SANJIVANI COLLEGE OF ENGIEERING,
KOPARGAON

(An autonomous Institute affiliated to SPPU Pune)

Department of Electronics and Computer Engineering

Academic Year: 2025-26 Sem-II

Web Technology (PCEC310)

Group ID: G10

Report on

Blood Bank & Emergency Donor Finder Website

Submited By

Miss. Bhagyashree Savata Mohalkar	**UEC23F1038**
Miss. Pradnya Shailendra Pangavahne	**UEC23F1043**
Mr. Shivraj Yogesh Pawar	**UEC23M1046**
Mr. Chandraraj Chandrashekhar Rahane	**UEC23M1048**
Mr. Swarup Sachin Sandhan	**UEC23M1055**

Course Incharge
Mr. J. N Kale

	Sanjivani Rural Educational Society's SANJIVANI COLLEGE OF ENGINEERING (An Autonomous Institution) Kopargaon – 423 603, Maharashtra.	**ACAD-F-15 K**
Academic Year: 2025-26	**CIA ACTIVITY**	**Revision: 00 Dated :**
Department : ECE	**Electronics and Computer Engineering**	**Date of Preparation : 02/05/26**
Course Code & Name:	**Web Technology - PCEC310**	**Year/Sem: TY BTech-6th sem**

Project Title: Blood Bank & Emergency Donor Finder Website

Submitted by:

Roll No.	PRN No.	Name of the Student	Signature
38	UEC23F1038	Bhagyashree Savata Mohalkar	
43	UEC23F1043	Pradnya Shailendra Pangavhane	
46	UEC23M1046	Shivraj Yogesh Pawar	
48	UEC23M1048	Chandraraj Chandrashekhar Rahane	
55	UEC23M1055	Swarup Sachin Sandhan	

Course Incharge
Prof. J. N Kale

INDEX

ABSTRACT

Blood Connect Pro is a smart blood donation and management system designed to bridge the gap between blood donors, patients, and healthcare institutions. The platform enables real-time connection between donors and recipients by using location-based services and intelligent matching based on blood type and availability. It provides essential functionalities such as donor registration, emergency blood request alerts, hospital inventory management, and automated notifications to nearby eligible donors.

The system enhances efficiency during critical situations by reducing the time required to find compatible donors and ensuring quick response through geolocation and push notifications. It also incorporates features like QR-based donor identification, donation tracking, and community engagement to encourage regular participation. By integrating modern technologies such as mobile applications, cloud databases, and real-time communication systems, Blood Connect Pro aims to create a reliable, scalable, and life-saving ecosystem for blood donation management.

OBJECTIVES

1. To create a centralized platform : Develop a unified system that connects blood donors, recipients, and hospitals in one place for easy access and coordination.

2. To enable quick donor-recipient matching : Match donors with patients based on blood group, location, and availability to reduce delays during emergencies.

3. To provide real-time emergency alerts : Notify nearby eligible donors instantly when a blood request is raised.

4. To maintain and manage blood inventory : Help hospitals and blood banks track blood stock levels efficiently and update availability in real time.

5. To encourage voluntary blood donation : Promote awareness and engagement through reminders, notifications, and donor activity tracking.

6. To ensure secure data management : Protect user data (donors and patients) using proper authentication and secure database systems.

7. To simplify the donation process : Allow easy registration, request submission, and communication between donors and recipients.

8. To improve response time in emergencies : Minimize the time required to find and contact suitable donors using automation and smart notifications.

CHAPTER 1: PROJECT DESCRIPTION

What the system does:

Blood Connect Pro is a digital platform that connects blood donors, patients, and healthcare providers to streamline the process of blood donation and requests. It allows users to register as donors, search for available blood based on type and location, and raise emergency requests. The system ensures quick communication between donors and recipients, helping reduce delays during critical situations.

Key Features:

1. Donor Registration & Management: Users can register as donors and maintain their profiles.
2. Real-time Blood Request System: Patients or hospitals can raise urgent blood requests.
3. Location-based Matching: Finds nearby donors based on blood group and availability.
4. Instant Notifications/Alerts: Sends alerts to eligible donors during emergencies.
5. Blood Inventory Tracking: Helps hospitals manage and update blood stock levels.
6. Secure Authentication: Ensures safe login and data protection.
7. Donation History Tracking: Keeps records of past donations for donors.

CHAPTER 2: TECHNOLOGY STACK

Here's your technology stack for **BloodConnect Pro** formatted professionally for a report. I've refined the structure, added consistency, fixed minor issues (e.g., typos, spacing), and made it more formal while keeping your original content intact. Use this directly in your document with headings and bullet points for visual appeal.

1. Frontend Technologies
HTML5: Defines page structure and semantics.
CSS3: Manages styling and responsive design.
JavaScript (ES6+): Handles client-side logic and interactivity.
React.js: Enables component-based UI development.

2. Backend Technologies
Node.js: JavaScript runtime environment for servers.
Express.js: Framework for building RESTful APIs.

3. Database Technologies
MongoDB Atlas: Cloud-based NoSQL database.
Mongoose: Object Data Modeling (ODM) for schema validation.

4. Authentication & Security
JWT (JSON Web Token): Stateless authentication tokens.
bcrypt.js: Secure password hashing.
Environment Variables (.env): Protects sensitive credentials.

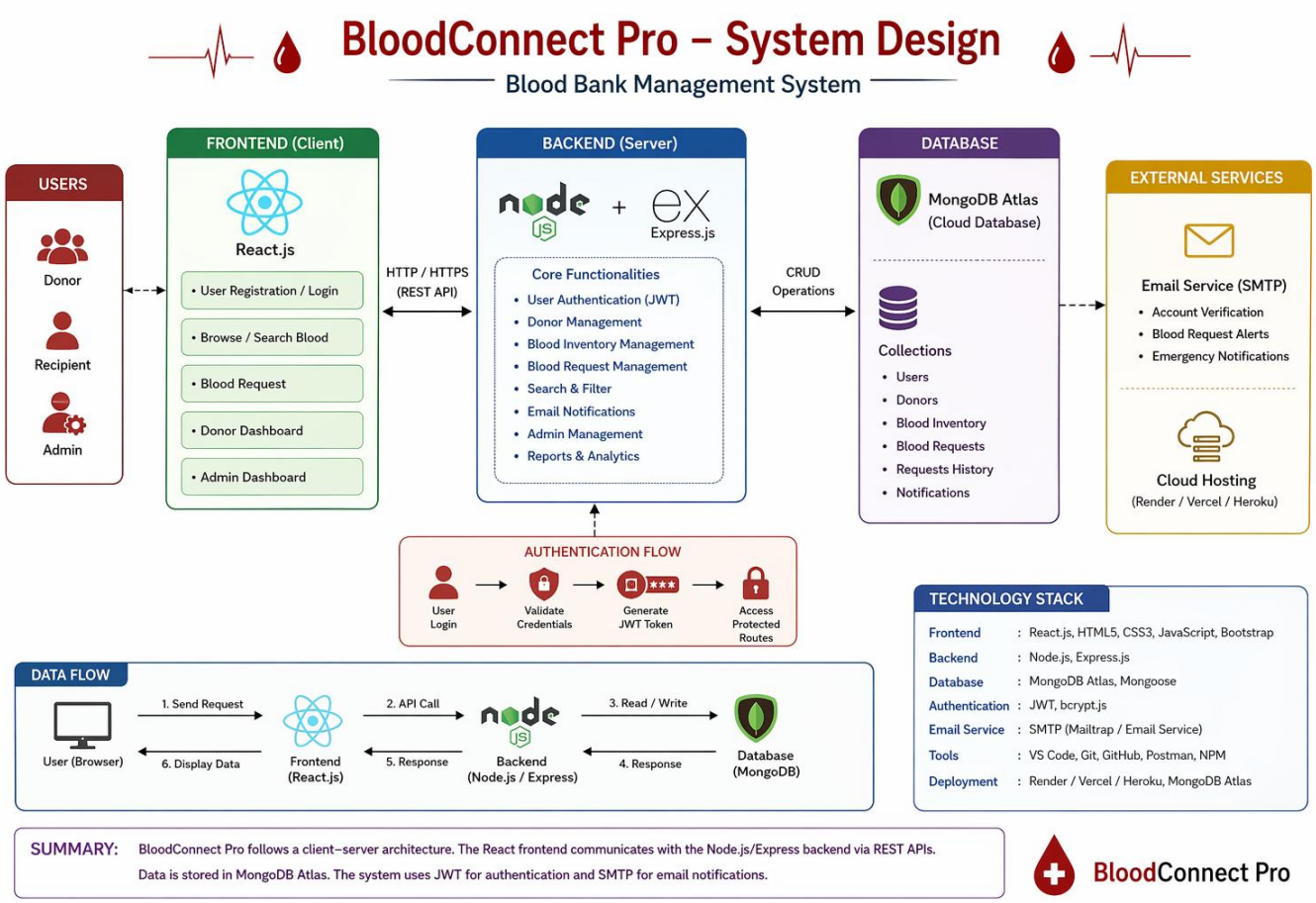
5. Email & Notification System
SMTP (Mailtrap): Email service integration.

6. Development Tools.
Visual Studio Code: Primary code editor.
Git: Version control system.
GitHub: Remote repository hosting.
Postman: API testing and documentation.
NPM: JavaScript package manager.

8. Deployment & Hosting.
Render / Vercel / Heroku: Platform for app hosting (frontend + backend).
MongoDB Atlas: Managed cloud database.

9. Architecture Pattern
MVC (Model-View-Controller): Promotes code organization.

CHAPTER 3: SYSTEM DESIGN



CHAPTER 4: MODULES

System Modules

1. User Authentication Module

This module is responsible for managing user identity and access control within the system.

It provides functionalities such as user registration, login, logout, and secure session handling using authentication mechanisms like JWT. It ensures that only authorized users can access system resources based on their roles (Admin, Donor, Recipient).

2. Donor Management Module

This module handles all operations related to blood donors.

It allows donors to register, update their personal and medical details, and manage their availability status. The system maintains a structured database of donors categorized by blood group and location, enabling efficient matching during emergencies.

3. Blood Inventory Management Module

This module is responsible for maintaining records of available blood units.

It tracks different blood groups, updates stock levels, and ensures real-time availability information. The module helps in avoiding shortages and maintaining proper inventory control within the system.

4. Blood Request Management Module

This module facilitates the process of requesting blood by recipients.

Users can submit blood requests, and the system processes these requests by checking availability and notifying relevant donors or administrators. It also maintains the status of each request (pending, approved, rejected) and keeps a history for future reference.

5. Search and Matching Module

It allows users to search donors or blood availability based on parameters such as blood group and location. The system uses filtering mechanisms to provide quick and accurate results, improving response time in critical situations.

6. Notification Module

This module is responsible for communication within the system.

It sends automated notifications via email to users regarding registration confirmation, blood requests, approval status, and emergency alerts. This ensures timely information delivery and

enhances system responsiveness.

7. Admin Control Module

This module provides administrative control over the system.

The admin can manage users, monitor donor activity, control blood inventory, and approve or reject blood requests. It ensures proper system governance and maintains data integrity.

CHAPTER 5: IMPLEMENTATION / SCREENSHOTS

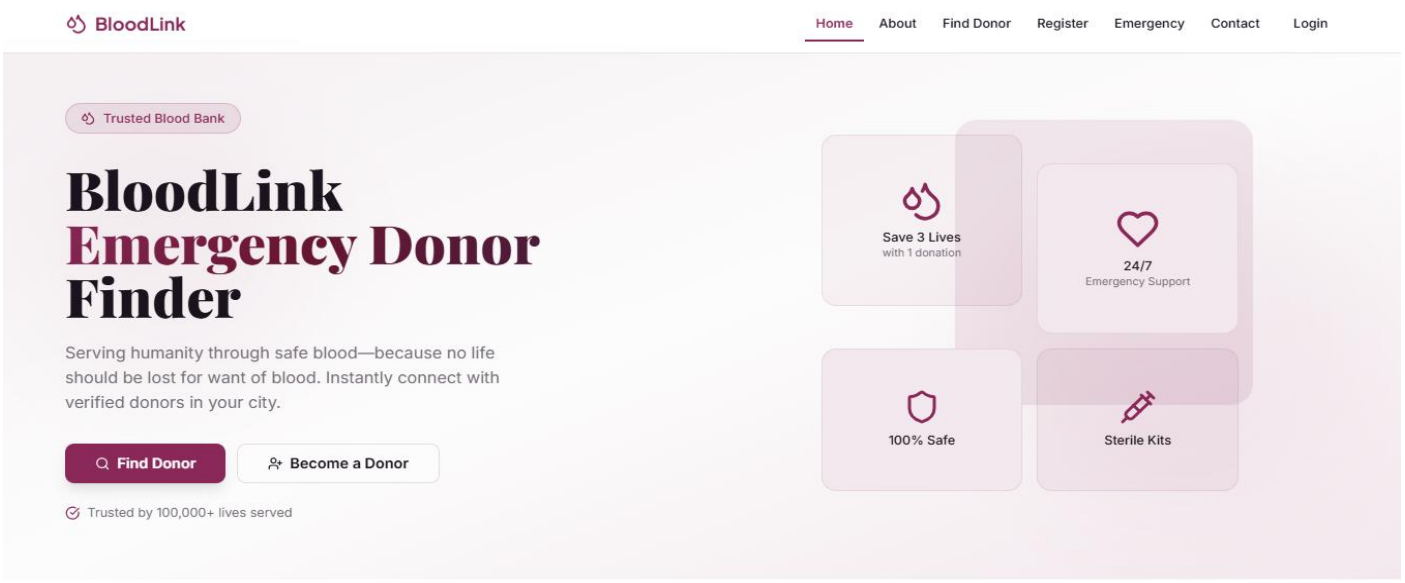


Fig No.01:Landing Page

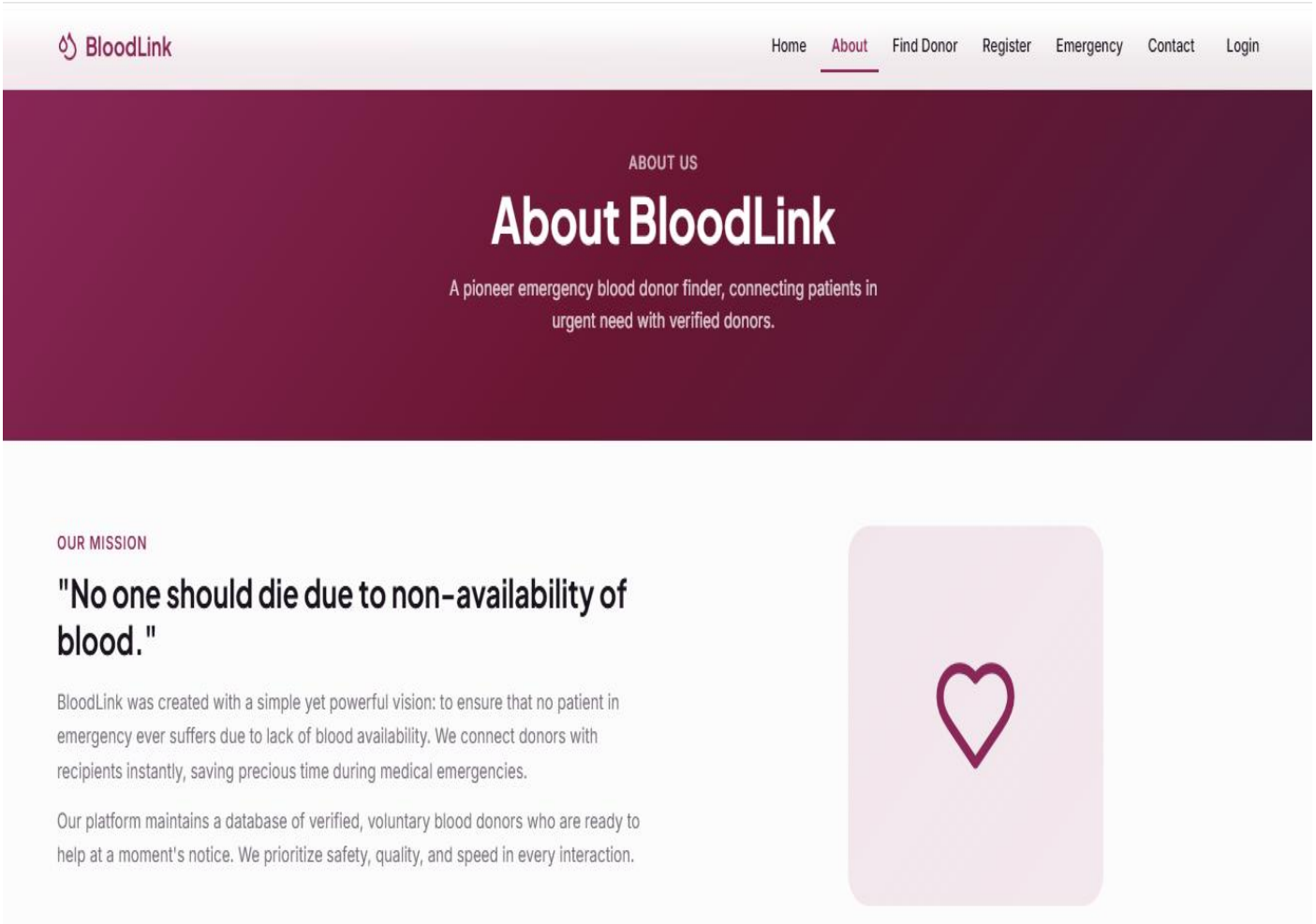


Fig No.02: About Page

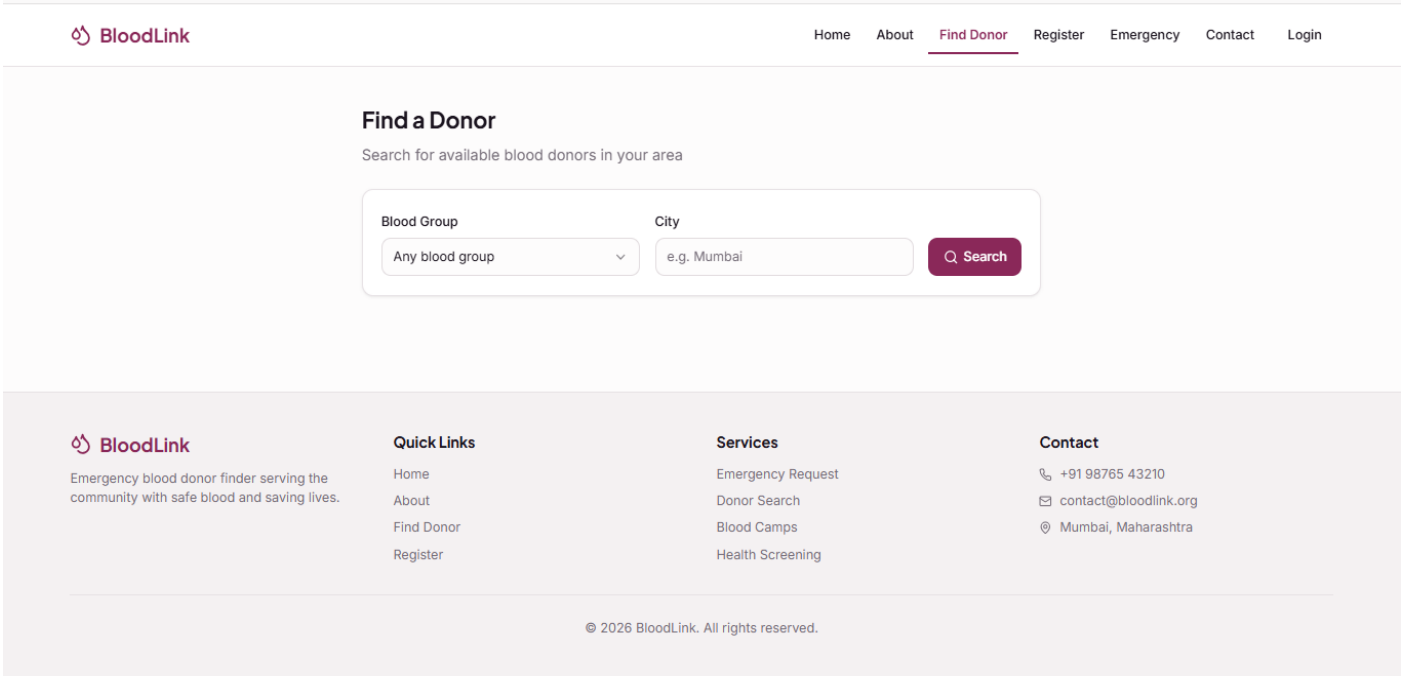


Fig No.03: Find Donor Page

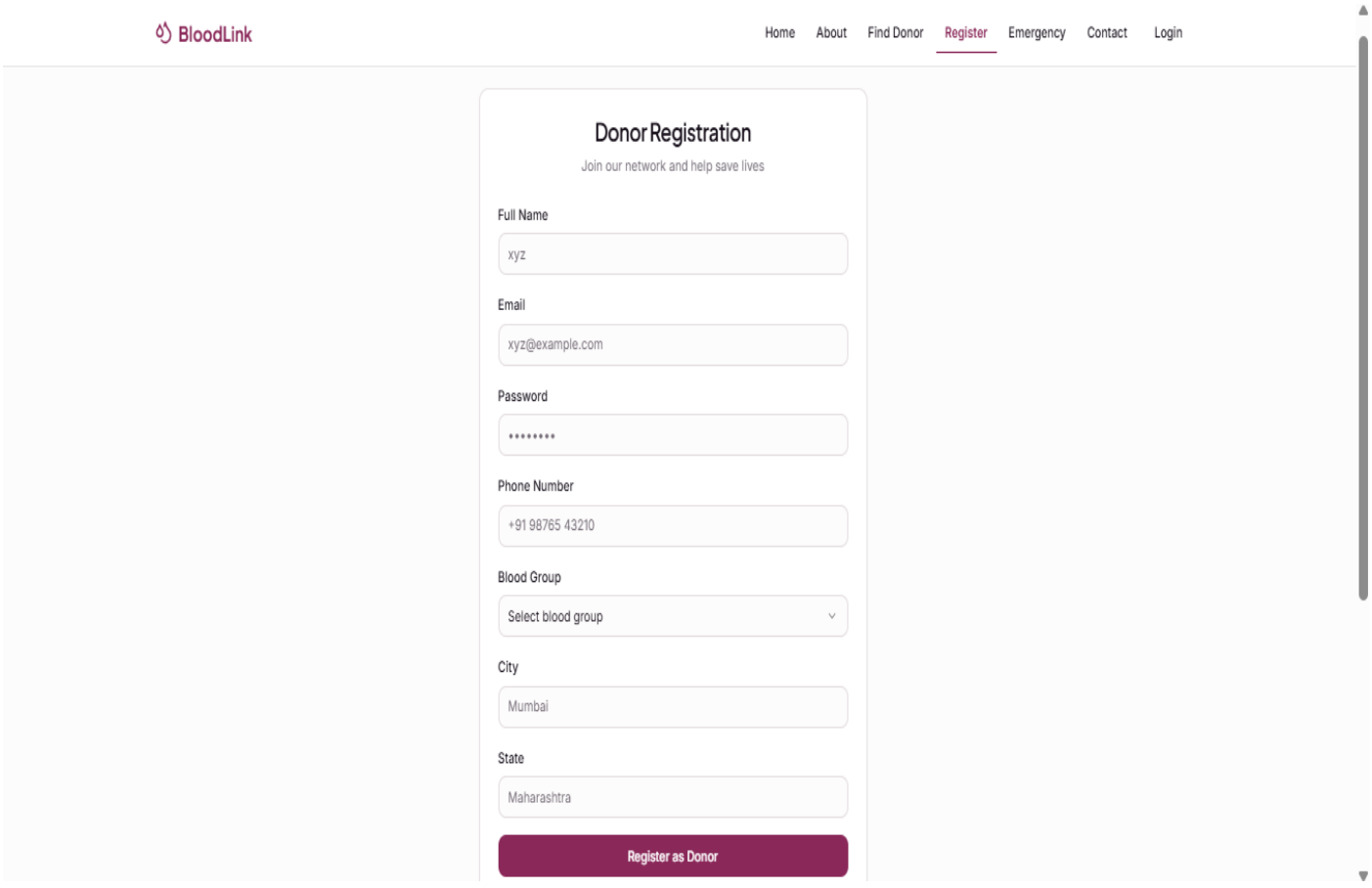


Fig No.04: Donor Registration Page

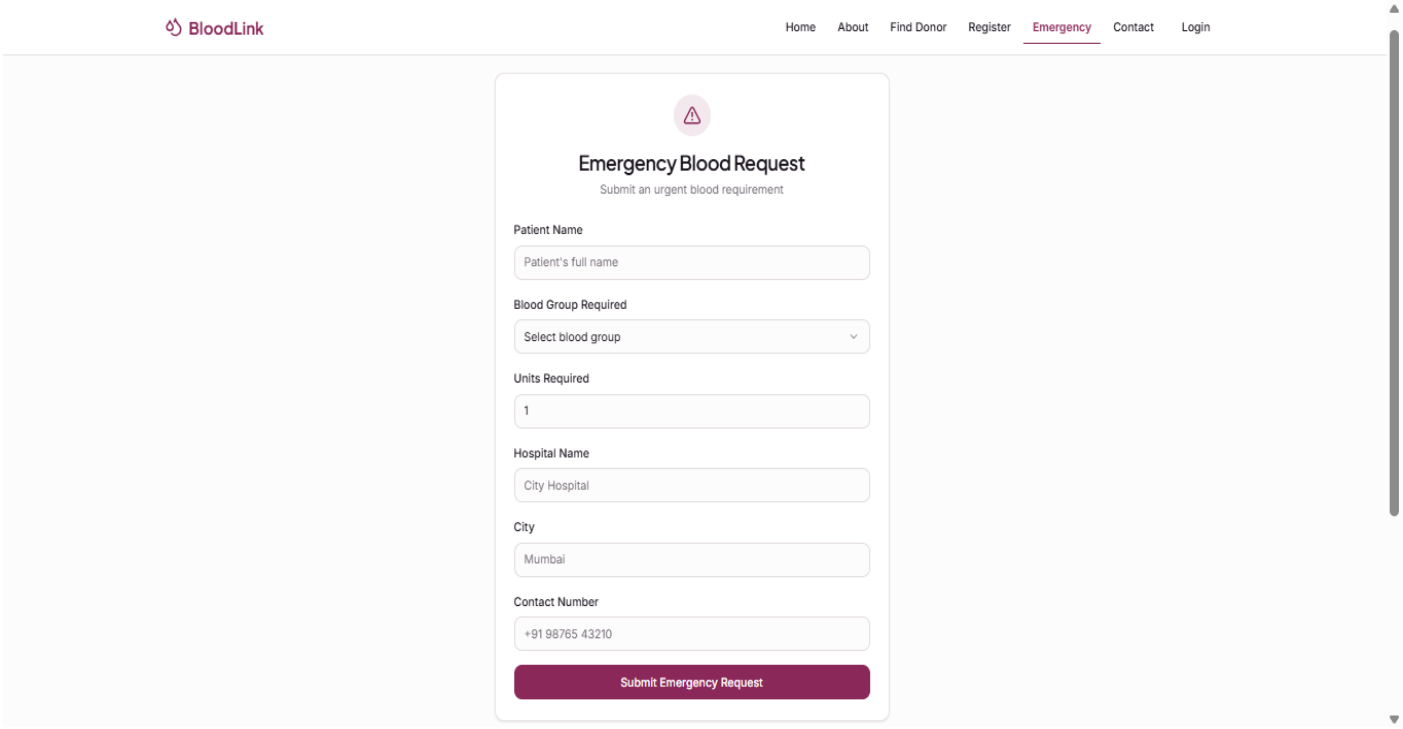


Fig No.05: Emergency Blood Request Page

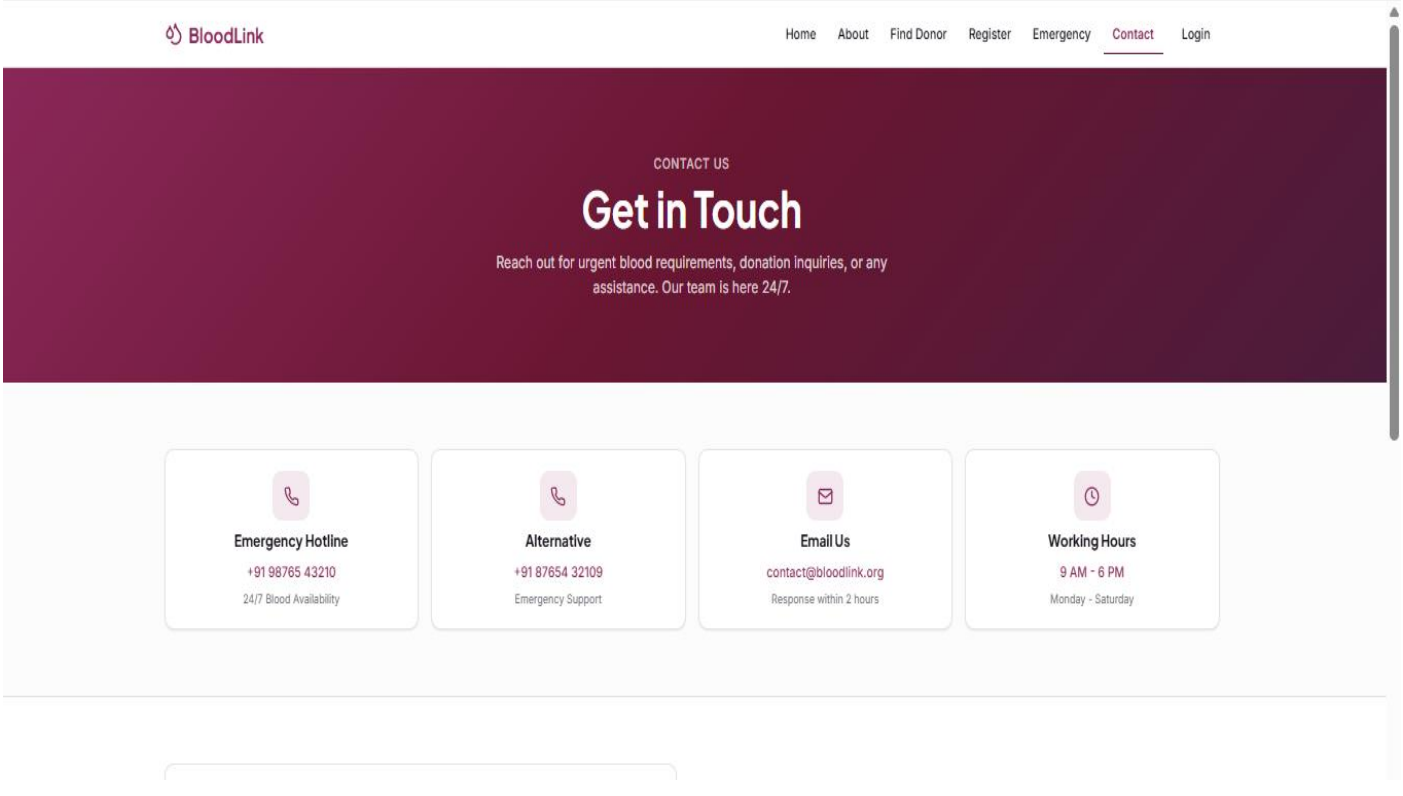


Fig No.05: Contact Page

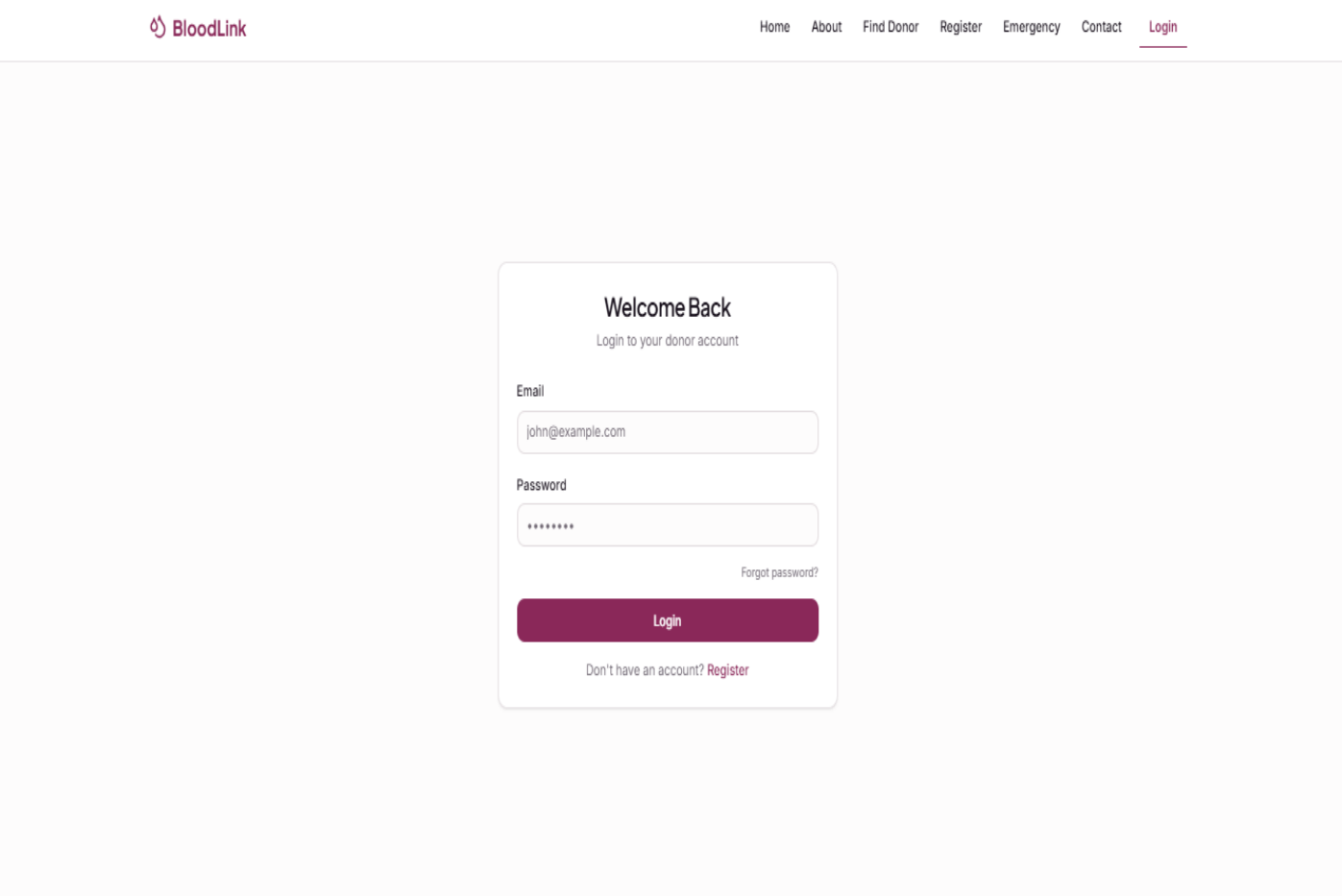


Fig No.07: Login Page

CHAPTER 6: EMERGING TECHNOLOGY / FEATURE

1. Cloud-Based Architecture
The system leverages modern cloud platforms such as Render/Vercel for application hosting and MongoDB Atlas for data storage. This ensures high availability, scalability, and reliability.

Benefits:
High availability with approximately 99.9% uptime
Automatic scalability to handle peak demand
Reduced infrastructure cost using a pay-as-you-go model
Global accessibility for donors, hospitals, and administrators

2. JWT-Based Authentication
The application implements JSON Web Token (JWT) for secure and stateless user authentication.

Advantages:
Eliminates the need for server-side session storage
Provides enhanced security against session hijacking
Supports scalability in distributed cloud environments
Enables role-based access control (Donor, Recipient, Admin)

3. Real-Time Notification System
The system integrates SMTP services (Mailtrap/Nodemailer) to deliver instant email notifications.

Capabilities:
Sends blood request alerts to nearby donors
Provides donor availability confirmations
Handles emergency alert notifications
Supports account verification and password recovery

4. RESTful API Architecture
The system follows REST principles to enable smooth communication between frontend and backend components.

Key Strengths:
High scalability and performance
Easy integration with mobile applications and third-party services
Standardized API methods (GET, POST, PUT, DELETE)
Efficient JSON-based data exchange

5. Responsive Web Design
The application is developed using React.js along with Bootstrap/Tailwind CSS to ensure responsiveness across devices.

User Experience:
Optimized for mobile, tablet, and desktop devices
Touch-friendly interface for ease of use
Accessibility-friendly design principles
Fast loading with optimized resources

6. Scalable NoSQL Database (MongoDB)
The system uses MongoDB Atlas along with Mongoose ODM for flexible and efficient data handling.

Performance Features:
Schema-less structure to support evolving requirements
Horizontal scalability for handling large datasets
Efficient indexing for fast search operations
Support for geo-spatial queries for location-based donor matching

Contributions:

1. Cloud-Based Architecture

We used Render / Vercel to host our application and MongoDB Atlas to store data online. This makes our system accessible anytime and scalable.

Team Contribution:
Chandraraj – Worked on MongoDB Atlas setup
Bhagyashree & Swarup – Deployed backend using Express
Shivraj – Deployed frontend using React
Pradnya – Connected frontend and backend
2. Authentication & Security

We used JSON Web Token (JWT) for login system and bcrypt for password security.

Team Contribution:
Bhagyashree & Swarup – Created login system in backend
Pradnya – Connected login/signup with frontend
Chandraraj – Managed user data in database
Shivraj – Designed login/signup pages
3. Backend & API Development

We used Node.js and Express to create APIs that connect frontend and database.

Team Contribution:
Bhagyashree & Swarup – Developed APIs
Pradnya – Used APIs in frontend
Chandraraj – Connected database using Mongoose
Shivraj – Displayed API data in UI
4. Frontend Development

We used React with HTML, CSS, and JavaScript to build a simple and responsive user interface.

Team Contribution:
Shivraj – Designed UI and handled CSS
Chandraraj – Worked on React components
Pradnya – Connected frontend with backend
Bhagyashree & Swarup – Provided backend data
5. Database (MongoDB)

We used MongoDB to store all user and system data.

Team Contribution:
Chandraraj – Designed database
Bhagyashree & Swarup – Connected backend with database
Pradnya – Managed data flow
Shivraj – Displayed data on UI
6. Development Tools

We used tools like Git, GitHub, Postman, and Visual Studio Code.

Team Contribution:

All Members – Used these tools for coding, testing, and collaboration

CONCLUSION

The BloodConnect Pro system successfully demonstrates the development of a modern, scalable, and efficient blood bank management solution. By integrating technologies such as React, Node.js, Express, and MongoDB, the system ensures seamless communication, secure data handling, and real-time accessibility.

The platform simplifies donor management, blood inventory tracking, and request processing, thereby improving response time during critical situations. Features like JWT-based authentication and notification systems enhance security and user engagement.

Overall, the project highlights the effective use of full-stack web technologies to address real-world healthcare challenges and provides a strong foundation for future enhancements such as AI-based prediction and smart donor matching.

REFERENCES

1. React.js Official Documentation – https://react.dev/
2. Node.js Documentation – https://nodejs.org/
3. Express.js Guide – https://expressjs.com/
4. MongoDB Atlas Documentation – https://www.mongodb.com/docs/
5. Mongoose Documentation – https://mongoosejs.com/
6. JSON Web Token – https://jwt.io/introduction
7. bcrypt – https://www.npmjs.com/package/bcrypt
8. Postman – https://www.postman.com/
9. Visual Studio Code – https://code.visualstudio.com/
10. GitHub – https://github.com/
11. Mailtrap – https://mailtrap.io/
12. W3Schools – HTML, CSS, JavaScript Tutorials – https://www.w3schools.com/
13. MDN Web Docs – Web Development Resources – https://developer.mozilla.org/
14. REST API Tutorial – https://restfulapi.net/