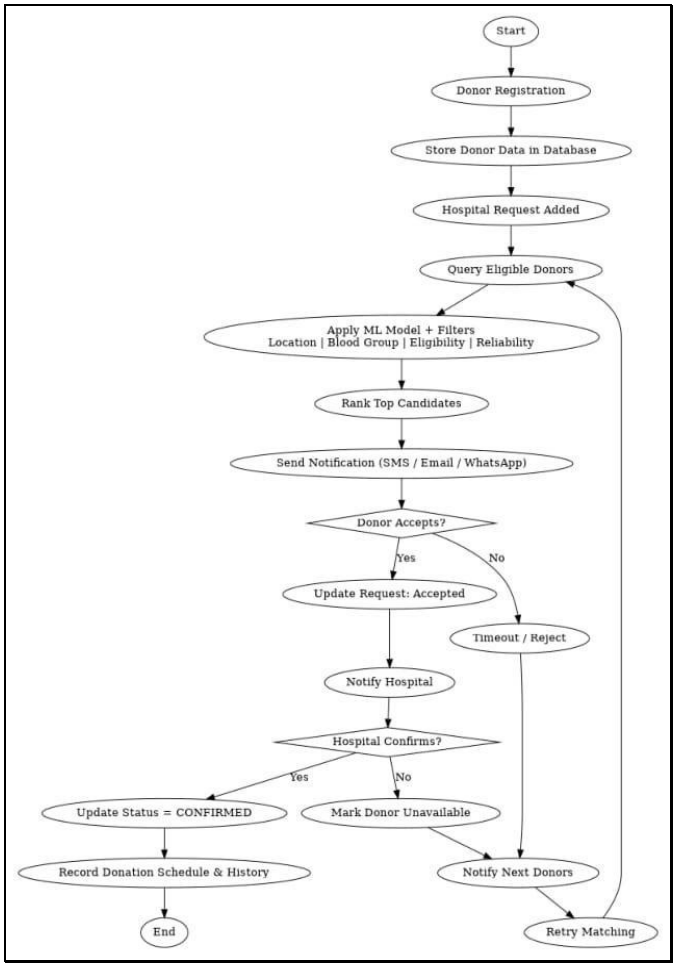


**Fig. 2:** System Flowchart

## 7. System Architecture:

The proposed system follows a layered architecture that supports both web and mobile platforms for efficient access and communication.

At the top level, donors and hospitals interact with the system through the user layer. The frontend, developed using React, provides the interface and communicates with the backend through API calls.

The backend is implemented using Node.js and Express.js, which processes requests and manages key modules such as the matching engine, notification service, and authentication system. The matching engine identifies suitable donors based on blood group, location, and availability.

The system uses a MySQL database to store donor and request data, while external services like SMS, email, and WhatsApp are used for sending notifications.

This architecture ensures smooth data flow, real-time communication, and efficient donor matching.

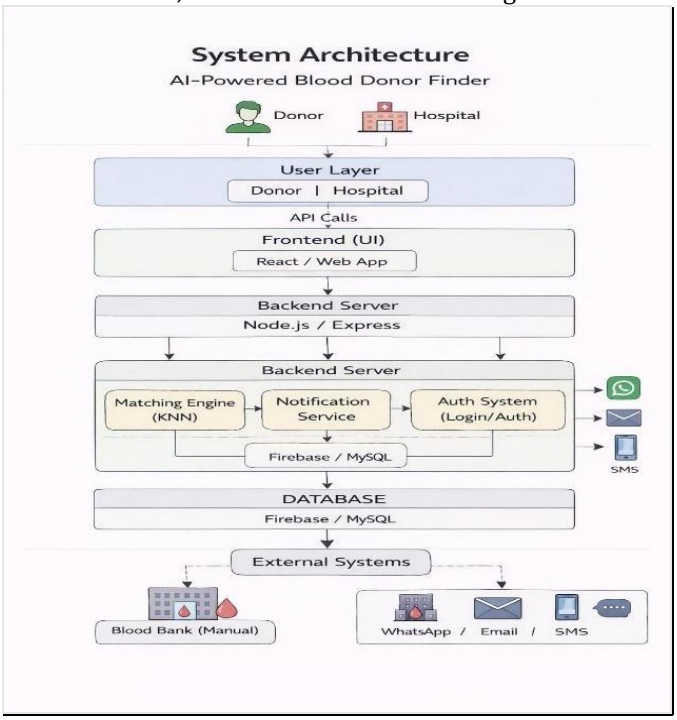


**Fig. 3:** System Architecture

## 8. Implementation:

The proposed system is implemented as both a web and mobile-accessible application using modern technologies. The frontend is developed using React.js, which provides a user-friendly interface for donor registration, login, and blood search.

The backend is built using Node.js and Express.js, which handle request processing, donor filtering, and notification management. The system uses MySQL as the database to store donor details, request information, and response data.

The application includes modules such as registration, authentication, search, request handling, and notification. Mobile access allows users to receive instant alerts and respond quickly during emergency situations.

Overall, the implementation focuses on simplicity, speed, and reliability for real-time usage.

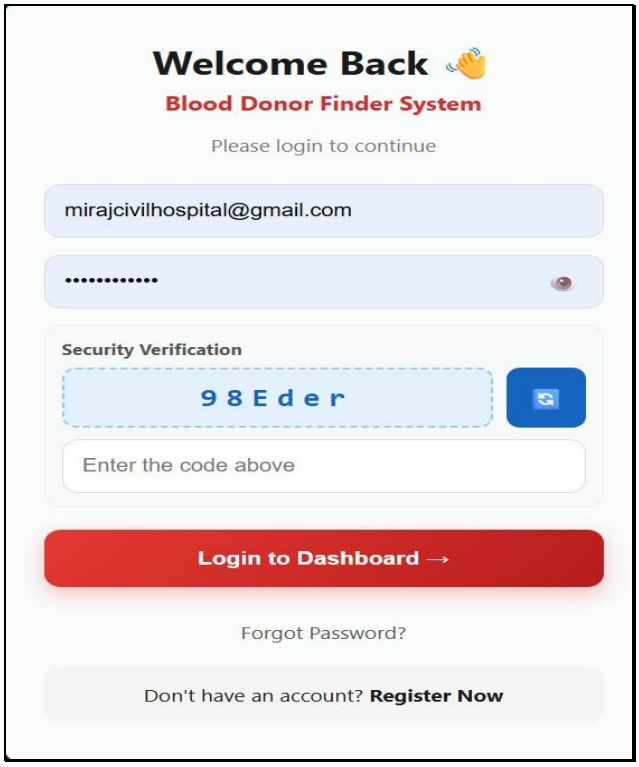


**Fig. 4:** Login Page

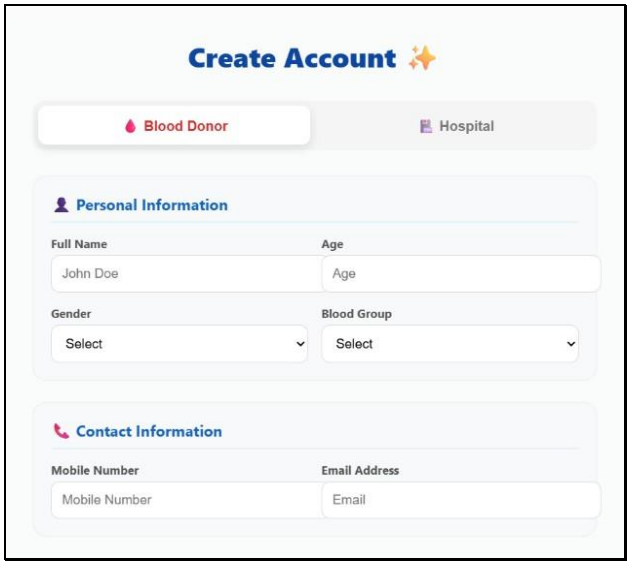


**Fig. 5:** Register Page

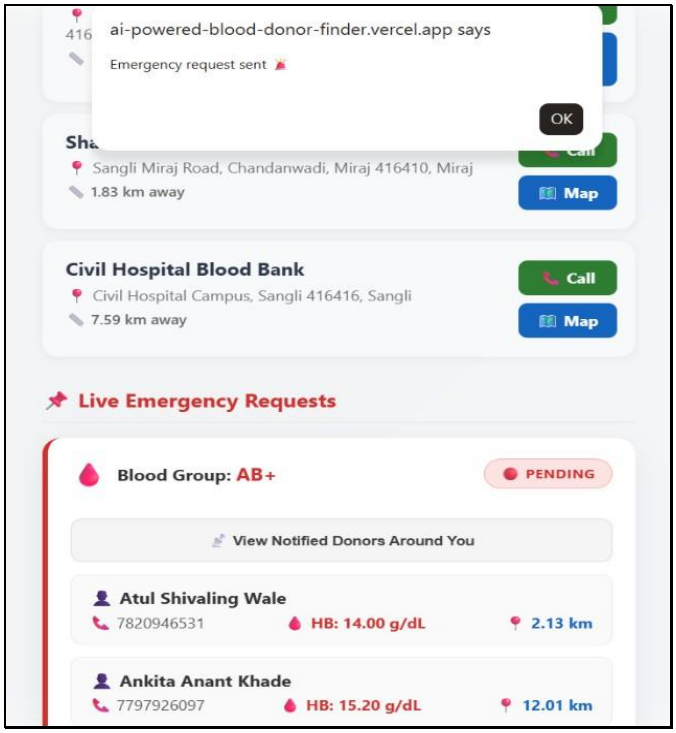


**Fig. 6:** Emergency Request Create

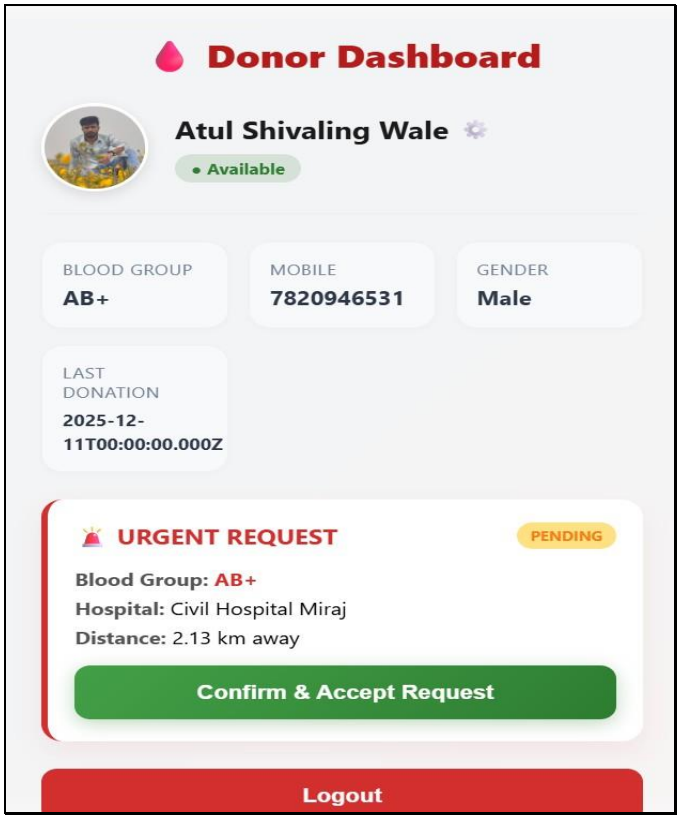


**Fig. 7**: Notified Donor

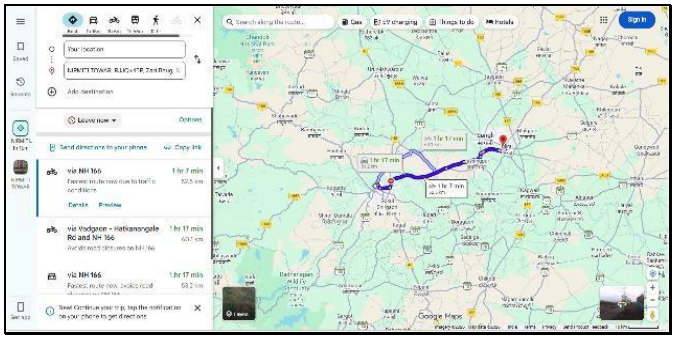

**Fig. 8:** Location Tracking

## 9. Results and Discussion

The system was tested under different scenarios to evaluate its performance in identifying suitable blood donors. The results show that the system can quickly filter donors based on blood group and location, reducing the time required to find a match compared to traditional methods.

Location-based filtering improves efficiency by prioritizing nearby donors, while real-time notifications increase the chances of faster responses. The request handling mechanism ensures that once a donor accepts, further responses are controlled, avoiding confusion.

The system is easy to use and performs efficiently, making it suitable for real-world emergency situations.

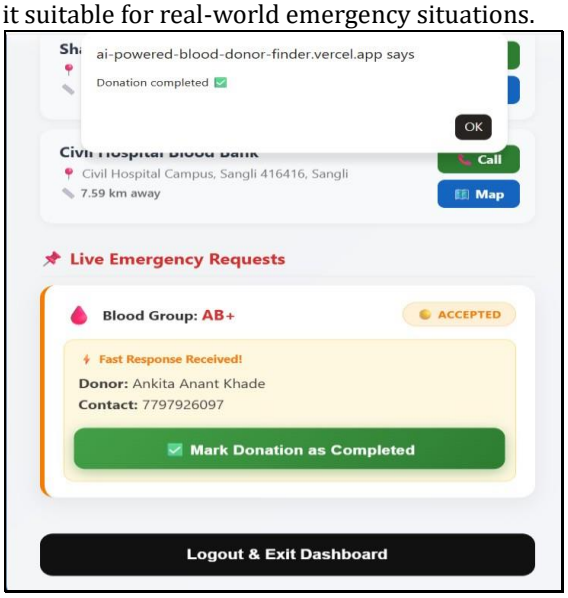


**Fig. 9:** Donation completed

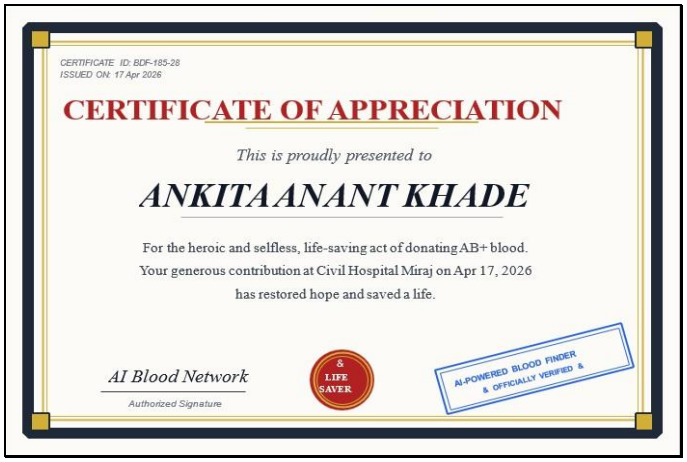


**Fig. 10:** Donor certificate

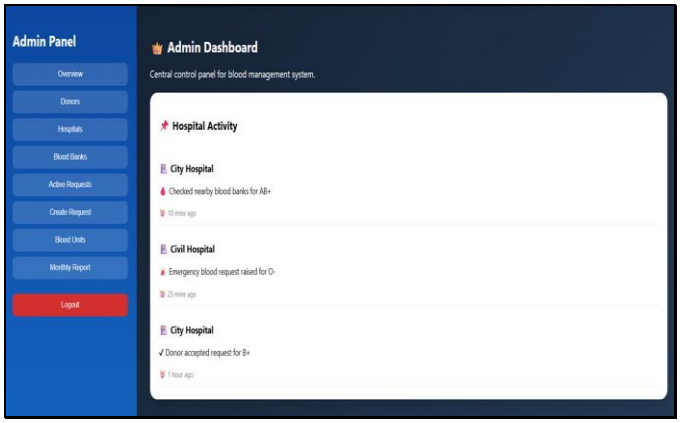


**Fig. 11:** Admin Dashboard

## 10. Conclusion:

The AI-based blood donor finder system provides an effective solution for connecting donors and recipients during emergency situations. By using location-based filtering and real-time communication, the system reduces the time required to identify suitable donors and improves overall response efficiency.

The integration of both web and mobile platforms enhances accessibility and allows users to send and receive requests quickly. The system is simple, reliable, and suitable for real-world use.

In conclusion, the proposed system improves the process of blood donor search and can be further expanded for large-scale healthcare applications.

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