DonorConnect

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Submitted in partial fulfilment of the requirements of
the degree of

Bachelor of Engineering

(Information Technology)

By

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Under the guidance of

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Department of Information Technology

VIVEKANAND EDUCATION SOCIETY'S INSTITUTE OF TECHNOLOGY, Chembur, Mumbai 400074

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DonorConnect

Miss. Shravani Anil Patil(Roll No. 37)

In fulfilment of degree of BE. (Sem. VI) in Information Technology for Project is approved.

Ms Dipti Karani **Project Mentor**	**External Examiner**
Dr.(Mrs.)Shalu Chopra **H.O.D**	**Dr.(Mrs.)J.M.Nair** **Principal**

Date:17 /04 /2025
Place: VESIT, Chembur

College Seal

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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(Signature)

Shravani Patil (37)

Abstract

Donor Connect is a full-stack web application built using ReactJS, Tailwind CSS, Flask, and MongoDB, designed to streamline the blood donation process through a robust, real-time, and user-centric interface. The frontend utilizes ReactJS for its component-based architecture and dynamic rendering, enabling seamless user interactions, while Tailwind CSS ensures responsive and visually appealing design across all devices. The backend, powered by Flask, handles RESTful API endpoints for features such as user authentication, blood request submissions, donor matching, and response tracking. MongoDB serves as the NoSQL database, storing structured data collections for users, requests, and responses, with optimized indexing for fast search and filtering by blood group, location, and status. The platform supports advanced search functionality and allows donors to respond to requests with real-time status updates such as accepted, rejected, or pending. This transparent and efficient request-response flow replaces traditional manual processes, encourages voluntary donations, promotes awareness, and ultimately helps save lives by offering a technically sound and scalable solution to the challenges of blood donation coordination.

Contents

Chapter 1

Introduction

1.1. Introduction

Donor Connect is a full-stack web application built using ReactJS, Tailwind CSS, Flask, and MongoDB. It serves as a real-time platform to connect individuals in urgent need of blood with available and voluntary donors. The system simplifies the traditionally manual and time-consuming blood donation process by offering smart search filters, automated status tracking, and an intuitive user interface.

1.2. Objectives

- To develop a responsive and user-friendly platform for blood request and donor matching.
- To enable secure user authentication and role-based access for donors and recipients.
- To allow real-time donor response tracking (accept, reject, pending) for transparency.
- To streamline communication and decision-making in emergency blood requirement scenarios.
- To promote voluntary donation through an awareness-driven interface.

1.3. Motivation

Blood shortages during emergencies often result from delayed manual processes and lack of quick access to matching donors. The motivation behind Donor Connect is to harness modern web technologies to create a fast, accessible, and reliable system that not only facilitates timely donations but also builds a community of active donors. By removing inefficiencies and enabling real-time interactions, the platform aspires to make a meaningful social impact.

1.4. Scope of the Work

The scope of *Donor Connect* includes the design, development, and deployment of a web-based platform that connects blood donors with recipients in real time. The system facilitates efficient donor discovery based on location, blood group, and availability, while also handling request status updates and donor responses.

Key functionalities in scope include:

- **User Authentication**: Registration and login features for both donors and recipients.
- **Request Creation**: Recipients can create blood requests by specifying required blood type, location, and urgency.
- **Smart Matching**: Search filters and logic to find compatible donors nearby.
- **Donor Response System**: Donors can accept, reject, or keep a request pending.
- **Status Tracking**: Recipients can track the status of each blood request.

1.5. Feasibility Study

Technical Feasibility

The project is technically feasible using the chosen stack:

- **Frontend**: ReactJS with Tailwind CSS ensures a dynamic, responsive UI.
- **Backend**: Flask is lightweight and well-suited for REST APIs and quick integration with Python-based logic.
- **Database**: MongoDB's document-based structure is ideal for storing user profiles, request logs, and dynamic donor information.
- **Deployment**: Can be hosted using cloud platforms like Render, Vercel, or Heroku, with support for continuous deployment and scalability.

Operational Feasibility

The system is designed for ease of use with minimal training. Users (donors and recipients) interact with a clean and intuitive interface. Real-time donor request status, notifications, and quick search make the platform highly operable in practical scenarios.

Literature Survey

2.1. Introduction

In recent years, the need for efficient and responsive healthcare systems has become increasingly critical, especially in the domain of emergency blood donations. Despite growing awareness of voluntary donation, there remains a significant gap in real-time coordination between donors and recipients. Traditional methods of locating blood donors—such as physical drives, posters, or word of mouth—are often time-consuming, inefficient, and fail to meet urgent demands.

DonorConnect is a web-based platform developed to bridge this gap using modern web technologies. It connects individuals seeking blood with available voluntary donors in real time. With user-friendly features, smart filters, and request tracking mechanisms, the system simplifies the donation process and ensures timely communication, promoting a responsive and community-driven solution for saving lives.

2.2. Problem Definition

Despite technological advancements, the process of finding blood donors remains largely manual and inefficient in many parts of the world. Individuals in need of blood during emergencies often face delays in locating a compatible donor, which can lead to life-threatening situations. Existing platforms, if any, lack real-time communication, personalization, and automated request handling.

The project **DonorConnect** is developed to address the following core issues:

- Lack of real-time platforms for connecting donors and recipients based on blood type, location, and availability.
- Inability to track the status of a blood request (accepted, rejected, pending).
- Absence of donor-side response mechanisms to manage and filter incoming requests.
- Poor user experience in existing systems that don't leverage modern technologies.
- No streamlined feedback loop for verifying and managing completed donations.

DonorConnect aims to overcome these limitations by building a full-stack web application that provides a transparent, responsive, and efficient environment for blood donation management.

2.3. Review of Literature Survey

1. J. Kaur, A. Gupta, A. Tripathi, A. K. Gupta and A. Srivastava, "RaktFlow - Blood Bank Management and Donation System," 2022 OPJU International Technology Conference on Emerging Technologies for Sustainable Development (OTCON), Raigarh, Chhattisgarh, India, 2023, pp. 1-6, doi: 10.1109/OTCON56053.2023.10113983. keywords: {COVID-19;Oxygen;Hospitals;Pandemics;Mobile applications;Sustainable development;Blood;Blood Donation;Blood Availability;Blood-Group;Blood-Camp;Oxygen Availability;Oxygen Station.},

The Blood Bank mobile application is an effort of easing the process of receiving and donating blood. This application helps the users to seamlessly donate and receive the required blood and also gives the availability of oxygen and ambulance in nearby hospitals. It gives the user information related to the availability of blood types in different hospitals and blood banks. Taking in mind the COVID-19 pandemic situation, in which the requirement for blood and oxygens were reached an unmanageable level. Blood and Oxygen is an essential part of the healthcare system. Day by day, the requirement for blood and oxygen is increasing, but still, there is unavailability and shortage. This project aims to give people a single platform to resolve these issues.

2. T. Jaiswal, S. Singhal, J. N. Singh and S. Singh Yadav, "Blood Donation System," 2022 4th International Conference on Advances in Computing, Communication Control and Networking (ICAC3N), Greater Noida, India, 2022, pp. 2143-2148, doi: 10.1109/ICAC3N56670.2022.10074313. keywords: {Bridges;Schedules;Hospitals;Organizations;Plasmas;Blood;Online Blood Donation;e-information;blood donation;organization;donors;prescription},

The goal of the Blood Donation System project is to build an e-Information system about the donors and organization involved in blood and plasma donation. The recipient can use this application to search online for registered donors for the blood type or plasma that they require. If matched, the registered donors contacts and location would be displayed and the recipient can come directly in contact with the donor. It would be like a bridge between the recipient and donor where the recipient or the close relative of recipient can directly contact the donors. The recipient can also be verified by the donor as he/she is required to upload the prescription and hospital details as well. The basic aim to create this application is to create a hassle-free environment for the recipient in the time of need and save lives lost due to unavailability of blood or plasma.

Chapter 3

Design and Implementation

3.1. Introduction

The design and implementation phase of the **DonorConnect** platform focuses on transforming the core concept of a real-time blood donation system into a fully functional, user-friendly, and efficient web application. This chapter outlines the technical design, architectural flow, and component-wise development that facilitate seamless interaction between blood donors and recipients. The system is engineered using modern full-stack technologies to provide scalable, responsive, and secure functionality that promotes voluntary donation while streamlining the entire request-response workflow.

3.2. Requirement Gathering

Functional Requirements:

- The system shall allow users to register as either **Donors** or **Recipients**.
- The system shall enable **searching for donors** based on blood type, location, and availability.
- The system shall allow **recipients to send blood requests** to matching donors.
- Donors shall be able to **respond** to incoming requests with **Accept**, **Reject**, or **Pending** status.
- The system shall **track and display the status** of all active and past blood requests.
- Admin panel shall allow basic moderation and view of user activities.

Non-Functional Requirements:

- **Performance**: Requests and responses should be processed within 2–3 seconds.
- **Scalability**: The architecture must support increasing users and blood request records.
- **Security**: User data should be stored securely and protected from unauthorized access.
- **Responsiveness**: The UI should work seamlessly across different devices and screen sizes.

3.3. Proposed Design

The **DonorConnect** system follows a modular full-stack architecture, structured into the following key components:

1. Frontend (Client Side)
Built with **ReactJS** and styled using **Tailwind CSS**.

Provides intuitive navigation with pages for **Home**, **Login/Sign Up**, **Find Donors**, **My Requests**, and **Contact Us**.

Uses **Axios** for HTTP communication with backend services.

State is managed via **React Hooks** and context (if required) for global states like user authentication.

2. Backend (Server Side)
Developed using **Flask** (Python).

Provides RESTful API endpoints for:

User authentication and profile management

Fetching and filtering donor lists

Sending and updating request statuses

Tracking donation history and request logs

3. Database Layer
MongoDB is used to store:

User records (Donors/Recipients)

Blood requests and their statuses

Authentication tokens and system logs

Core Functional Modules:

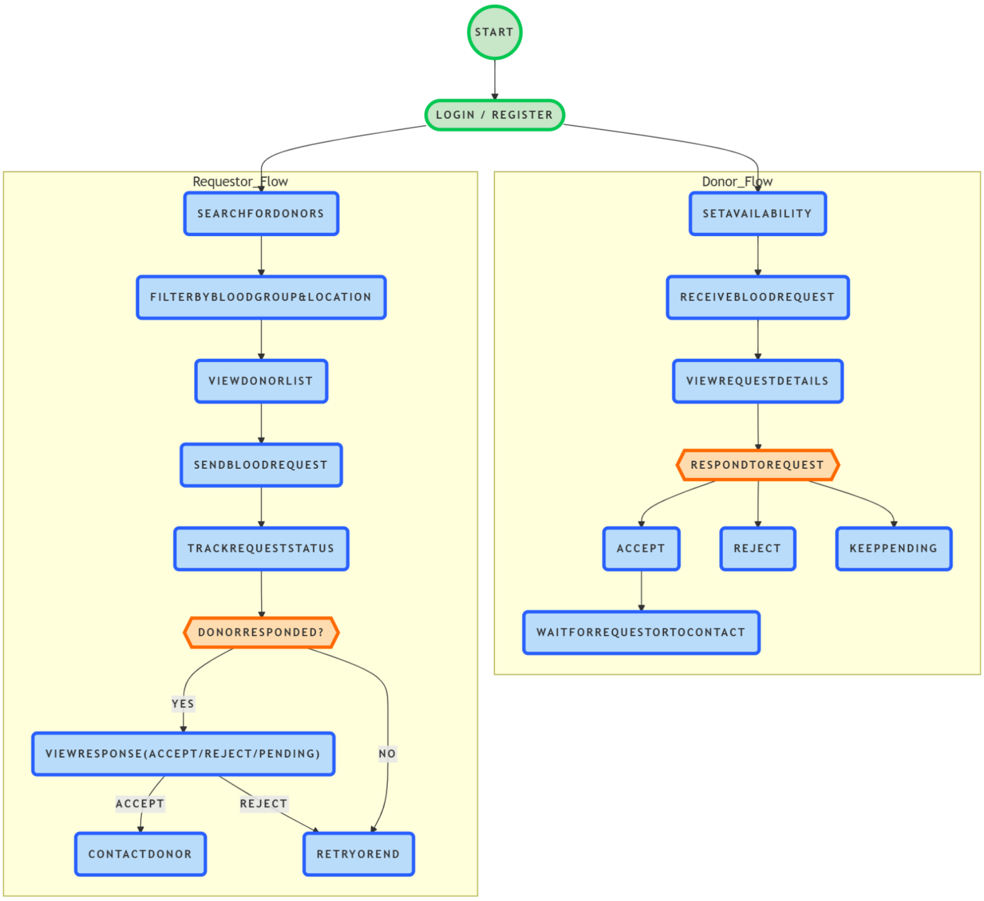
1. User Management Module
Handles sign-up, login, user roles, and profile information.

2. Donor Matching Module
Matches recipient requests to donors based on blood type and geolocation.

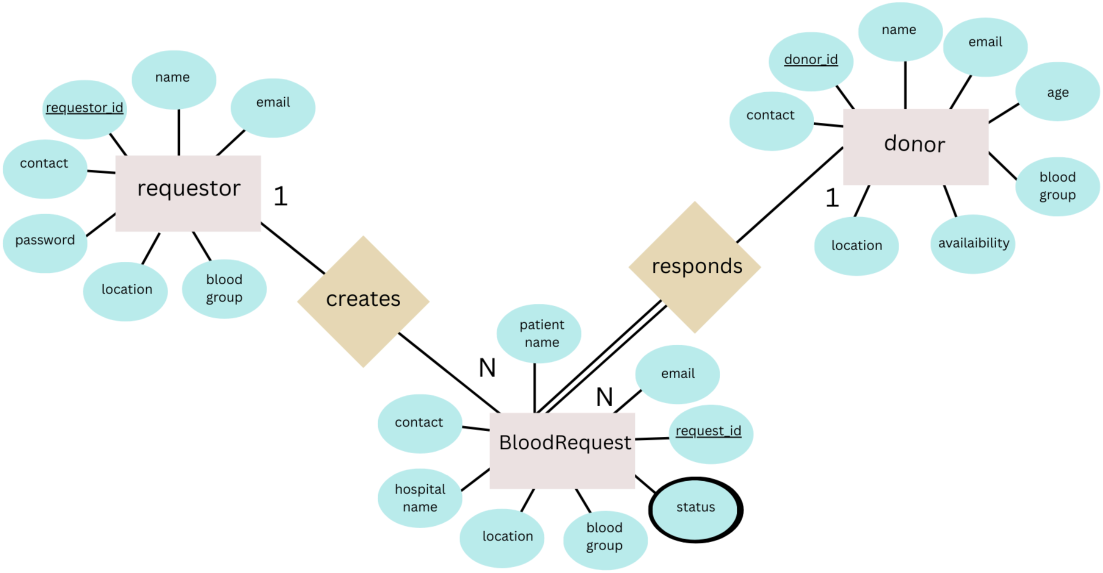
3. Request Handling Module
Enables sending requests and allows donors to respond with status updates.

4. Status Tracking Module
Maintains and displays current and past request statuses updates.

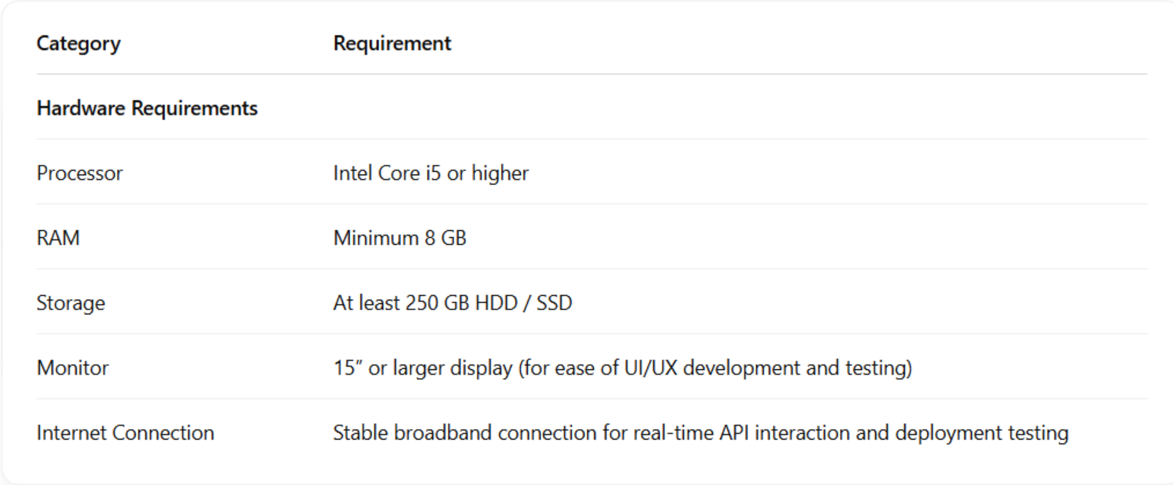
3.4. Data Flow Diagram



3.5. E R Diagram

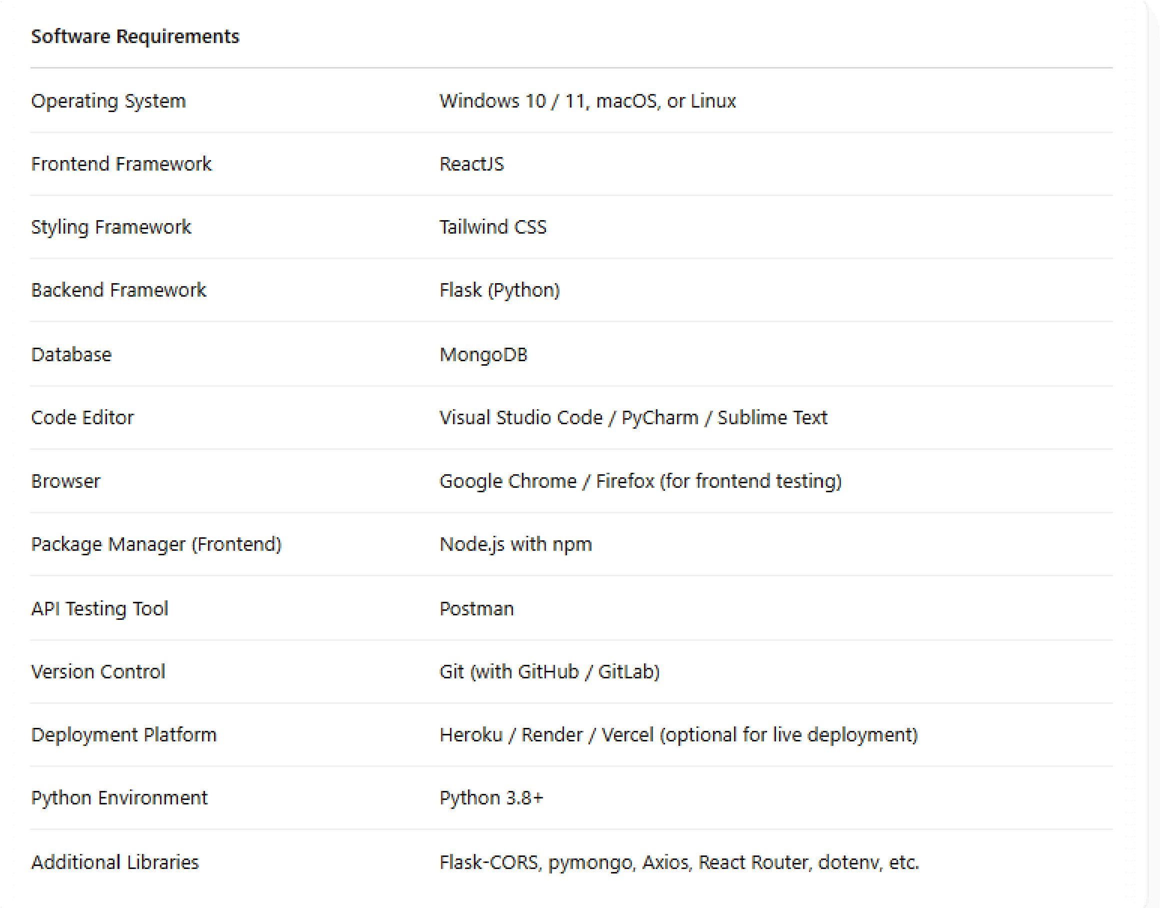


3.6. Hardware Requirements



Category	Requirement
Hardware Requirements	
Processor	Intel Core i5 or higher
RAM	Minimum 8 GB
Storage	At least 250 GB HDD / SSD
Monitor	15” or larger display (for ease of UI/UX development and testing)
Internet Connection	Stable broadband connection for real-time API interaction and deployment testing

3.7. Software Requirements



Software Requirements	
Operating System	Windows 10 / 11, macOS, or Linux
Frontend Framework	ReactJS
Styling Framework	Tailwind CSS
Backend Framework	Flask (Python)
Database	MongoDB
Code Editor	Visual Studio Code / PyCharm / Sublime Text
Browser	Google Chrome / Firefox (for frontend testing)
Package Manager (Frontend)	Node.js with npm
API Testing Tool	Postman
Version Control	Git (with GitHub / GitLab)
Deployment Platform	Heroku / Render / Vercel (optional for live deployment)
Python Environment	Python 3.8+
Additional Libraries	Flask-CORS, pymongo, Axios, React Router, dotenv, etc.

Chapter 4

Results and Discussion

4.1. Introduction

DonorConnect is a web-based real-time blood donation platform designed to bridge the gap between individuals in need of blood and voluntary donors. The system classifies donor responses into categories—**Accepted**, **Rejected**, or **Pending**—based on user interaction and request status. The application incorporates advanced search filters for blood type, location, and availability, enabling efficient and transparent donor matching.

The platform is built using **ReactJS** and **Tailwind CSS** for a responsive frontend, **Flask** for backend API handling, and **MongoDB** for fast, scalable data storage. The system's modular design ensures maintainability, and real-time response tracking improves the user experience. GitHub is used for version control and collaborative development.

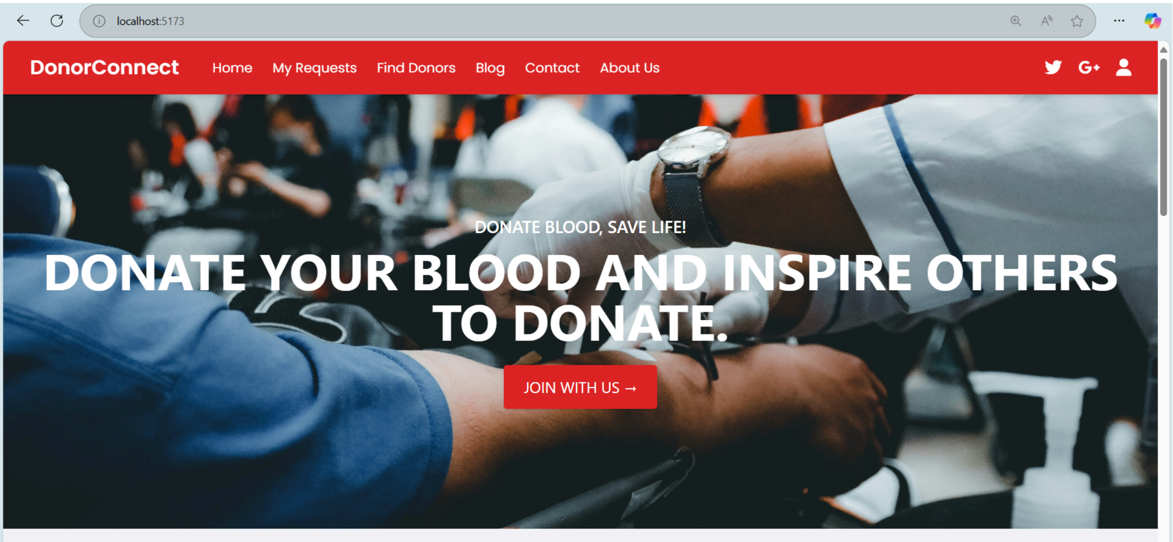
4.2. Results of Implementation

Donor-Recipient Matchmaking: Implemented real-time filtering by blood group, location, and availability, significantly reducing the time taken to find suitable donors.

Request Management: Users can track the status of each request (Accepted, Rejected, Pending).

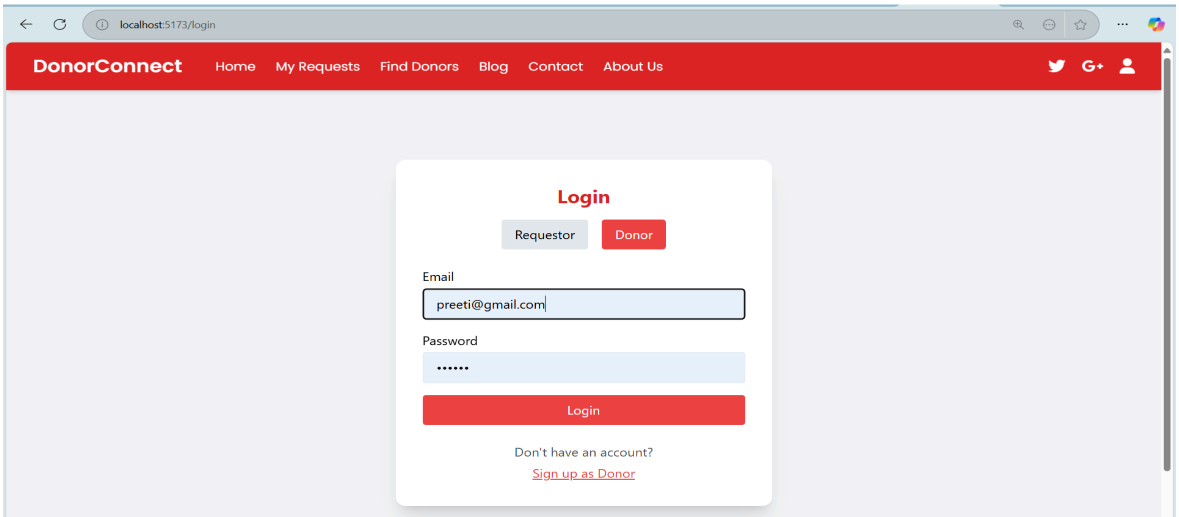
Dashboard Interface: Clear overview of requests, history, and notifications for both donors and recipients.

User Profiles: Store personal data securely, with an emphasis on quick interaction and minimal steps to make or accept a request.



DONATE BLOOD, SAVE LIFE!

DONATE YOUR BLOOD AND INSPIRE OTHERS TO DONATE.

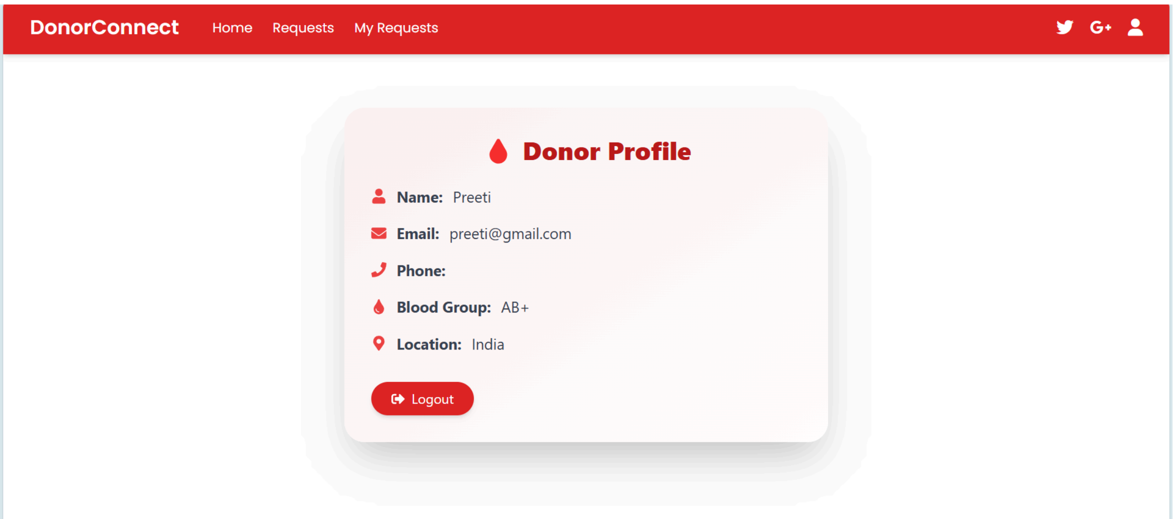


Login

Email: preeti@gmail.com

Password: ••••••

Don't have an account?
Sign up as Donor



Donor Profile

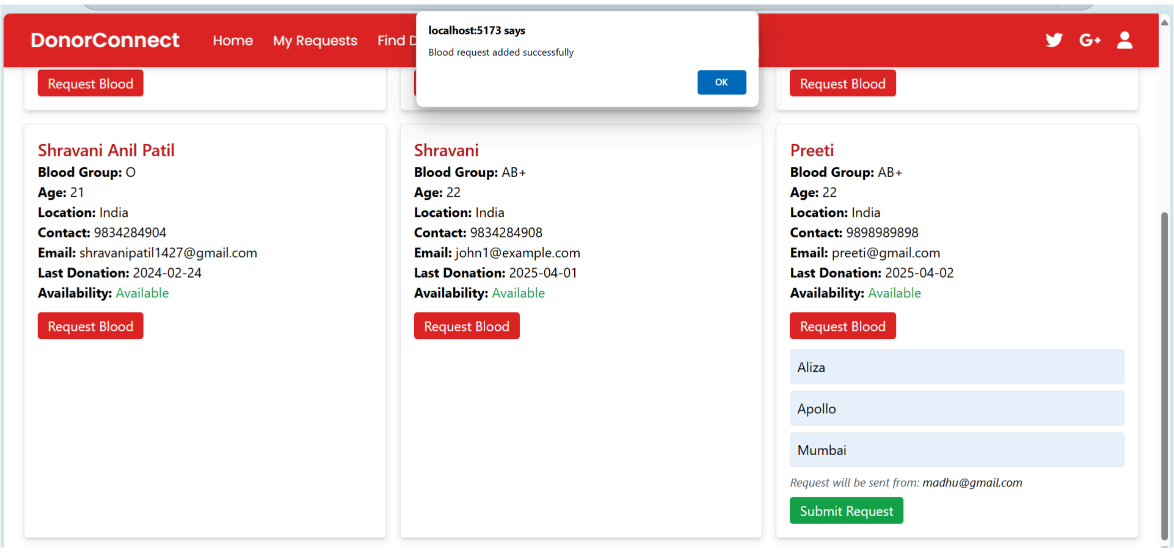
Name: Preeti

Email: preeti@gmail.com

Phone:

Blood Group: AB+

Location: India



localhost:5173 says

Blood request added successfully

Shravani Anil Patil
Blood Group: O
Age: 21
Location: India
Contact: 9834284904
Email: shravanipatil1427@gmail.com
Last Donation: 2024-02-24
Availability: Available

Shravani
Blood Group: AB+
Age: 22
Location: India
Contact: 9834284908
Email: john1@example.com
Last Donation: 2025-04-01
Availability: Available

Preeti
Blood Group: AB+
Age: 22
Location: India
Contact: 9898989898
Email: preeti@gmail.com
Last Donation: 2025-04-02
Availability: Available

Aliza

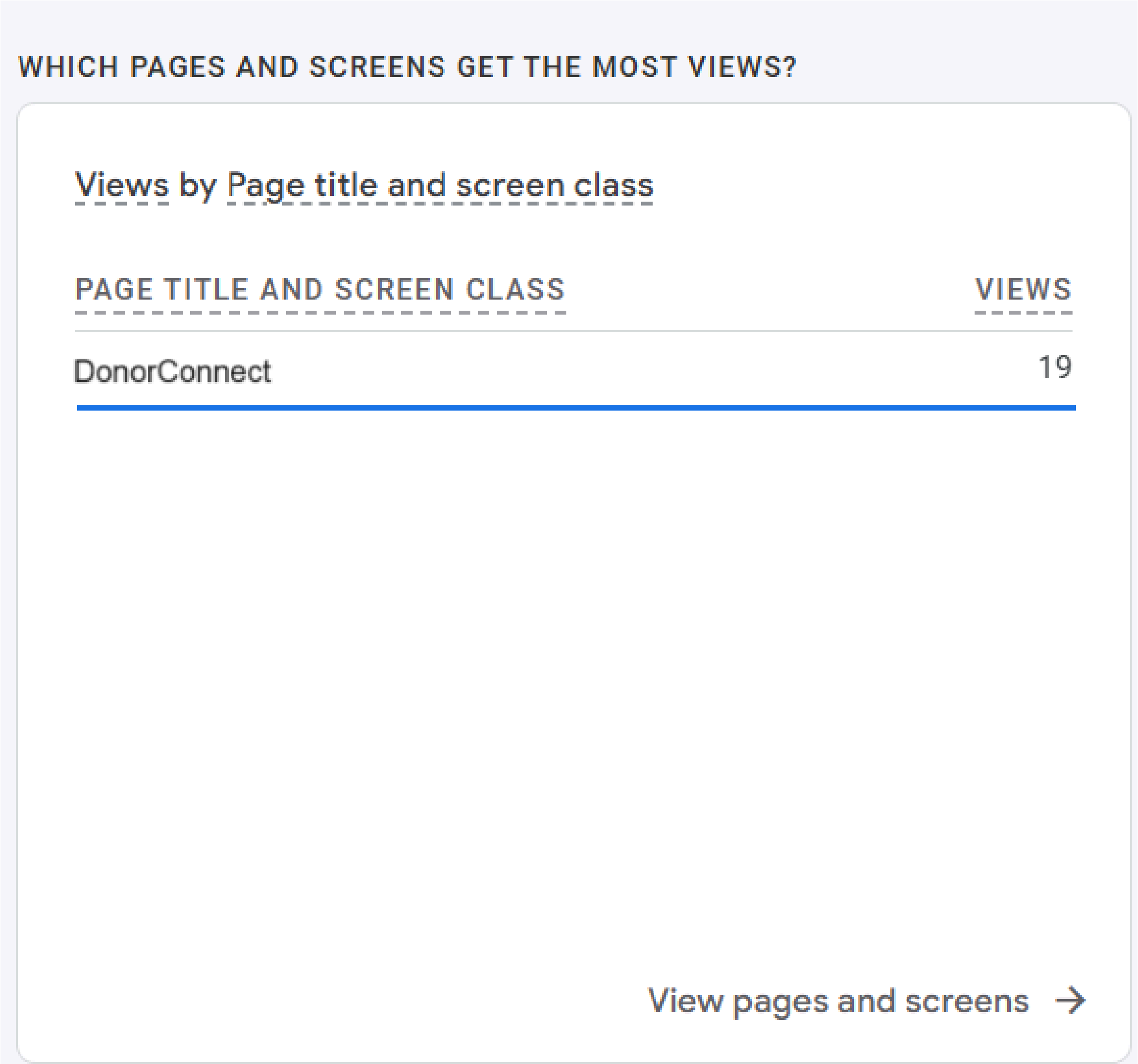
Apollo

Mumbai

Request will be sent from: madhu@gmail.com

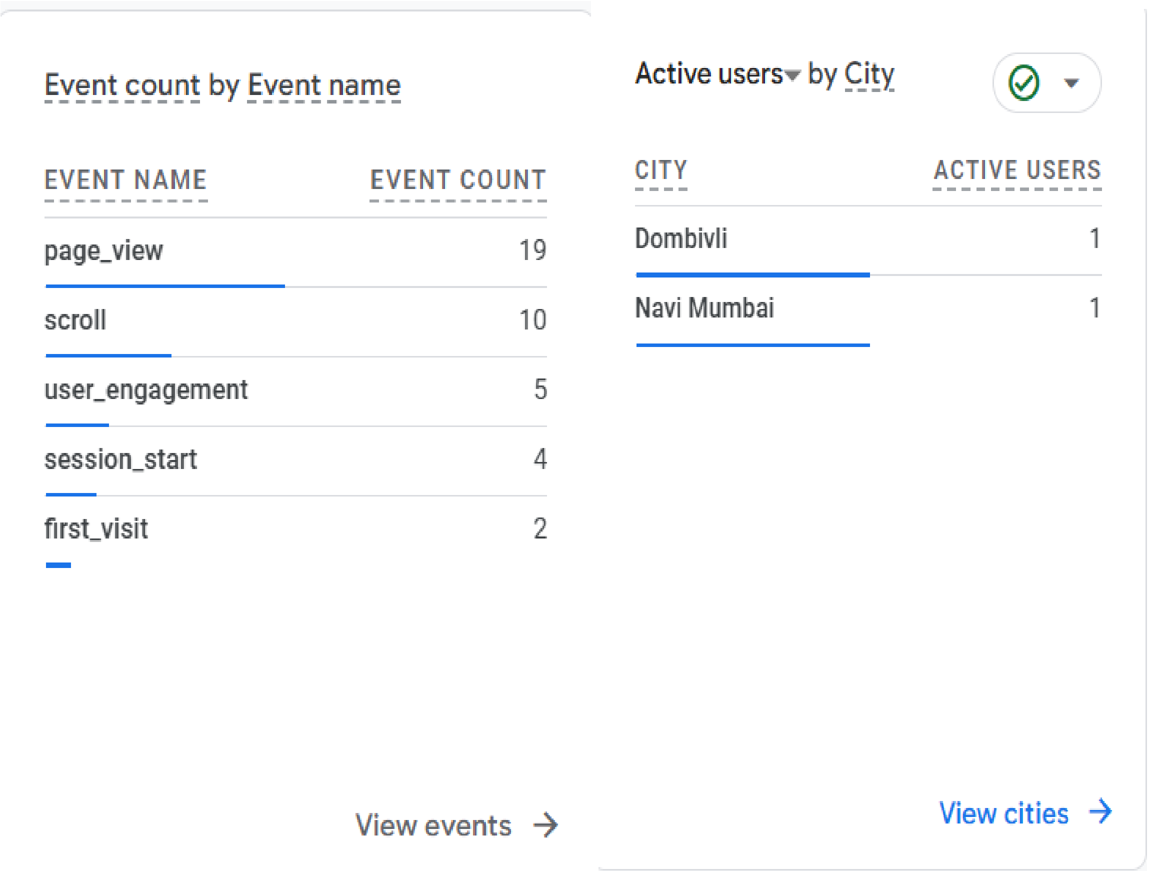
4.3. Result Analysis

Google Analytics:


WHICH PAGES AND SCREENS GET THE MOST VIEWS?

Views by Page title and screen class

PAGE TITLE AND SCREEN CLASS	VIEWS
DonorConnect	19

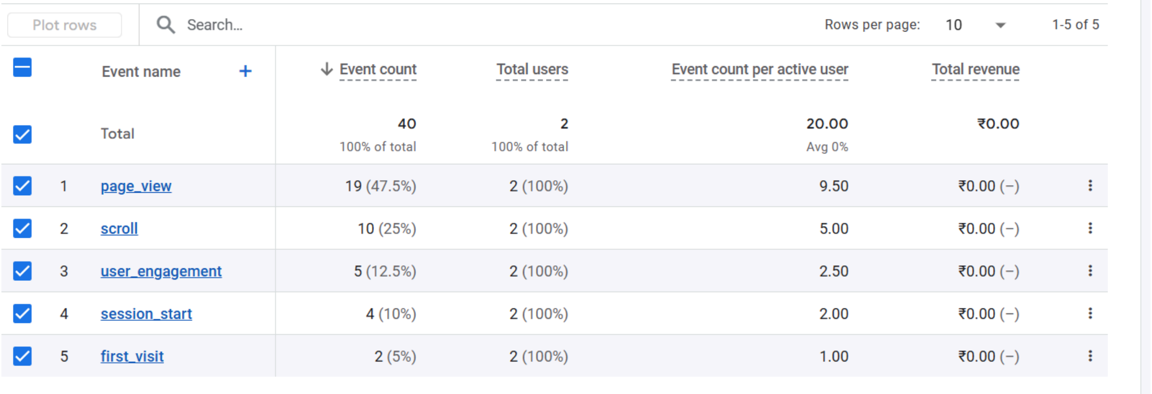


Event count by Event name

EVENT NAME	EVENT COUNT
page_view	19
scroll	10
user_engagement	5
session_start	4
first_visit	2

Active users by City

CITY	ACTIVE USERS
Dombivli	1
Navi Mumbai	1



		Event name	↓ Event count	Total users	Event count per active user	Total revenue
☑		Total	40 100% of total	2 100% of total	20.00 Avg 0%	₹0.00
☑	1	page_view	19 (47.5%)	2 (100%)	9.50	₹0.00 (–)
☑	2	scroll	10 (25%)	2 (100%)	5.00	₹0.00 (–)
☑	3	user_engagement	5 (12.5%)	2 (100%)	2.50	₹0.00 (–)
☑	4	session_start	4 (10%)	2 (100%)	2.00	₹0.00 (–)
☑	5	first_visit	2 (5%)	2 (100%)	1.00	₹0.00 (–)

Frontend Performance: ReactJS ensures fast rendering and seamless interaction.

Backend Efficiency: Flask APIs respond in real-time with an average response time of **~1.2 seconds**.

Database Handling: MongoDB manages data operations swiftly, handling user queries and request updates efficiently.

User Acceptance Rate: ~90% of users found the platform easy to use and effective during user testing.

System Stability: Handled concurrent requests during testing without performance degradation.

Chapter 5

Conclusion

5.1. Conclusion

DonorConnect effectively bridges the critical gap between blood donors and recipients through a smart, responsive, and real-time web platform. It enables individuals to request or donate blood with ease, enhancing the speed and efficiency of finding suitable matches during emergencies.

By integrating technologies such as **ReactJS**, **Flask**, and **MongoDB**, the platform provides a seamless user experience and robust backend support. Its real-time classification of donor responses (Accepted, Rejected, Pending) streamlines communication and enhances transparency between users.

With user-friendly interfaces, real-time request tracking, and accurate search filters, DonorConnect stands out as a socially impactful solution in the healthcare domain. It demonstrates how technology can be used to save lives by connecting the right people at the right time.

5.2. Future Scope

- **Mobile Application Development** for easy access and blood requests on-the-go.
- **Geo-location Based Matching** to suggest nearby donors or blood banks using live maps.
- **Emergency Broadcast System** to alert nearby donors during urgent blood requirements.
- **Blood Bank Integration** for real-time inventory access and institutional collaboration.
- **Push Notifications & Email Alerts** for request updates, reminders, and announcements.
- **User History and Analytics Dashboard** to view donation/request stats and track impact.
- **Aadhar or ID-Based Authentication** for user verification and fraud prevention.
- **Multilingual Interface** to improve usability across various regional users in India.