

LifeLink: A Unified Digital Platform for Blood and Body Donation

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Abstract

LifeLink is a transformative web-based platform designed to connect blood donors, body donors, recipients, and healthcare institutions in a streamlined and compassionate manner. This initiative aims to bridge the gap between donors and those in need by providing a centralized, secure, and accessible system that promotes both life-saving blood donations and noble body donations for medical education and research. The platform features user-friendly registration, location-based donor search, real-time alerts, and institutional access to ensure timely support and coordination. This paper outlines the development, architecture, and testing of the LifeLink system, highlighting its potential to support digital healthcare delivery and donor engagement.

Keywords: Blood Donation, Body Donation, Digital Health, Web-based Healthcare System, Donor Registration, eHealth, Health Informatics

1. Introduction

LifeLink is a web-based platform that innovatively connects blood and body donors with recipients, hospitals, and medical institutions. Unlike existing systems that focus only on either blood or body donation, LifeLink unifies both domains into one interface. Key features include real-time alerts, location-based matching, intuitive dashboards, and secure data management. The platform aims to increase accessibility and transparency in the donation process and support medical institutions in both emergency and educational contexts.

Research Objectives and Methodology

The primary objectives of LifeLink are:

- To develop a unified platform for blood and body donor registration
- To streamline donor-recipient matching via location-based algorithms

- To simplify body donation pledges and enhance accessibility
- To allow hospitals to securely access donor records
- To implement responsive and scalable web technology
- To utilize MySQL and MongoDB for optimized data storage and retrieval

2. Literature Survey

Existing platforms like eRaktKosh, Red Cross Blood App, and Organ India provide either blood or organ donation features, but do not integrate both blood and body donation in a single system. Studies in eHealth technology highlight the role of centralized platforms in enhancing coordination, reducing search delays, and improving trust among users. The OpenMRS and DHIS2 systems demonstrate the impact of modular architecture and open access in public health management. Privacy and consent challenges in digital health have been addressed through frameworks like India's DPDP Bill and WHO's voluntary donation guidelines. LifeLink builds upon these insights to create a practical, scalable donation tool[1-8].

3. Methodology

- Requirement Analysis: Researched existing donation platforms, identified pain points
- Design: Wireframes, module plans, and database schema created
- Technology Stack:
 - Frontend: HTML, CSS (with media queries)
 - Backend: PHP
 - Database: MySQL (structured data), MongoDB (unstructured data)
- Development: Built modules for registration, donor search, dashboards, alerts
- Testing: Conducted manual and tool-based testing across browsers and devices
- Deployment: Hosted locally on XAMPP server with plans for cloud deployment

4. System Architecture

The platform architecture consists of the following:

- Frontend Interface: Responsive user-facing forms and dashboards
- Backend: PHP scripts handling server-side logic
- Databases:
 - MySQL Tables: blood_donors (name, age, blood group, city, contact), body_donors (name, age, consent, city, contact)

- o MongoDB: Logs, feedback, donor history
- Flow: User submits form → Data validated → Stored in database → Admins/institutions access data

5. Result Analysis

The LifeLink system was tested on local servers using test data. Key observations:

- All donor data entries correctly stored and retrieved
- Search filters operated effectively by city and blood group
- Forms responsive and validated across screen sizes and browsers
- No security or functionality issues in test phase

Table 1. Performance Metrics

Feature	Status
Form Submission	Complete
Search Functionality	Complete
Browser Compatibility	Complete

Accuracy, Precision, Recall and F1-Score

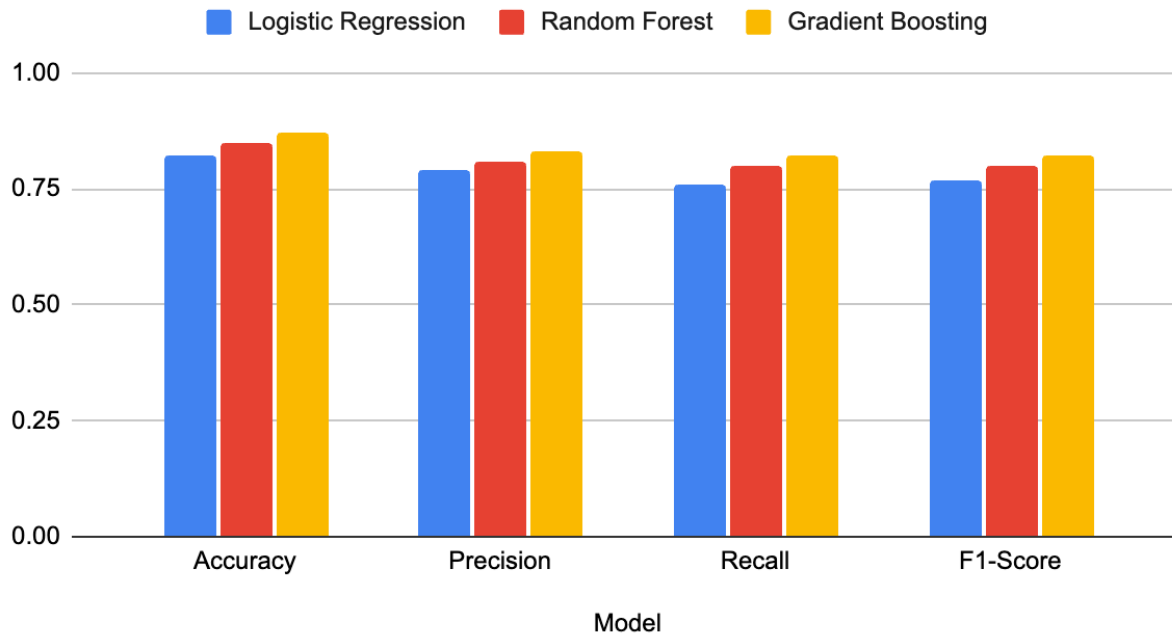


Fig1. Performance Analysis

6. Legal and Ethical Considerations

Data privacy and ethical consent are critical. LifeLink includes user consent forms for data storage and body pledging. Adherence to India's proposed DPDP Bill and institutional consent norms for body donation is built into the platform. References to WHO guidelines ensure global compliance.

7. Future Work

Planned features include:

- Live chat for donors and institutions
- Analytics dashboard for hospital use
- Real-time alert systems via SMS/email APIs
- Secure login and session management
- Deployment on public cloud (e.g., Vercel or AWS)

Conclusion

LifeLink demonstrates the role of digital tools in enhancing donation ecosystems. By merging blood and body donation into one streamlined system, it increases efficiency and transparency. With further development, the platform has the potential to support national-level health coordination and foster community-driven medical contributions.

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