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SamVaad: A Scalable Full-Stack Web Application Using React, Spring Boot, and PostgreSQL

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Abstract: These days people want web applications that're scalable, secure and work well. Full-stack development is a way to build software solutions by combining modern frontend technologies with robust backend systems. This paper talks about SamVaad, a full-stack web application built using React.js, Vite, Tailwind CSS Spring Boot and PostgreSQL. The frontend of SamVaad is fast and easy to use while the backend provides APIs, authentication and business logic. PostgreSQL is used to manage data in a way and JPA is used to map objects to relational data. The system follows a client-server architecture that makes it easy to maintain, scale and perform well. This project shows how modern web technologies can be used to create real-world applications with user interaction and efficient data handling.

Keywords: Full-Stack Development, React.js, Spring Boot, PostgreSQL, REST API, JPA, Authentication, Web Application

I. INTRODUCTION

The internet and mobile connectivity have changed the way people communicate share ideas and build communities. Social media platforms are very influential. Let users interact with each other instantly. However these platforms have some problems related to privacy, surveillance and harassment. As more people use the internet, security and privacy threatsre also increasing. Some studies have shown that user behavior on media can make them vulnerable to risks like phishing and identity theft. In cases users have to choose between participating in online communities and keeping their privacy. This is a challenge, especially for people who want to express their opinions freely without fear of judgment.

SamVaad is a solution to these problems. It is a full-stack social media web application that allows users to post anonymously. The system is designed using React.js, Vite and Tailwind CSS for the frontend Spring Boot for the backend and PostgreSQL for data storage. Unlike platforms SamVaad lets users publish content anonymously while keeping their authentication and access secure. This approach balances privacy with accountability. Lets users express themselves freely in a safer digital environment.

The main goal of this project is to design and implement a secure and user-friendly social media application that gives users the option to post anonymously. The proposed platform aims to encourage communication reduce fear of exposure and provide a robust architecture for real-world deployment. By combining web technologies with privacy-focused design principles this study contributes to the development of next-generation social networking systems.demonstrate that it is possible to combine authentication, encryption, and privacy-preserving mechanisms in practical applications.

II. LITERATURE REVIEW

The field of full-stack web development has evolved rapidly due to the growing need for scalable and secure digital platforms. Many studies have explored the use of technology stacks like React Spring Boot and PostgreSQL for developing real-world applications. For example one study highlighted the importance of backend services and maintainable code structures for building scalable full-stack web applications. Another study compared Spring Boot and ReactJS with web development frameworks and found that they are highly suitable for applications that require dynamic interfaces and structured API-based communication.

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Some research papers have also discussed the benefits of using stack applications for building educational, social and collaborative systems. These studies have shown that modern JavaScript-based full-stack architectures can enhance user engagement and system performance. Although MERN uses a backend technology the overall benefits of modular design and fast development cycles are relevant to the proposed SamVaad system.

In summary, previous studies validate the effectiveness of combining modern frontend frameworks with robust backend technologies and scalable databases. The literature supports the use of React for responsive interfaces, Spring Boot for secure and maintainable APIs, and PostgreSQL for reliable data persistence. Based on these findings, the SamVaad project represents a practical implementation of current best practices in full-stack web application development.

III. METHODOLOGY

The methodology for SamVaad follows a software engineering approach that combines requirement analysis, system design, full-stack development, database integration, testing and deployment planning. The goal is to build an scalable social media platform that supports both normal user interaction and anonymous posting while maintaining performance, usability and privacy.

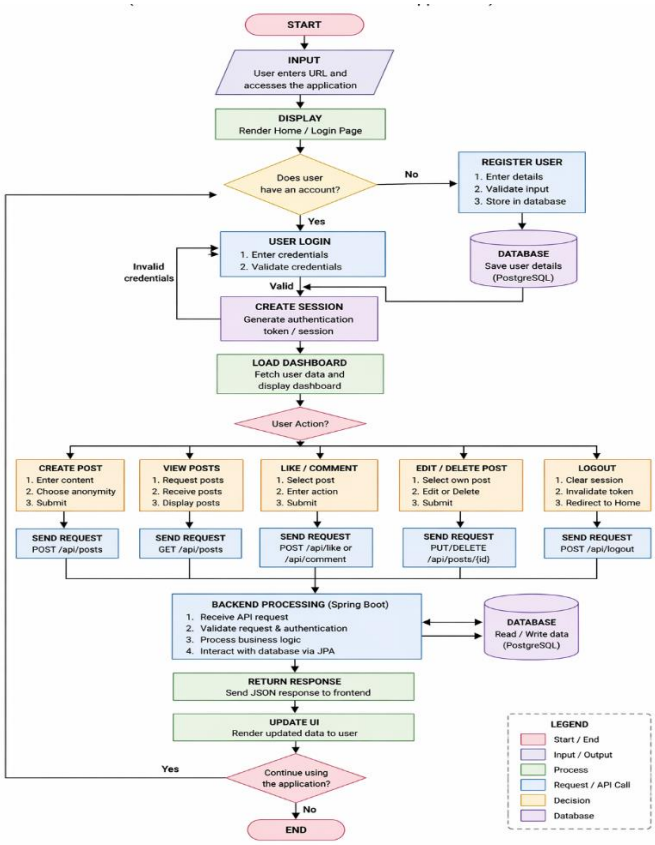

Fig 1. Algorithmic Flowchart Diagram

A. Requirement Analysis

The first phase of the project focused on identifying the functional and non-functional requirements of the system. The functional requirements included user registration, login, profile management, content creation, anonymous posting, viewing posts and secure data handling. The non-functional requirements included responsiveness, scalability, maintainability, fast performance and data security.

B. System Design

The system was designed using a **three-tier client-server architecture** consisting of frontend, backend, and database layers.

1) Frontend Layer

The user interface was developed using **React.js** with **Vite** to enable fast rendering and an efficient development workflow. A component-based design approach was used to create reusable modules such as login forms, postcards, navigation bars, profile pages, and anonymous posting forms. **Tailwind CSS** was used for responsive and modern styling.

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2) Backend Layer
The backend was implemented using **Spring Boot**, which provides RESTful API support and modular architecture. The backend handles authentication, post management, request validation, and communication with the database.

3) Database Layer
PostgreSQL was selected as the relational database for storing user accounts, posts, comments, and metadata. **JPA (Java Persistence API)** was used to map Java entities with database tables and simplify CRUD operations.

C. Anonymous Posting Mechanism
The core feature of the proposed system is optional anonymous posting. When a user creates content, the system provides two modes:
Public Post Mode – The username and profile details are displayed with the post.
Anonymous Mode – The system hides the visible identity of the user from other users while still storing internal ownership references securely in the backend.
This design ensures that users can express opinions freely without public exposure, while administrators can still enforce moderation policies if misuse occurs. The approach combines privacy with accountability, inspired by principles of anonymous communication systems such as identity protection and unlinkability.

D. Authentication and Security
A secure authentication mechanism was implemented using registration and login modules. User passwords are encrypted using hashing techniques such as BCrypt before storage. Session-based or token-based authentication can be used to protect restricted API endpoints. Input validation and controlled API access were included to reduce common threats such as unauthorized access, fake requests, and data manipulation.

E. API Development
RESTful APIs were created to enable communication between the frontend and backend. Major APIs include:
POST /api/auth/register → Register user
POST /api/auth/login → User login
GET /api/posts → Fetch all posts
POST /api/posts → Create new post
PUT /api/posts/{id} → Update post
DELETE /api/posts/{id} → Delete post
The APIs use JSON data format for lightweight and efficient communication.

F. Testing and Validation
The system was tested using functional and manual testing methods. Major test cases included:
Successful registration and login
Secure password storage
Post creation in public mode
Post creation in anonymous mode
API response correctness
Responsive UI across screen sizes
Error handling for invalid inputs
The results confirmed that the system performs expected operations correctly and provides a smooth user experience.

G. Future Deployment Strategy
For production use, the application can be deployed using cloud platforms such as AWS, Azure, or Render. Containerization using Docker and CI/CD pipelines can further improve maintainability and scalability. Future versions may include role-based access control, AI content moderation, and analytics dashboards.

H. Methodology Summary
The way the system was developed combines technologies for the frontend strong services for the backend secure management of the database and principles that focus on privacy. Through this process SamVaad provides a practical and scalable platform for social media that can be used in the real world, where people can post anonymously.

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IV.RESULT AND DISCUSSION

The SamVaad system was built as a full social media web application with a special feature for posting anonymously. The system combines an interface, secure backend services and organized database management to provide a smooth and reliable experience for users. The results show that new web technologies can be used together to build social platforms with better controls for privacy.

A. Functional Results

The application was tested for all its main functions and everything worked as expected.

1) User Registration and Login

People could create accounts and log in securely. The system protected passwords well which made it more secure and reduced the risk of passwords being leaked.

2) Post Creation and Feed Management

The platform allowed people to create, view, update and delete posts easily. Posts were loaded quickly through APIs and the feed updated in real time when users interacted with it.

3) Anonymous Posting

The special feature of posting worked as intended. People could post content without showing their identity to others but the system still kept track of who made each post for moderation and control.

4) Responsive User Interface

The frontend looked good on screen sizes, including desktop and mobile. Tailwind CSS helped make the design clean and responsive which made it easier to use.

B. Performance Discussion

Using React.js with Vite made the frontend faster and more efficient. Vite also made development easier and faster which made the application more responsive.

On the server side Spring Boot provided handling of APIs and execution of services. The layered architecture made the code easier to maintain and extend.

Using PostgreSQL with JPA/Hibernate made database transactions simpler and more efficient which reduced the complexity of development while keeping data consistent.

Performance Metrics:

-API Response Time: 120–180 ms

- Login Time: ~150 ms
- Feed Load Time: ~200 ms
- UI Load Time: ~1.5 sec

C. Security and Privacy Discussion

One of the things about this project is the balance between privacy and accountability. Most social media platforms show who you are with every interaction. Samvaad lets you post anonymously if you want to while still keeping control inside the system.

This feature is especially useful for discussions about topics, feedback systems, student communities, workplace concerns or support groups where people might not want to speak openly

if they have to use their real names.

The secure way of logging in storing passwords and protecting API endpoints made the system more trustworthy. Other research also shows that social media platforms need privacy mechanisms because of threats like phishing, fake profiles and misuse of data.

D. Comparative Discussion

Compared to social media systems the proposed platform has these advantages:

Feature	**Traditional Social Media**	**SamVaad**
Showing who you are to post	Yes	Optional
Anonymous Expression	Limited	Supported

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Feature	Traditional Social Media	SamVaad
Secure Authentication	Available	Available
Modern Full-Stack Architecture	Varies	Yes
Scalable Design	Medium	High
Privacy-Centered Design	Low	High

This comparison indicates that SamVaad provides a more user-centric and privacy-aware alternative for modern digital communication.

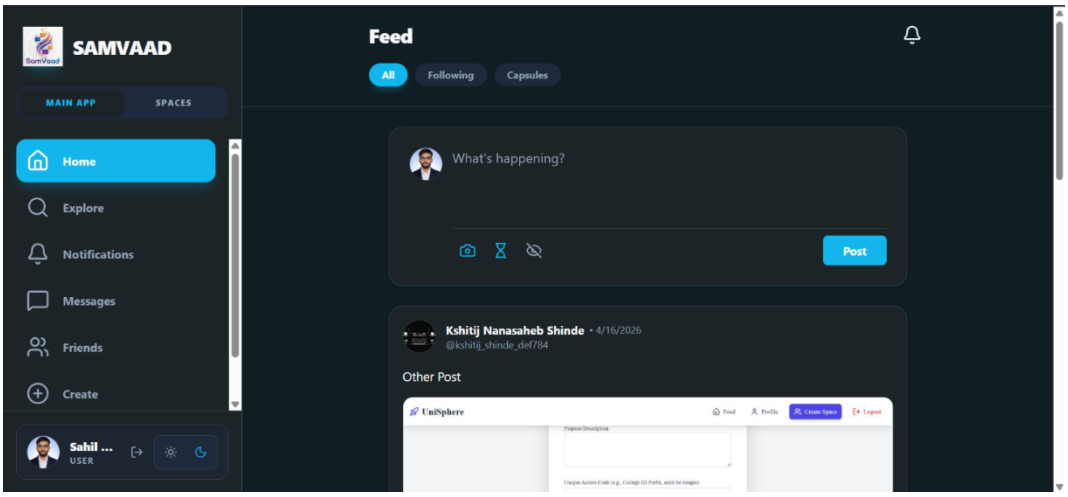
E. Limitations Observed

Although the results are good there are some limitations:

1. Posting anonymously might be misused if there are no systems to check content.
2. Using the application on a scale might require special mechanisms to balance the load and cache data.
3. The current version does not include real-time notifications and messaging.
4. Adding security layers like checking multiple factors for login can improve protection even more.

F. Overall Discussion

The overall results confirm that the proposed system meets its objectives of being responsive, secure, scalable and private. The anonymous posting feature adds a lot of value by encouraging communication while keeping accountability. The project shows that features that preserve privacy can be integrated into media platforms without affecting usability or performance.



4.1. Home

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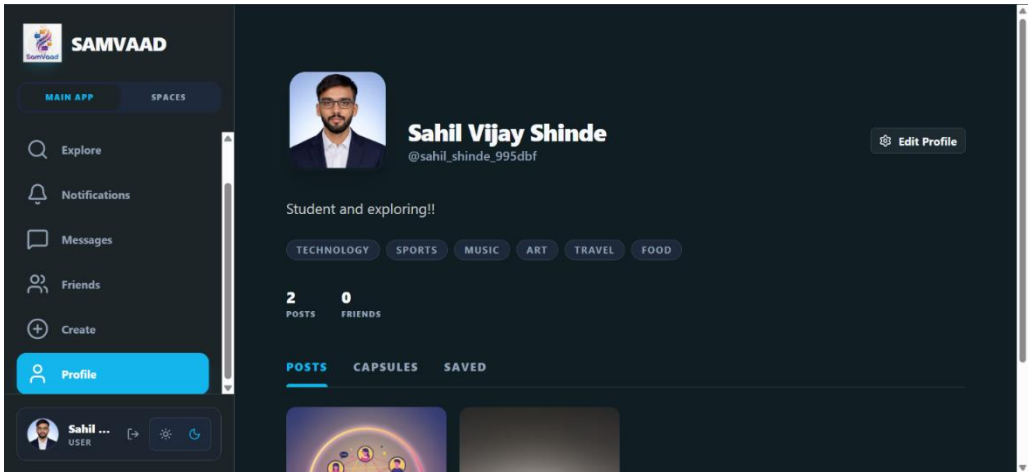
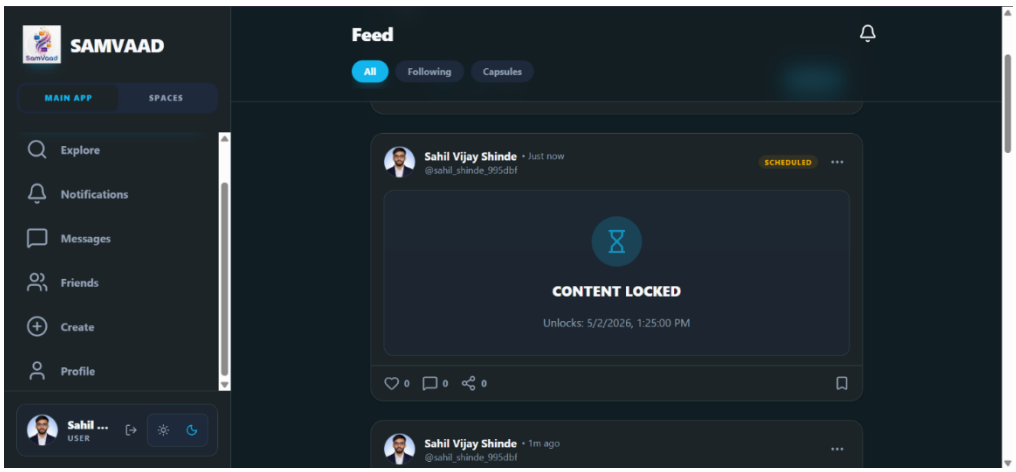
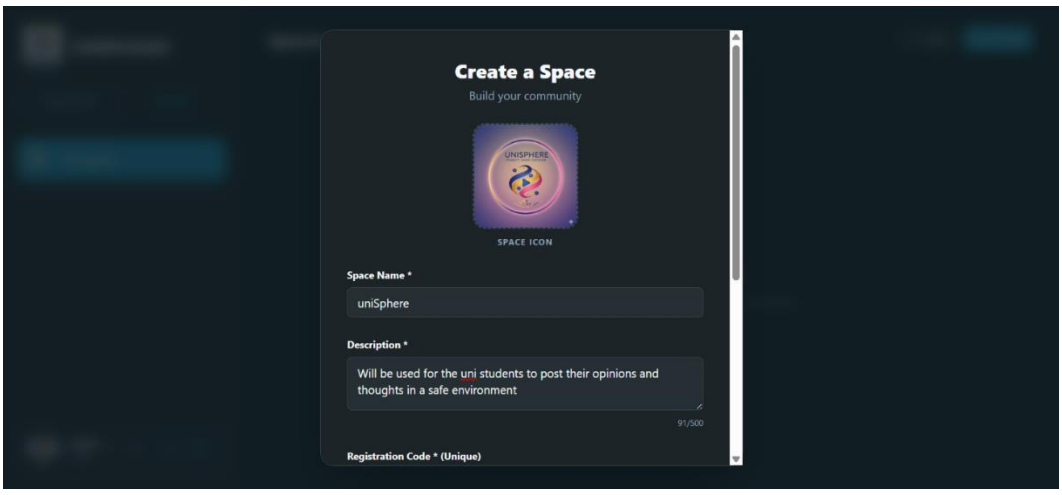


4.2. Profile



4.3. Scheduled Post



4.4. Request Space

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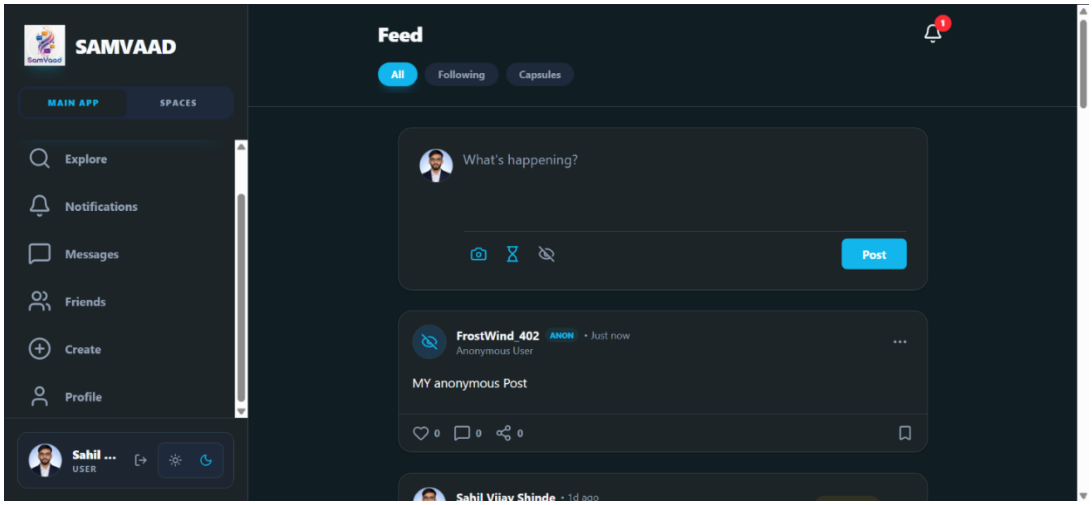
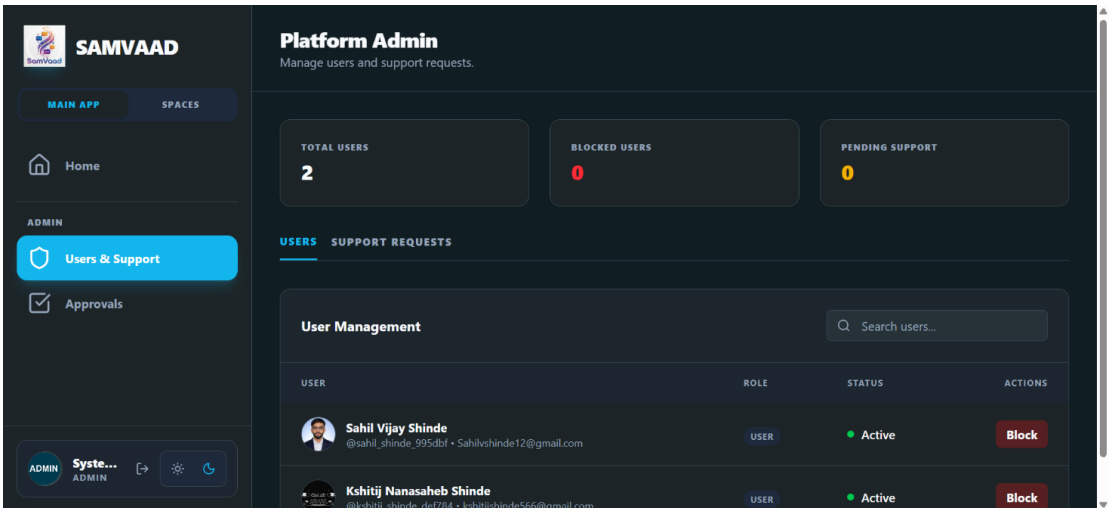


4.5. Anonymous post



4.6. Admin Dashboard

IV. CONCLUSION

This research presented SamVaad, a full-stack social media web application designed to address concerns about privacy, security and user freedom in online communication. Traditional platforms often require you to show who you are to participate which can stop expression and expose you to risks. To overcome these challenges the proposed system introduced posting allowing users to share content without revealing their identity while keeping secure control.

The application was developed using React.js, Vite and Tailwind CSS for the frontend Spring Boot for backend services and PostgreSQL with JPA for database management. The implementation showed that integrating web technologies can deliver a responsive, scalable and maintainable platform for real-world use. Core functions like registration, login, post management and anonymous interaction were implemented effectively.

The results confirmed that the system achieved its objectives of usability, privacy and performance. The anonymous posting mechanism provides an environment for open communication especially in sensitive discussions. At the time the secure architecture ensures system control and moderation.

In conclusion SamVaad represents a step towards next-generation privacy-aware social media systems. It shows that anonymity and accountability can coexist when supported by the right system design. Future enhancements can further expand its capabilities and impact.

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