DONOR NOTIFICATION WITH LOCATION MAPPING

A DESIGN PROJECT REPORT

submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

K RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai, Approved by AICTE, New Delhi)

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ABSTRACT

In urgent medical situations, delays in locating compatible blood donors can have serious health consequences. While existing donor notification systems rely on blood group matching, they often neglect the geographic proximity of donors, leading to inefficiencies and slower response times. A donor notification system has been developed that integrates real time location mapping with blood group filtering. The application features an interactive map displaying donor locations and calculates distances from a user-selected point, enabling spatial filtering and prioritization of nearby donors. This location aware approach improves notification accuracy, reduces emergency response time, and enhances decision making for hospitals and recipients. The proposed system bridges the gap between blood compatibility and donor proximity, contributing to more effective healthcare delivery.

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LIST OF ABBREVIATIONS

ABBREVIATION		FULL FORM
HTML	-	Hyper Text Markup Language
CSS	-	Cascading Style Sheet
API	-	Application Programmable Interface
IT	-	Information Technology
SDLC	-	Software Development Life Cycle
RAM	-	Random Access Memory
JS	-	Java Script
GPS	-	Global Positioning System

CHAPTER 1

INTRODUCTION

1.1 GENERAL

Timely access to compatible blood donors plays a crucial role in saving lives during medical emergencies. With increasing urban populations and frequent health-related incidents, there is a growing need for faster and more efficient ways to connect blood donors with those in urgent need. Traditional methods of donor outreach, such as manual phone calls or static lists, often lack the responsiveness and reach required in critical situations.

Modern technology offers powerful tools to bridge this gap. By integrating digital communication with real-time geographical information, a smarter and faster approach can be developed to reach suitable donors based on both blood group and location. An application designed with these capabilities can greatly improve the speed at which donors are identified and contacted, especially when time is a critical factor.

Incorporating a map-based interface helps visualize donor locations and enables users to interact with the system more intuitively. Selecting a location to find nearby donors reduces response time and ensures that help arrives faster. Using distance calculations along with filtered blood group data enhances decision-making for hospitals, emergency responders, and patients. This approach empowers healthcare support systems with a more reliable and responsive donor communication method during emergencies.

1.2 SCOPE OF THE PROJECT

Coverage includes the development of a web-based platform that connects blood donors and recipients using real-time location mapping and blood group filtering. Key functionalities involve displaying donor locations on an interactive map, calculating distances from a selected point, and enabling targeted notifications to nearby compatible donors. Users can easily identify and contact the closest suitable donors, enhancing response speed during emergencies. The platform focuses on user-friendly interaction, reliable data handling, and effective communication. Designed for use by hospitals, patients, and emergency services, the application ensures a more efficient and organized approach to managing blood donation efforts.

1.3 ORGANIZATION OF THE PROJECT

This project is organized into seven chapters. Chapter one provides an introduction, outlining the introduction and scope of the project. Chapter two presents a literature survey of related work and existing solutions. Chapter three focuses on system analysis and design, including system architecture and data flow. Chapter four explains the individual modules and their functionalities. Chapter five details the software used, including tools, technologies, and development environment. Chapter six covers testing and analysis to validate performance and functionality. Chapter seven presents the results and discussion, highlighting outcomes, user interaction, and possible improvements for future development and scalability.

CHAPTER 2

LITERATURE SURVEY

2.1 TITLE: Geolocation-Based Mobile Application for Blood Donation

AUTHORS: N. Shah, A. Jagtap

YEAR: 2019

This paper[1] investigated the development of a mobile application that utilized geolocation technology to facilitate efficient matching between blood donors and recipients. The study described a system that supported real-time tracking of donors and provided route guidance for recipients to access the nearest donors or blood banks. Emphasis was placed on improving donor visibility and minimizing the physical distance between donors and requesters, a critical factor in time-sensitive scenarios.

N. Shah et al. detailed the integration of GPS with mobile interfaces to ensure a smooth user experience, allowing users to view nearby donors on a map and obtain directions. Battery optimization and accuracy in location tracking were also prioritized, addressing common challenges associated with geolocation-based mobile applications. The inclusion of route suggestion functionality was noted as a particularly valuable aspect, aiding users in efficient navigation and potentially reducing delays in accessing blood resources.

Inspired by this approach, the present system adopted mapping technology to display donor locations and enable interactive selection of search areas on the map. Although route navigation was not yet implemented, it was identified as a potential enhancement that would further support rapid and safe connections between donors and recipients.

2.2 TITLE: Blood Bank Management System with SMS Notification

AUTHORS: K. Menon, V. Thomas

YEAR: 2020

This paper[2] investigated a blood bank management system that integrated SMS notification services to alert donors during urgent need situations. The study focused on ensuring fast communication by sending immediate alerts to donors with matching blood groups, thereby increasing the likelihood of timely blood donations. The system highlighted SMS as a reliable communication channel, especially in regions with limited internet connectivity, ensuring wide reach to donors regardless of smartphone or data availability.

K. Menon et al. discussed challenges such as managing response rates and avoiding message overload, which could cause donor fatigue. The implemented system was capable of sending bulk SMS messages to multiple donors simultaneously while monitoring responses to prevent redundancy and enhance donor engagement. This research underscored the importance of a centralized interface to manage notifications and responses, streamlining processes for blood banks and reducing administrative workload.

While SMS remained effective, the approach was extended by employing more interactive, app-based notification systems that allowed not only alerts but also two-way communication through integrated chat features. This method enabled more direct and convenient engagement between donors and recipients, improving coordination and reducing delays. The concept of alerting multiple donors simultaneously significantly influenced the notification strategy, ensuring broad yet targeted outreach during emergencies.

2.3 TITLE: Location-Based Emergency Blood Donor Finder Using Android

AUTHORS: A. Ghosh, S. Majumder

YEAR: 2020

A. Ghosh et al. developed an Android-based blood donor finder application that leveraged GPS technology to identify registered donors within the geographic proximity of a requester. The application sent SMS notifications to potential donors, ensuring rapid communication in emergency situations. The study highlighted the critical importance of location accuracy and timely messaging in improving the effectiveness of blood donation systems, emphasizing the need to reduce delays between requests and donor responses.

A significant contribution of the research lies in its use of mobile technology and SMS for instant alerts, enabling donors to respond promptly regardless of internet connectivity constraints. The study also discusses challenges related to GPS inaccuracies and battery optimization while running location services in the background. The authors stress that geographic awareness plays a key role in saving lives by minimizing the search radius and focusing on donors who can realistically reach recipients quickly.

This paper[3] closely aligned with the objectives of systems integrating geographic proximity into donor selection. It was extended by incorporating an interactive map interface that allowed users to select specific locations and visualize distances to donors, thereby improving upon basic notification models through enhanced user control and interactivity.

2.4 TITLE: Intelligent Blood Donor Locator Using Google Maps API

AUTHORS: J. Mehta, S. Pandey

YEAR: 2020

This paper[4] presents an intelligent blood donor locator system that utilized the Google Maps API to provide real-time location tracking and navigation support for blood recipients. The application guided users to the nearest donor or blood bank by offering clear visual directions and an easy-to-use interface. The system prioritized usability, ensuring that even users with limited technical skills could benefit from accurate geographic guidance during emergencies.

J. Mehta et al. emphasized the importance of flexible mapping interfaces that supported zooming, panning, and dynamic updating of location data. They discussed challenges related to integrating external map services while maintaining performance and responsiveness. The study also highlighted user navigation as a key factor in improving accessibility, enabling recipients to reach donors faster and with fewer errors.

This approach was extended by incorporating a feature that allowed selection of any point on the map—not just the current location—to calculate donor proximity. Such flexibility supported scenarios where blood was needed at different locations or where third parties were involved in coordination. The study served as a valuable technical reference for effectively integrating mapping APIs and handling user inputs on geographic interfaces, aiding in the design of an intuitive, interactive user experience.

2.5 TITLE: Design and Implementation of a Blood Donation Management System

AUTHORS: R. K. Reddy, S. N. Rao

YEAR: 2021

R.K. Reddy et al. developed a comprehensive web-based blood donation management system aimed at simplifying donor registration and blood request handling. The system incorporated core modules such as user registration, blood availability search, donation history tracking, and message communication. Emphasis was placed on creating a modular and scalable architecture with a user-friendly interface to ensure accessibility for both donors and recipients. However, the system lacked map-based or location-aware features, limiting its ability to optimize donor matching based on proximity.

This paper[5] despite the absence of geolocation integration, provides important insights into designing efficient data management and search modules that ensure smooth and accurate donor retrieval. The modular approach facilitates easier updates and expansions, which is critical for systems requiring adaptation over time. User experience factors, such as straightforward navigation and clear status updates, are also discussed, highlighting the importance of usability in encouraging donor participation and timely responses.

Building on these foundations, geolocation and distance filtering were incorporated into the existing functionalities. Donor search capabilities were enhanced by integrating interactive maps that visualized donor locations and calculated real-time distances from the requester. This extension improved search precision and accelerated communication by prioritizing the nearest donors, thus moving beyond data handling to deliver practical, location-based solutions that saved crucial time in emergency situations.

2.6 TITLE: E-Blood Bank and Donor Management System

AUTHORS: A. Mishra, S. Verma

YEAR: 2021

A. Mishra et al. introduced an electronic platform designed to enhance blood bank administration by consolidating inventory management, donor data recording, and blood request logs into a unified system. The web-based interface allowed hospitals and clinics to log blood requests efficiently and track availability, aiming to reduce manual errors and delays common in traditional systems. Digitizing these processes improved transparency and accountability within blood bank operations.

This paper[6] features a detailed maintenance of donor histories and request records, which assisted in analyzing donation patterns, donor reliability, and overall blood stock trends. This data-driven approach supported blood banks in making informed decisions, such as targeting specific donor groups for campaigns or optimizing inventory levels. The platform also emphasized role-based access, ensuring sensitive donor information remained protected while enabling authorized personnel to perform necessary actions.

Building upon this framework, real-time donor outreach was incorporated, extending beyond primary inventory management. Donor history and request tracking offered a holistic view of donor engagement to improve responsiveness. Historical data enabled better matching algorithms and helped maintain donor commitment by tracking past donations and communications.

2.7 TITLE: Blood Donation Mobile Application Using Location-Based Services

AUTHORS: R. Karthikeyan, P. Subashini

YEAR: 2022

R. Karthikeyan et al. introduced a mobile-based platform that utilized location-based services (LBS) to simplify the blood donation process by connecting recipients with nearby donors. The study focused on reducing delays in locating suitable blood donors by allowing users to register with essential details such as blood group, contact information, and real-time location. Upon a blood request raised through the app, the system retrieved GPS coordinates of both requesters and registered donors and calculated proximity using the Google Maps API.

The paper[7] emphasizes the importance of real-time updates and responsive design in medical emergency tools. It explains how integrating Google Maps not only aids in visualizing donor locations but also enhances the credibility and functionality of the system. Additionally, potential scalability challenges are discussed, including handling dense urban donor clusters and low donor availability in remote areas.

Detailed emphasis was placed on the location-aware aspect of subsequent systems, especially in the use of mapping services and live notifications to save crucial time. The dynamic map interface marked donor locations and allowed selection of target areas to view nearby donors. The notification mechanism was adapted to prioritize proximity, improving the chances of a fast response..

2.8 TITLE: Location-Aware Health Services Using Android App

AUTHORS: T. Kiran, M. Naik

YEAR: 2022

This paper[8] explored a broad spectrum of health-related services that leverage geolocation technologies within an Android application framework. These services include ambulance dispatch coordination, locating available doctors, and finding blood donors based on real-time spatial data. The study underscores the pivotal role of location awareness in enhancing healthcare delivery, especially in time-critical scenarios where reducing response time can save lives.

T. Kiran et al. detailed the technical challenges and solutions for incorporating accurate spatial data, such as integrating GPS tracking, managing battery consumption, and ensuring privacy compliance. An intuitive map interface was emphasized as crucial for users to easily access and interpret spatial information quickly. By utilizing location-based services, healthcare providers optimized resource allocation and improved communication between patients, emergency responders, and medical staff.

A detailed analysis strongly influenced the location-aware aspect of subsequent systems, especially in the use of mapping services and live notifications to save crucial time. The dynamic map interface marked donor locations and allowed selection of target areas to view nearby donors. The notification mechanism was adapted to prioritize proximity, improving the chances of a fast response.

2.9 TITLE: A Smart Blood Bank System Using IoT and Cloud

AUTHORS: D. Priya, M. Ramkumar

YEAR: 2022

D. Priya et al. proposed a smart blood bank system that combined Internet of Things (IoT) devices with cloud computing to maintain real-time synchronization of donor and blood inventory data. IoT-enabled sensors at blood banks automated inventory monitoring, while cloud storage ensured data was instantly updated and accessible to authorized users. This integration enhanced transparency and coordination between donors, hospitals, and blood banks, reduced wastage, and improved availability.

This paper[9] explored how real-time data synchronization and automated updates contributed to system reliability and responsiveness in critical healthcare environments. The cloud-based architecture also facilitated scalability and remote access, making the system adaptable to larger networks of donors and institutions. Security mechanisms for data privacy and controlled access were addressed, ensuring the system protected sensitive medical information while providing timely updates.

Although the system did not directly employ IoT hardware, the principles of real-time synchronization and cloud-based data management significantly influenced the system design. Cloud storage was implemented to ensure that donor information and availability status were consistently up to date across all users. This real-time data flow was essential for the location-based search functionality to accurately reflect donor positions and availability, thereby improving response times in emergencies.

2.10 TITLE: Online Blood Donor System with Geolocation and Filtering

AUTHORS: R. Singh,

YEAR: 2023

This paper[10] presented an online blood donor system that combined geolocation with advanced filtering options, enabling users to refine searches by blood group, donor availability, and geographic distance. The system leveraged database query optimization alongside basic mapping tools to efficiently retrieve and display relevant donor information. It emphasized precision and speed, critical for emergency blood donation scenarios.

R. Singh focused on designing filtering algorithms that handled large datasets, ensuring quick response times even in densely populated urban areas with many donors. The integration of location mapping allowed users to visualize search results on a map, providing spatial context that text-based lists lacked. This combination of data filtering and geographic visualization empowered users to make informed choices rapidly.

Building on this foundation, this work enhanced user experience by integrating dynamic, interactive maps that allowed users not only to view donors but also to select specific search areas and receive real-time distance calculations. Optimization of the filtering process balanced speed and accuracy, facilitating quicker matches and better resource allocation. The study's approach to managing large donor databases informed design decisions, ensuring scalability and efficiency.

CHAPTER 3

SYSTEM ANALYSIS AND DESIGN

3.1 EXISTING SYSTEM

The existing System is designed to assist users in quickly locating potential blood donors based on specific blood groups. It provides a straightforward interface where users can search for a particular blood group, such as A+, B−, O+, or AB−. Once a blood group is selected, the system displays a list of all donors who have registered under that group. For each matching donor, the system shows essential details including the donor's name and contact number. This allows users to identify suitable donors for their needs.

The system is the ability to send notifications. After viewing the donor list, the user can send alerts or messages directly to individual donors using the system's built-in notification function. This makes it easier to reach out to multiple donors efficiently during the time of need. Overall, the system acts as a searchable donor directory that streamlines communication between blood recipients and registered donors. It is especially helpful in organizing and managing donor out reach based on blood group compatibility, ensuring that users can contact potential donors quickly through a simple and accessible interface.

3.2 DISADVANTAGES OF EXISTING SYSTEM

- No Location Awareness
- Cannot find nearest donor
- No Distance-Based Filtering
- Time-consuming in emergencies

3.3 PROPOSED SYSTEM

The proposed Blood Donor Notification System introduces advanced features that enhance the process of identifying and contacting suitable blood donors. At the core of this system is the integration of an interactive map interface using tools like Leaflet.js, which allows donors to be displayed based on their geographical locations. Users can begin by selecting a required blood group from the interface. Once selected, the system displays matching donors as markers on the map. Each marker corresponds to a donor's exact location, based on their registered coordinates (latitude and longitude). This visual representation allows users to quickly understand the distribution of donors for that specific blood group.

A key feature of the system is its integration of interactive location selection, target location marking, shortest distance calculation, and notification sending. When the interactive location selection allowing users to click on any point on the map such as a hospital or emergency site to set a target location mark. Once this location is selected, the system automatically calculates the shortest distance from that point to each donor's location. Donors are then sorted based on proximity to help users quickly identify the nearest available individuals. After reviewing nearby donors, users can send notifications directly through the interface to one or more selected donors. This process enables faster and more effective outreach in time-sensitive situations.

This system provides a user-friendly and efficient solution for discovering, viewing, and notifying blood donors. With the help of real-time mapping and distance calculations, it ensures better coordination and quicker responses, especially in emergencies. The system combines search functionality, map visualization, and communication tools into a single platform, making it easier to connect the right donors with those in need.

3.4 ADVANTAGES OF PROPOSED SYSTEM

- Location-Based Filtering
- Real-Time Map Integration
- Distance Calculation Feature
- Interactive Map Display
- Target Location Selection
- Instant Notification Feature

3.5 SYSTEM REQUIREMENTS

Operating System	:	Windows 10
Coding Language	:	HTML , CSS , JAVA AND JS
Tools	:	VS code
Data Base	:	MYSQL

3.6 HARDWARE REQUIREMENTS

System	:	Intel i3
Hard Disk	:	500 GB
Monitor	:	15 VGA Color
RAM	:	4 GB

3.7 ARCHITECTURE DIAGRAM

The proposed Blood Donor Notification System streamlines the process of locating and contacting nearby blood donors. It begins with a recipient searching for a specific blood group, after which the system retrieves and displays matching donor details from the database. The recipient can then send direct notifications to selected donors about the blood requirement. Simultaneously, the system calculates the routing distance using donor location data to identify the nearest donors. This efficient workflow is illustrated in Fig 3.1.

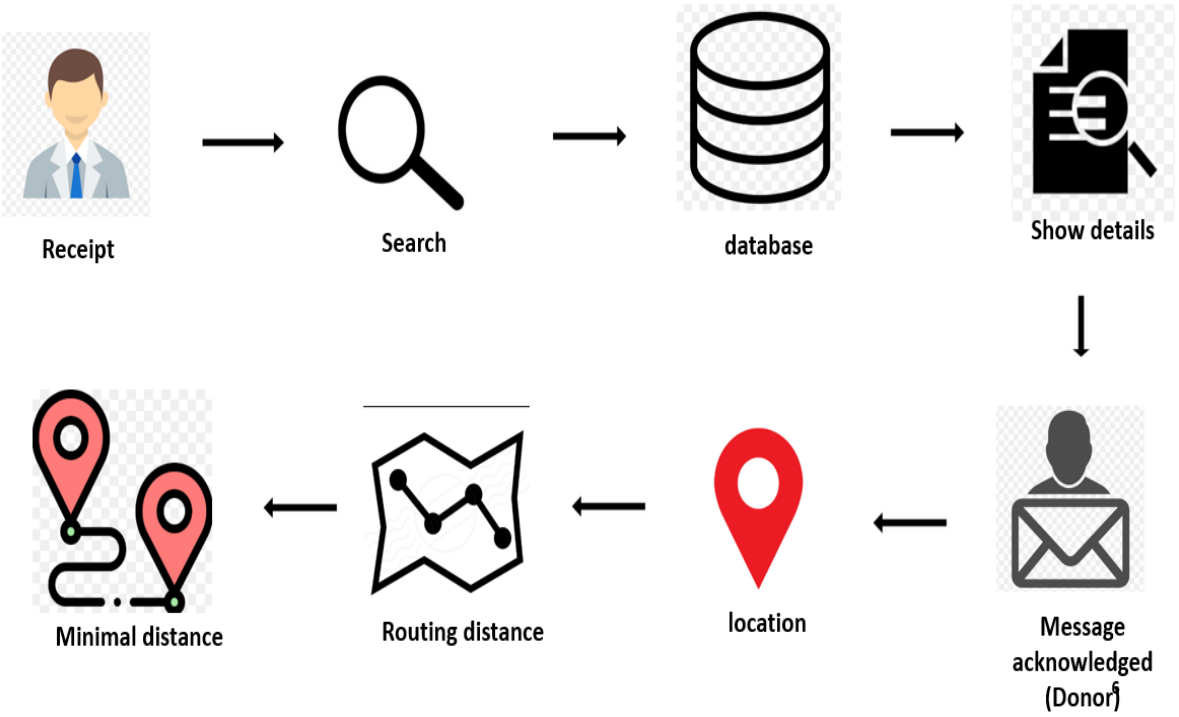


Fig 3.1 Architecture diagram

3.8 USE CASE DIAGRAM

The Fig 3.2 illustrates the use case diagram of the Donor Notification System with Location Mapping, highlighting interactions between three main actors: Recipient, Admin, and Donor. Recipients can search blood groups, select locations, and notify nearby donors. Admins manage data, while Donors register and submit forms for emergency response.

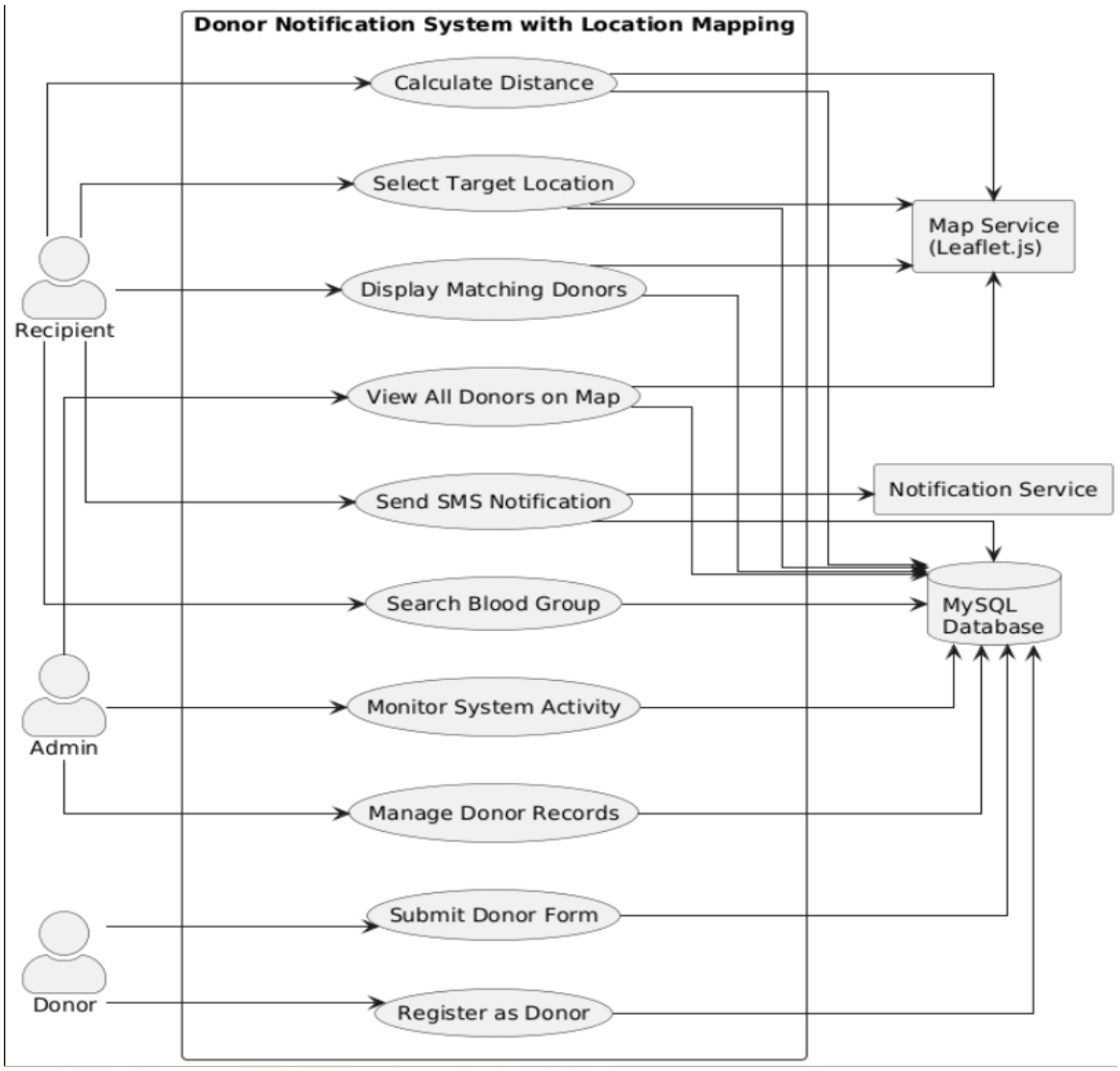


Fig. 3.2 Use case diagram

3.9 ACTIVITY DIAGRAM

The Fig 3.3 shows the activity diagram of the Donor Notification System, illustrating the workflow from donor registration to recipient search and notification. Donors register and select their location, which is saved and shown on the map. Recipients search for blood groups, select a location, and notify nearby donors based on calculated distance.

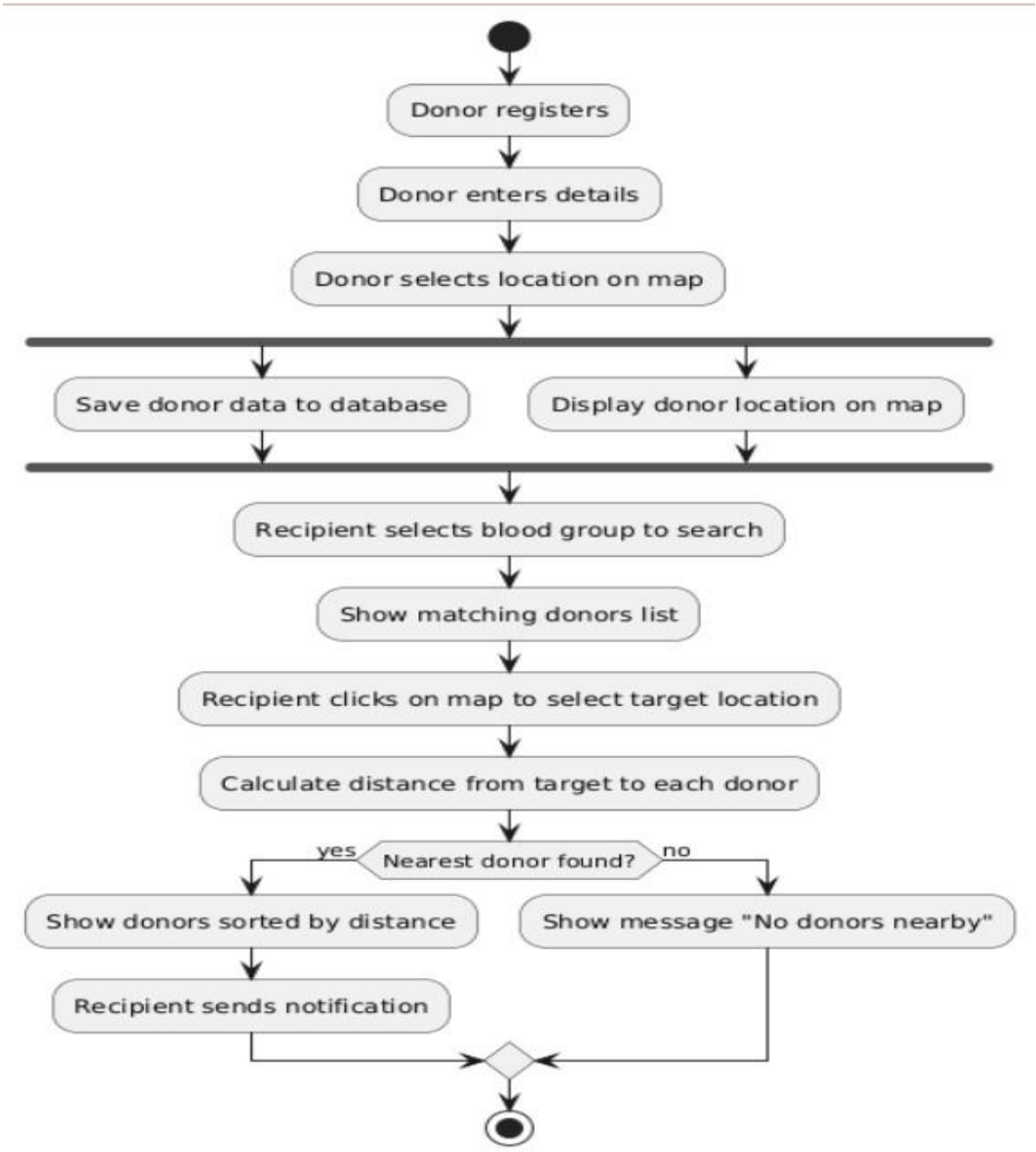


Fig 3.3 Activity diagram

3.10 SEQUENCE DIAGRAM

The Fig 3.4 presents the sequence diagram of the Donor Notification System, covering Donor Registration and Recipient Search with Notification. It shows how donor details are submitted and stored via the frontend and backend. Recipients search, view matching donors on a map, and send notifications through the system.

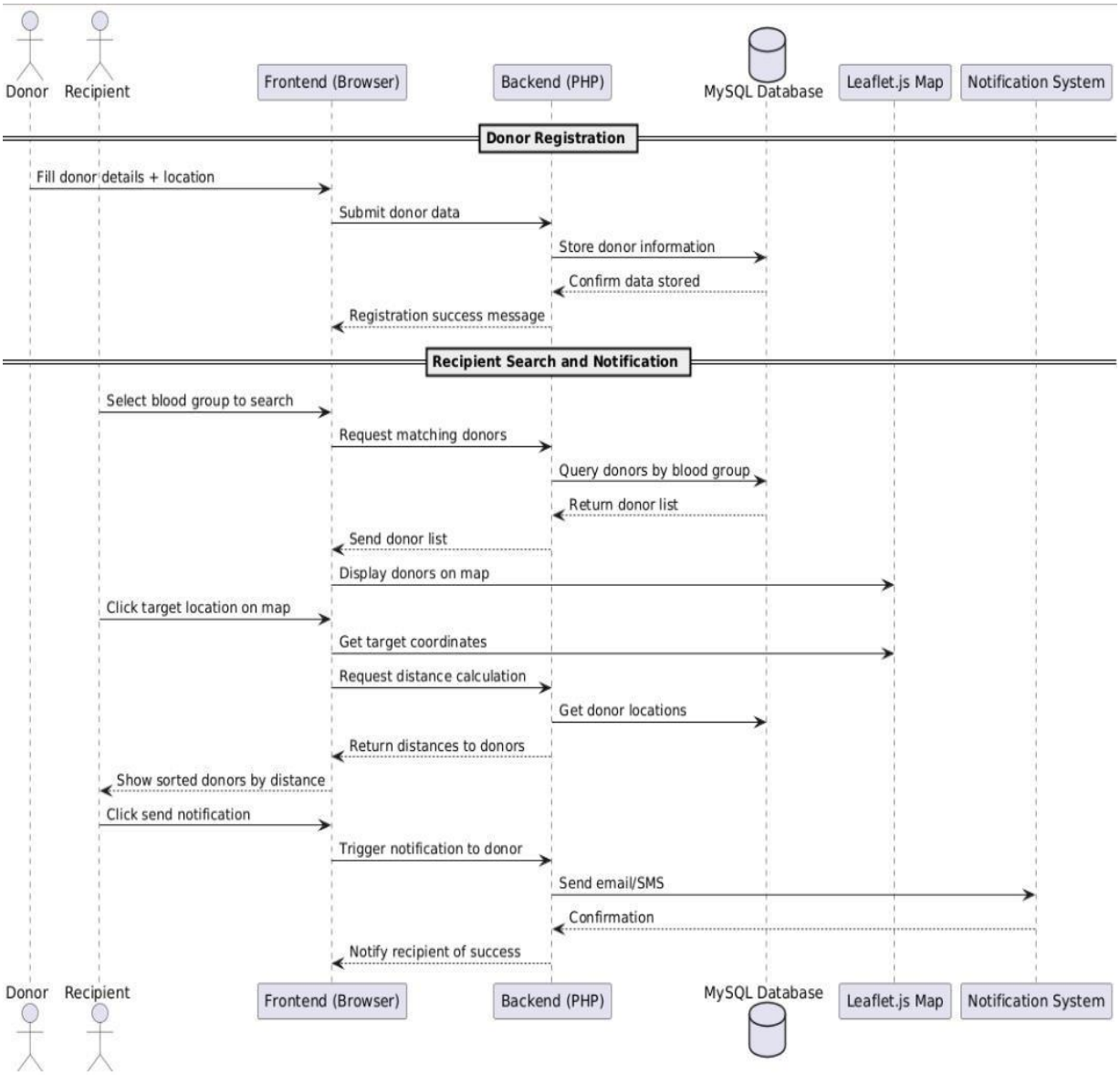


Fig 3.4 Sequence diagram

CHAPTER 4

MODULE DESCRIPTION

4.1 MODULE DISCRIPTION

The design is organized into five core modules. The Donor Registration & Login Module handles donor sign-up and authentication. The Recipient Search Module allows recipients to find matching donors. The Calculation Module computes distances between donors and target locations. The Notification Module sends alerts to selected donors. Lastly, the Admin Module manages user data, system monitoring, and overall maintenance.

Key modules of the system include:

1. Donor registration & login module
2. Recipient search module
3. Calculation module
4. Notification module
5. Admin module

4.1.1 DONOR REGISTRATION & LOGIN

The Donor Registration & Login module is a crucial part of the Blood Donor Notification System. It allows individuals who are willing to donate blood to create an account and securely access the system's features. During the registration process, donors are required to provide essential details such as name, age, gender, blood group, mobile number, email address, and residential location (often using map coordinates). These details are stored in the database and used for matching donors with recipients in need.

After successful registration, donors can use the login feature to access their account. The login process typically involves entering a registered email or mobile number along with a password. This ensures secure access and protects the donor's personal information.Once logged in, donors can view and update their profile and respond to blood requests. This system not only maintains a verified database of genuine donors but also enables real-time communication and location-based matching.

By combining user authentication with accurate data collection, the Donor Registration & Login system ensures that only registered and willing individuals are contacted during emergencies, thereby improving the reliability and efficiency of blood donation drives.

4.1.2 RECIPIENT SEARCH MODULE

The The Recipient Search Module is a vital component of the Blood Donor Notification System. It enables recipients or hospital staff to search for suitable blood donors based on specific blood group requirements. The user inputs the required blood group (e.g., A+, B−), and the system queries the donor database to retrieve a list of matching registered donors.

Once the results are displayed, the module shows detailed donor information such as name, contact number, and location on an interactive map. The user can then click on a specific location on the map—such as a hospital or emergency site—to allow the system to calculate the routing distance from that point to each donor.

Donors are then sorted based on minimal distance, helping recipients quickly identify the nearest available donors. The system also allows recipients to send messages directly to selected donors, making the search fast, accurate, and highly effective during emergencies.

4.1.3 CALCULATION MODULE

The Calculation Module is a core functional part of the Blood Donor Notification System that determines the distance between the recipient's selected location and each donor's registered location. When a recipient clicks on a specific point on the map (such as a hospital or emergency site), the module retrieves the latitude and longitude of that location.

Using this data, the system calculates the routing distance the actual travel path between the recipient's point and each donor's location, rather than just straight-line (aerial) distance. This ensures more realistic and practical distance measurement. The module identifies the minimal distance among all results to help prioritize the nearest donors. These distances are used to sort donor results on the map, allowing recipients to quickly view and contact the most accessible donors.

This module is essential for enabling location-based decision-making, improving emergency response time, and increasing the efficiency and accuracy of connecting recipients with nearby donors.

4.1.4 NOTIFICATION MODULE

The **Notification Module** is responsible for enabling direct communication between recipients and blood donors. After a recipient selects a blood group and identifies nearby matching donors, this module allows the user to send messages or alerts to one or more selected donors. Notifications are typically sent via SMS, email, or in-app alerts, informing donors about the urgent need for blood along with the recipient's contact details and location. This immediate communication helps in faster donor response and timely blood donation. The module ensures that only registered and relevant donors are notified, making the process efficient, targeted, and highly effective during medical emergencies.

4.1.5 ADMIN MODULE

The **Admin Module** serves as the central control panel of the Blood Donor Notification System. It provides administrative users with access to manage and monitor all activities within the system. The admin can view, update, and delete donor and recipient records, ensuring the database remains accurate and up-to-date. This module allows the admin to approve new donor registrations, verify details, and manage user access.

Additionally, the admin has access to a dashboard that displays blood group availability, donor distribution on the map, and ongoing notification activity. The system also allows the admin to track which donors have been notified and their response status.

The Admin Module plays a key role in maintaining data integrity, overseeing communication logs, and ensuring smooth system operation. By controlling backend functions and data flow, it enables efficient coordination between donors and recipients, especially during high-demand or emergency situations, making the system reliable and responsive.

CHAPTER 5
SOFTWARE DESCRIPTION

5.1 SOFTWARE DESCRIPTION

The development of the system utilizes several essential tools and technologies. HTML, CSS, and JavaScript are used for creating the frontend interface, ensuring a responsive and interactive user experience. PHP is employed for backend development and server-side scripting. MySQL serves as the database for storing user and donor data. Leaflet.js is integrated for interactive map functionalities. XAMPP is used as the local server environment for development and testing.

The system is developed using the following tools and technologies:

1. HTML, CSS, Java script
2. PHP
3. MYSQL
4. LEAFLET.JS
5. XAMPP

5.1.1 HTML,CSS,JAVASCRIPT

The frontend of the system is developed using HTML, CSS, and JavaScript. HTML structures the web pages, CSS styles the interface for a clean and user-friendly design, and JavaScript adds interactivity. Together, they enable users to input data, interact with maps, and receive real-time feedback on the web interface.

5.1.2 PHP

The backend of the system is built using PHP, which handles all server-side logic, data processing, and communication with the MySQL database. PHP is responsible for storing donor information, processing recipient searches, managing notifications, and calculating distances. It acts as a bridge between the frontend and the database, ensuring smooth data flow and secure operations. PHP also integrates with APIs for sending SMS or email notifications efficiently and in real time.

5.1.3 MYSQL

MySQL is used as the database management system for the Donor Notification System with Location Mapping. It plays a crucial role in storing, organizing, and retrieving data efficiently. All donor and recipient information, such as name, address, contact details, blood group, email, and geolocation coordinates, is securely stored in structured tables within the MySQL database. The system performs queries to match donors based on blood group and fetch their corresponding location data for mapping and distance calculations. MySQL ensures data consistency, supports relationships between tables, and handles concurrent data access without conflict.

It is highly scalable, reliable, and widely supported, making it ideal for handling real-time requests such as searching for nearby donors. Combined with PHP for backend logic, MySQL helps deliver fast and responsive search results. Its compatibility with XAMPP allows developers to test and manage the system locally. Overall, MySQL provides a stable and efficient backbone for data handling in this project.

5.1.4 LEAFLET.JS

Leaflet.js is used for map integration in the Donor Notification System to visually display the geographical locations of blood donors. It allows users to interact with the map by selecting a target location, such as a hospital or emergency site. Donor locations are marked on the map with pins, and when a recipient clicks on a point, Leaflet.js helps calculate and display the distance from that point to each donor. This interactive feature enhances decision-making by identifying the nearest available donors quickly. Lightweight and easy to use, Leaflet.js provides a responsive and real-time mapping experience for both donors and recipients.

5.1.5 XAMPP

XAMPP is used as the local server environment for running the Donor Notification System. It includes Apache for hosting the PHP backend and MySQL for managing the database. XAMPP allows developers to test and run the full project on a local machine before deployment. It simplifies the setup process by bundling essential components, enabling smooth development, database management, and testing without requiring an internet connection or external server.

CHAPTER 6
TESTING AND ANALYSIS

6.1 TESTING STEPS

- Unit Testing
- System Testing
- White Box Testing
- Black Box Testing

TYPES OF TESTS

6.1.1 UNIT TESTING

Unit testing involves testing individual components or modules of the system in isolation to ensure they function as expected. In this project, unit testing was performed on modules like donor data entry, blood group filtering, map location capture, and distance calculation to verify their correctness and reliability during execution.

6.1.2 SYSTEM TESTING

System testing was conducted to validate the integrated functionality of the donor notification system. It ensured that modules such as user input, location mapping, blood group search, and notification features worked seamlessly together. The testing confirmed that the system met the overall requirements and performed reliably.

6.1.3 WHITEBOX TESTING

White box testing focuses on the internal logic, code structure, and flow of the application. In the proposed system, this testing method was used to verify the correctness of logic behind distance calculations, data filtering by blood group, and location mapping algorithms. Each function was tested for accurate output using test inputs, ensuring code paths, loops, and conditions behaved as expected to enhance the system's overall reliability and performance.

6.1.4 BLACKBOX TESTING

Black box testing involves evaluating the functionality of the system without knowing its internal code structure. In this project, black box testing was applied to test features like donor registration, blood group search, notification delivery, and map-based location display. Inputs were given through the user interface, and outputs were verified against expected results. This helped identify any issues related to data handling, form validation, and user interaction, ensuring the system functions correctly from an end-user perspective

CHAPTER 7
RESULTS AND DISCUSSION

7.1 RESULT

The location mapping was successfully implemented and met all functional requirements. Donors could register, and recipients were able to search for donors by specific blood groups. The system accurately displayed matching donors on an interactive map with markers showing their locations. When a location was selected, the system calculated the distance to each donor and sorted them by proximity. Sms Notifications were sent directly from the interface to selected donors. Testing with multiple entries showed the system to be reliable and effective in improving donor visibility and response time.

7.2 CONCLUSION

The System with Location Mapping offers by integrating location awareness, it enables recipients to find and contact the nearest suitable donors quickly, which improves response time during emergencies. The use of interactive maps and distance calculations enhances decision-making and communication efficiency. This system ensures accurate blood group matching while adding the practical benefit of proximity-based notifications. Overall, the project demonstrates how combining geolocation with donor data optimizes blood donation coordination and can potentially save more lives by facilitating faster donor-recipient connections.

7.3 FUTURE ENHANCEMENTS

- **Real-Time Donor Availability Status**
  Integrate live status updates so donors can mark themselves as *available* or *unavailable*, improving response accuracy during emergencies.
- **Automated Route Navigation**
  Add a feature that provides optimal driving routes from donor to recipient location using navigation APIs for faster travel.
- **Multi-Language Support**
  Implement multi-language options in the user interface to make the system accessible to users from diverse linguistic backgrounds, ensuring broader reach and usability.
- **Donor Eligibility Verification**
  Add features to verify donor eligibility based on health history, last donation date, and age criteria to ensure safe blood donation.
- **Push Notification Integration**
  Implement push notifications through mobile apps or browsers to instantly alert donors, increasing responsiveness.
- **Emergency Request Priority System**
  Introduce a priority level tagging (e.g., *High*, *Medium*, *Low* urgency) to help filter and act quickly on the most critical blood requests.
- **Mobile Application Support**
  Develop Android/iOS mobile apps to complement the web system, enabling easier access and faster notifications on the go.
- **Chatbot Assistance**
  Implement a chatbot for quick queries related to blood requests, donor status, eligibility, or navigation support.

APPENDIX A

SOURCE CODE:

INDEX.PHP:

```
<!-- login.php -->
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Blood Donor Notification - Login</title>
  <style>
    body {
      margin: 0;
      padding: 0;
      background: #f8d7da;
      font-family: Arial, sans-serif;
      display: flex;
      justify-content: center;
      align-items: center;
      height: 100vh;
    }

    .login-container {
      background-color: #fff;
      padding: 30px;
      border-radius: 8px;
      box-shadow: 0 0 15px rgba(0, 0, 0, 0.2);
      width: 320px;
```

```
}

.login-container h2 {
  text-align: center;
  color: #c82333;
  margin-bottom: 20px;
}

input[type="text"],
input[type="password"] {
  width: 100%;
  padding: 10px;
  margin: 10px 0;
  border: 1px solid #c82333;
  border-radius: 4px;
}

button {
  width: 100%;
  padding: 10px;
  background-color: #c82333;
  color: #fff;
  border: none;
  border-radius: 4px;
  cursor: pointer;
  font-weight: bold;
  margin-top: 10px;
}
```

```
    button:hover {
      background-color: #a71d2a;
    }

    .error {
      color: red;
      text-align: center;
      margin-top: 10px;
    }

    .footer {
      text-align: center;
      font-size: 12px;
      color: #555;
      margin-top: 20px;
    }
  </style>
</head>
<body>
  <div class="login-container">
    <h2>Blood Donor Login</h2>
    <form method="POST" action="login_action.php">
      <input type="text" name="username" placeholder="Username" required />
      <input type="password" name="password" placeholder="Password"
required />
      <button type="submit">Login</button>
    </form>

    <?php
```

```
    if (isset($_GET['error'])) {
      echo '<div class="error">Invalid username or password</div>';
    }
  ?>

  <div class="footer">Donor Notification System © 2025</div>
 </div>
</body>
</html>
```

ABOUT.PHP:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>About Us - Blood Donation System</title>
  <style>
    body {
      font-family: Arial, sans-serif;
      margin: 0;
      padding: 0;
      background-color: #f8f9fa;
    }

    header {
      background-color: #d9534f;
```

```
        color: white;
        padding: 15px;
        text-align: center;
    }

    .container {
        max-width: 800px;
        margin: 50px auto;
        background: white;
        padding: 20px;
        border-radius: 10px;
        box-shadow: 0px 0px 10px rgba(0, 0, 0, 0.1);
        text-align: center;
    }

    h2 {
        color: #d9534f;
    }

    p {
        font-size: 18px;
        line-height: 1.6;
        color: #333;
    }
  </style>
</head>
<body>

<header>
```

```
    <h1>About Us</h1>
</header>

<div class="container">
    <h2>Welcome to the Blood Donor Notification System</h2>
    <p>I am Abinesh from Karambakkudi, and this Blood Donor Notification System with Location Mapping is designed to provide a life-saving platform that connects blood donors with those in urgent need. By leveraging real-time location tracking, this system ensures that donors can be quickly identified and notified, making the process of blood donation faster, more efficient, and socially impactful.</p>
</div>

</body>
</html>
```

ADMIN.PHP:

```
<?php
session_start();
$conn = new mysqli("localhost", "root", "", "person_db");
if ($conn->connect_error) {
    die("Database connection failed: " . $conn->connect_error);
}

// Admin Login Credentials
$admin_user = "rabi";
$admin_pass = "vj";
```

```
// Handle Login
if ($_SERVER["REQUEST_METHOD"] == "POST" &&
isset($_POST['login'])) {
    $username = $_POST['username'];
    $password = $_POST['password'];
    if ($username === $admin_user && $password === $admin_pass) {
        $_SESSION['admin_logged_in'] = true;
    } else {
        $error = "Invalid username or password!";
    }
}

// Logout
if (isset($_GET['logout'])) {
    session_destroy();
    header("Location: admin.php");
    exit;
}

// If not logged in, show login form
if (!isset($_SESSION['admin_logged_in'])) {
?>
    <!DOCTYPE html>
    <html lang="en">
    <head>
        <meta charset="UTF-8">
        <title>Admin Login</title>
        <style>
```

```
        body { font-family: Arial, sans-serif; text-align: center; padding: 50px;
background: #f8f9fa; }
        form { background: white; padding: 20px; border-radius: 10px; display:
inline-block; box-shadow: 0px 0px 10px rgba(0,0,0,0.1); }
        input, button { padding: 10px; margin: 5px; width: 100%; }
        button { background: #d9534f; color: white; border: none; cursor:
pointer; }
        button:hover { background: #c9302c; }
    </style>
</head>
<body>
    <h2>Admin Login</h2>
    <form method="post">
        <input type="text" name="username" placeholder="Username"
required><br>
        <input type="password" name="password" placeholder="Password"
required><br>
        <button type="submit" name="login">Login</button>
    </form>
    <?php if (isset($error)) echo "<p style='color:red;'>$error</p>"; ?>
</body>
</html>
<?php
    exit;
}

// Handle Add Donor
if ($_SERVER["REQUEST_METHOD"] == "POST" &&
isset($_POST['add_donor'])) {
```

```
    $fullname = $_POST['fullname'];
    $mobile = $_POST['mobile'];
    $age = $_POST['age'];
    $email = $_POST['email'];
    $blood_group = $_POST['blood_group'];
    $address = $_POST['address'];
    $latitude = $_POST['latitude'];
    $longitude = $_POST['longitude'];

    if (!empty($latitude) && !empty($longitude)) {
        $stmt = $conn->prepare("INSERT INTO donors (fullname, mobile, age,
email, blood_group, address, latitude, longitude) VALUES (?, ?, ?, ?, ?, ?, ?,
?)");
        $stmt->bind_param("ssisssdd", $fullname, $mobile, $age, $email,
$blood_group, $address, $latitude, $longitude);
        if ($stmt->execute()) {
            header("Location: admin.php");
            exit;
        }
    }
}

// Handle Delete Donor
if (isset($_GET['delete'])) {
    $id = $_GET['delete'];
    $conn->query("DELETE FROM donors WHERE id = $id");
    header("Location: admin.php");
    exit;
}
```

```
// Fetch Donors
$result = $conn->query("SELECT * FROM donors");
$donors = [];
while ($row = $result->fetch_assoc()) {
    $donors[] = $row;
}
?>

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Admin Panel</title>
    <script src="https://unpkg.com/leaflet/dist/leaflet.js"></script>
    <link rel="stylesheet" href="https://unpkg.com/leaflet/dist/leaflet.css" />
    <style>
        body { font-family: Arial, sans-serif; background: #f8f9fa; text-align:
center; }
        .container { width: 90%; margin: 20px auto; background: white; padding:
20px; border-radius: 10px; box-shadow: 0px 0px 10px rgba(0,0,0,0.1); }
        table { width: 100%; border-collapse: collapse; margin-top: 20px; }
        th, td { border: 1px solid #ddd; padding: 10px; text-align: center; }
        th { background: #d9534f; color: white; }
        button { padding: 10px; background: #d9534f; color: white; border: none;
cursor: pointer; }
        button:hover { background: #c9302c; }
        #map { height: 400px; width: 100%; margin-top: 20px; border-radius:
10px; }
```

```
    </style>
</head>
<body>

<div class="container">
    <h2>Admin Panel - Donor Management</h2>
    <a href="admin.php?logout=true"><button>Logout</button></a>

    <h3>Add Donor</h3>
    <form method="post">
        <input type="text" name="fullname" placeholder="Full Name" required>
        <input type="text" name="mobile" placeholder="Mobile" required>
        <input type="number" name="age" placeholder="Age" required>
        <input type="email" name="email" placeholder="Email" required>
        <select name="blood_group" required>
            <option value="A+">A+</option>
            <option value="B+">B+</option>
            <option value="O+">O+</option>
            <option value="AB+">AB+</option>
            <option value="A-">A-</option>
        </select>
        <input type="text" name="address" placeholder="Address" required>
        <button type="button" onclick="openLocationPicker()">Set
Location</button>
        <input type="hidden" name="latitude" id="latitude">
        <input type="hidden" name="longitude" id="longitude">
        <button type="submit" name="add_donor">Add Donor</button>
    </form>
```

```
    <h3>All Donors</h3>
    <table>
        <tr>
            <th>Full Name</th>
            <th>Mobile</th>
            <th>Age</th>
            <th>Email</th>
            <th>Blood Group</th>
            <th>Address</th>
            <th>Location</th>
            <th>Action</th>
        </tr>
        <?php foreach ($donors as $donor): ?>
            <tr>
                <td><?= htmlspecialchars($donor['fullname']) ?></td>
                <td><?= htmlspecialchars($donor['mobile']) ?></td>
                <td><?= htmlspecialchars($donor['age']) ?></td>
                <td><?= htmlspecialchars($donor['email']) ?></td>
                <td><?= htmlspecialchars($donor['blood_group']) ?></td>
                <td><?= htmlspecialchars($donor['address']) ?></td>
                <td>(<?= $donor['latitude'] ?>, <?= $donor['longitude'] ?>)</td>
                <td><a href="admin.php?delete=<?= $donor['id']
?>"><button>Delete</button></a></td>
            </tr>
        <?php endforeach; ?>
    </table>

    <h3>Donor Locations</h3>
    <div id="map"></div>
```

```
</div>

<script>
    function openLocationPicker() {
        let newWindow = window.open('location_picker.php', 'Set Location',
'width=800,height=600');
        window.addEventListener('message', function(event) {
            document.getElementById('latitude').value = event.data.lat;
            document.getElementById('longitude').value = event.data.lng;
        });
    }

    var map = L.map('map').setView([20.5937, 78.9629], 5);
    L.tileLayer('https://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png', { attribution:
'&copy; OpenStreetMap contributors' }).addTo(map);

    <?php foreach ($donors as $donor): ?>
        L.marker([<?= $donor['latitude'] ?>, <?= $donor['longitude']
?>]).addTo(map).bindPopup("<b><?= $donor['fullname'] ?></b><br>Blood:
<?= $donor['blood_group'] ?><br><?= $donor['address'] ?>");
    <?php endforeach; ?>
</script>

</body>
</html>
```

LOGIN.PHP:

```
<!-- login.php -->
<!DOCTYPE html>
```

```
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Blood Donor Notification - Login</title>
  <style>
    body {
      margin: 0;
      padding: 0;
      background: #f8d7da;
      font-family: Arial, sans-serif;
      display: flex;
      justify-content: center;
      align-items: center;
      height: 100vh;
    }

    .login-container {
      background-color: #fff;
      padding: 30px;
      border-radius: 8px;
      box-shadow: 0 0 15px rgba(0, 0, 0, 0.2);
      width: 320px;
    }

    .login-container h2 {
      text-align: center;
      color: #c82333;
      margin-bottom: 20px;
    }
```

```
input[type="text"],
input[type="password"] {
  width: 100%;
  padding: 10px;
  margin: 10px 0;
  border: 1px solid #c82333;
  border-radius: 4px;
}

button {
  width: 100%;
  padding: 10px;
  background-color: #c82333;
  color: #fff;
  border: none;
  border-radius: 4px;
  cursor: pointer;
  font-weight: bold;
  margin-top: 10px;
}

button:hover {
  background-color: #a71d2a;
}

.error {
  color: red;
  text-align: center;
```

```
    margin-top: 10px;
   }

   .footer {
    text-align: center;
    font-size: 12px;
    color: #555;
    margin-top: 20px;
   }
  </style>
</head>
<body>
  <div class="login-container">
   <h2>Blood Donor Login</h2>
   <form method="POST" action="login_action.php">
    <input type="text" name="username" placeholder="Username" required />
    <input type="password" name="password" placeholder="Password"
required />
    <button type="submit">Login</button>
   </form>

   <?php
    if (isset($_GET['error'])) {
     echo '<div class="error">Invalid username or password</div>';
    }
   ?>

   <div class="footer">Donor Notification System © 2025</div>
  </div>
```

```
</body>
</html>
```

LOGIN_ACTION.PHP

```
<?php
session_start();

// Example credentials
$valid_user = "donoradmin";
$valid_pass = "blood123";

if ($_POST['username'] === $valid_user && $_POST['password'] ===
$valid_pass) {
    $_SESSION['username'] = $valid_user;
    header("Location: header.php");
    exit();
} else {
    header("Location: login.php?error=1");
    exit();
}
?>
```

APPENDIX B

OUTPUT SCREENSHOT

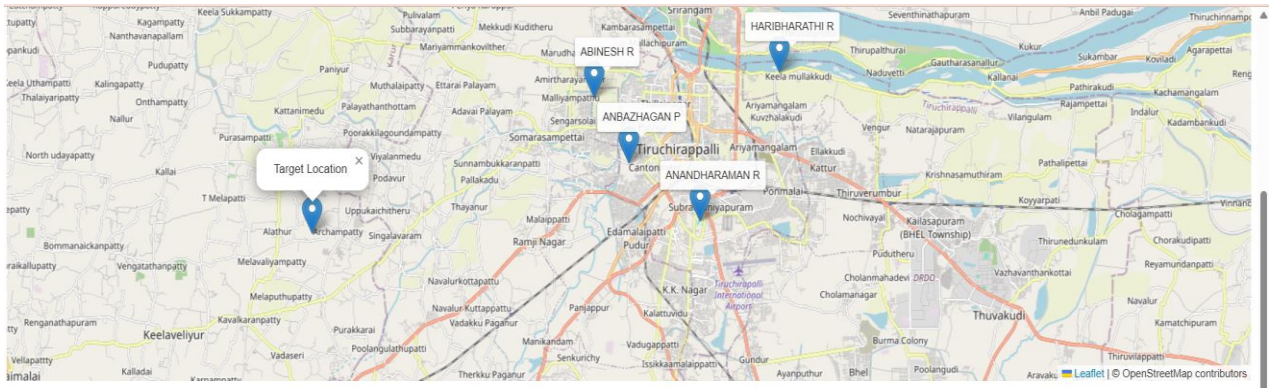
1.LOGIN PAGE

Fig B.1 Login page

2.HOME PAGE

Fig B.2 Home page

3.DESTINATION PAGE



Distance Table

Donor Name	Blood Group	Landmark	Distance (km)
ABINESH R	B+	Malliyampathu, Srirangam, Tiruchirappalli, Tamil Nadu, 620102, India	13.90
HARIBHARATHI R	B+	Kallanai Road, Puthapuram, Thiruverumbur, Tiruchirappalli, Tamil Nadu, 620019, India	22.15
ANBAZHAGAN P	B+	Ward 26, Trichy Zone V, Trichy Corporation Limits, Tiruchirappalli, Tiruchchirāppalli, Tiruchirappalli, Tamil Nadu, 620001, India	14.64
ANANDHARAMAN R	B+	Anna Stadium, Race Course Road, Kajamalai, Trichy Zone II, Trichy Corporation Limits, Tiruchirappalli, Tiruchchirāppalli, Tiruchirappalli, Tamil Nadu, 620020, India	17.60

Fig B.3 Destination page

4.DONOR REGISTRATION MODULE

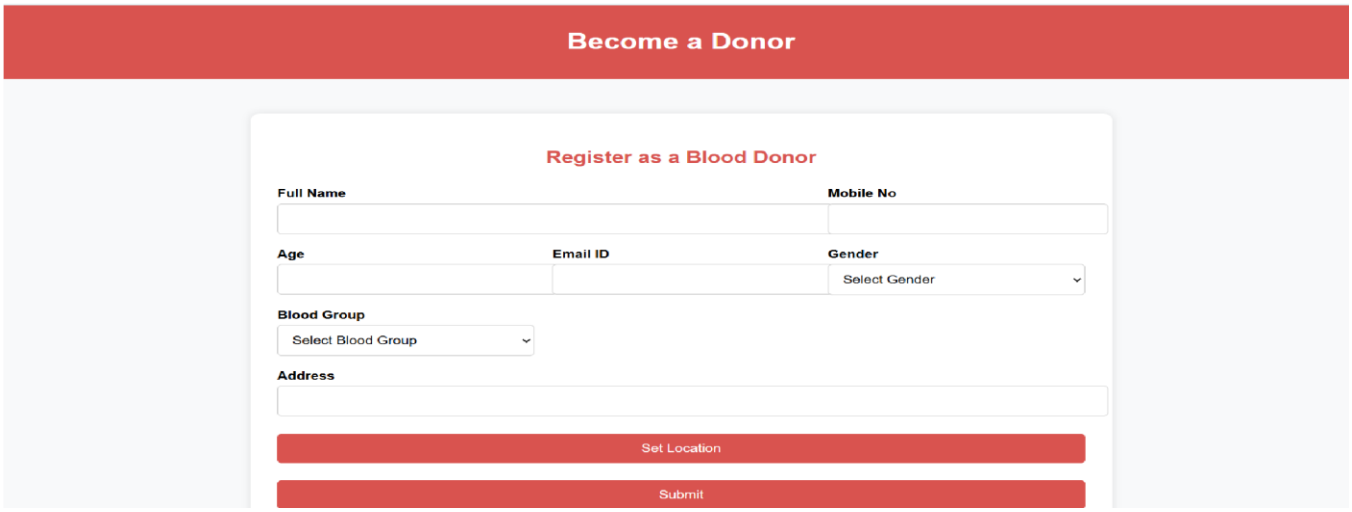


Fig B.4 Donor registration page

5.SEARCH AND NOTIFICATION MODULE

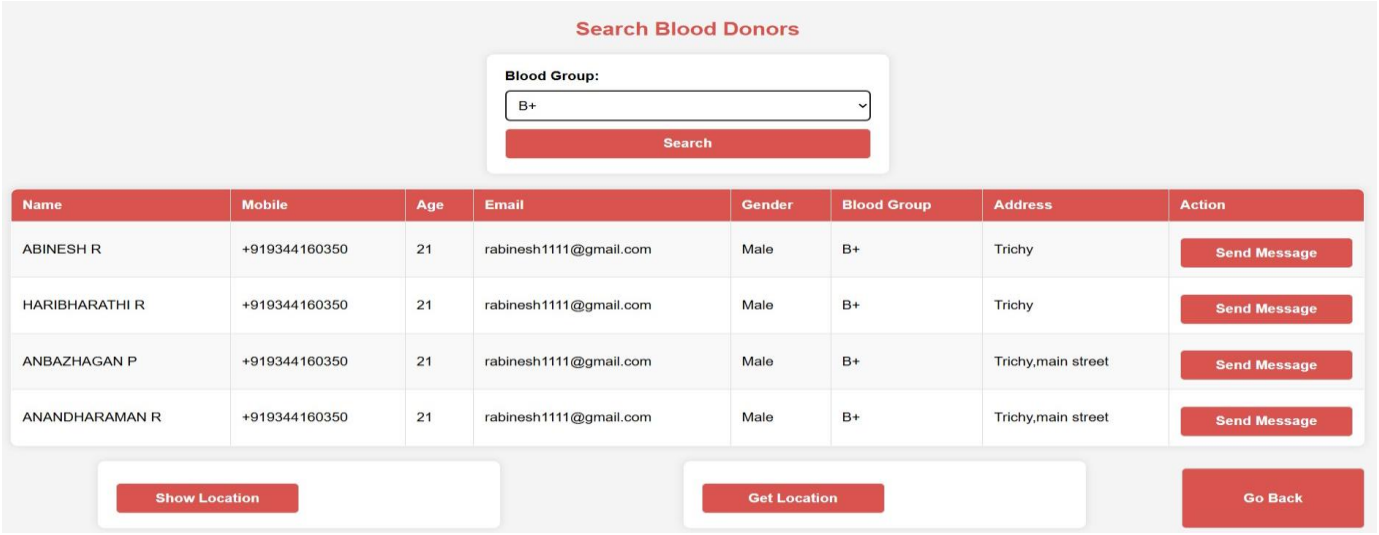


Fig B.5 Search and notification page

6.ADMIN MODULE

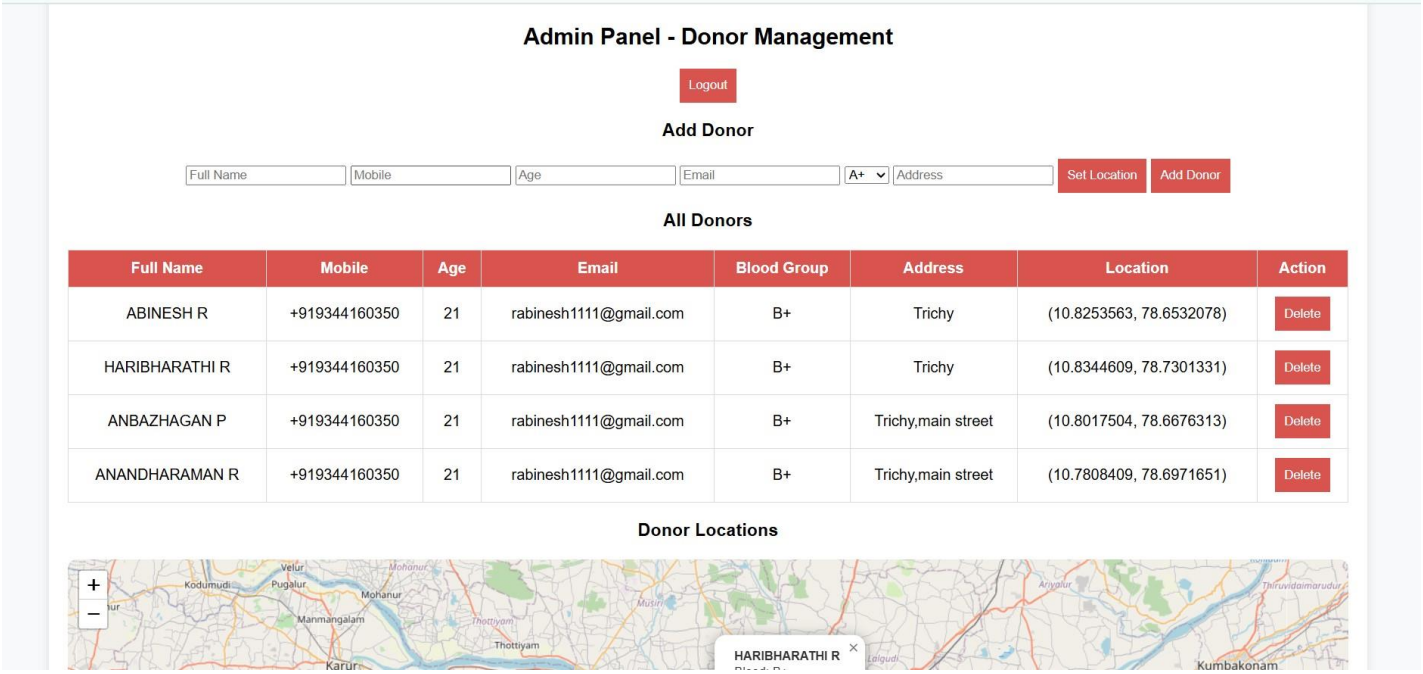


Fig B.6 Admin page

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