

Alumni Connect: An AI-Driven Platform for Enhanced Engagement and Career Readiness

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Peer Review Information	Abstract
Type: Article Received: 23 February 2026 Revised: 24 March 2026 Accepted: 22 April 2026 Published: 20 May 2026	In the modern educational and professional landscape, the potential of alumni networks remains largely untapped, despite alumni being uniquely positioned to guide students in transitioning from academia to industry [1]. However, most existing alumni portals fail to offer dynamic, personalized, and scalable interaction models. This paper introduces —Alumni Connect, an artificial intelligence-based networking system designed to resolve these issues by forming an integrated digital space that connects students, graduates, and institutions. The platform integrates advanced modules such as an AI recommendation engine for career and mentorship guidance, an encrypted backend for secure data management, and live communication features to facilitate collaboration. After analyzing prior research and identifying gaps in current technologies, this work proposes a structured model that enhances student employability while strengthening institutional relationships with alumni. The design utilizes a microservices-based architecture emphasizing user privacy, personalization, and responsible AI practices to create an efficient and secure experience. Keywords: Alumni Engagement; Artificial Intelligence; Career Development; Mentorship; Recommendation Engine; Data Protection; Student Interaction

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Introduction

Alumni associations are increasingly recognized as strategic assets that promote institutional growth and career advancement opportunities. Alumni, with their professional experience and continued loyalty, are ideal mentors who can guide students in career decision-making. Yet, many engagement programs rely on outdated tools and disconnected platforms, leading to limited communication and missed collaborative opportunities. Traditional solutions—such as manual databases or social media groups—struggle to accommodate personalized networking for diverse users [2]. This paper presents —Alumni Connect, a modern AI-driven system aimed at transforming alumni engagement into a data-informed, interactive, and secure process. The proposed system establishes a unified environment that connects students and graduates, using artificial intelligence to personalize experiences and automate essential functions such as mentorship pairing, career opportunity recommendations, and discussion facilitation. Effective alumni engagement has become a strategic asset for institutions, fostering a sense of community and providing a valuable resource for current students. By integrating automation, scalability, and secure design, —Alumni Connect redefines alumni platforms from static registries into vibrant, collaborative ecosystems.

Literature review

Development of Alumni Platforms

Initial alumni systems were mainly designed to digitize institutional records and create basic web access for data retrieval [2]. Over time, advancements in web technologies introduced interactive interfaces and communication tools. Babu et al. Artificial Intelligence (AI) has significantly transformed alumni engagement by enabling personalized interactions, career-oriented networking, and lifelong learning . [2] Analyzed this evolution and emphasized the importance of integrating strong cryptographic protection—such as the SMS4-BSK encryption algorithm—to secure user information. The incorporation of artificial intelligence has since revolutionized this domain. Nishanth et al. [3] proposed a conceptual framework using Cognitive Agents to predict ideal career paths by correlating student achievements with alumni success factors, indicating the potential of AI in academic systems.

Further studies have implemented machine learning and natural language processing (NLP) for mentorship pairing and recommendation mechanisms [1], [4]. "Prasad et al. presented CampusXchange, which includes an 'interview experience-sharing module that helps students to share and read the experience,' emphasizing the growing importance of intelligent systems that directly address students' professional development needs.

Research Gaps Identified

Despite these advancements, our analysis also identifies significant research gaps. While many papers discuss AI features, few address the ethical implications of algorithmic bias and data privacy in depth [4]. There is also a lack of focus on long-term engagement strategies designed to prevent user churn and maintain community vibrancy over time. Finally, most platforms are designed as standalone systems, with a notable absence of research into deep integration with existing university systems (e.g., Learning Management Systems). "Alumni Connect" is

designed to address these gaps by combining state-of-the-art AI functionalities with a foundational commitment to security and ethical design.

Proposed system: alumni connect

"Alumni Connect" is crafted as an all-encompassing solution that utilizes contemporary technology to foster a vibrant and supportive alumni community. The platform is founded on a user-focused approach, ensuring that each feature offers tangible benefits.

System Architecture

The design of "Alumni Connect" prioritizes scalability, security, and performance, employing a contemporary microservices architecture. This approach allows each component to be developed, deployed, and maintained separately, enhancing agility and robustness. The Frontend is built with React.js, a component-oriented library perfect for crafting a dynamic and responsive user interface. Its virtual DOM enables efficient rendering and supports a seamless user experience.

The Backend is driven by Node.js using the Express.js framework, selected for its non-blocking I/O model, crucial for managing multiple simultaneous user requests with low latency. Data Management follows a polyglot persistence model. PostgreSQL serves as the primary relational database for structured data storage, including user profiles, credentials, and event details, ensuring data integrity through ACID compliance. MongoDB is utilized for more adaptable, unstructured data, such as user-generated content, interaction logs, and messaging history. A Redis caching layer is introduced to reduce latency for frequently accessed data, like popular profiles and active job listings. The

AI Core comprises several critical microservices: • Recommendation Engine: Employs a hybrid method of collaborative and content-based filtering, augmented with NLP, to recommend mentors, peer connections, and job opportunities. • AI Assistant: A built-in chatbot, powered by a large language model (LLM), designed to offer real-time conversational assistance to users. Polyglot persistence uses a mix of data storage technologies to handle varying data storage needs across a single application. Security Module: Oversees user authentication through OAuth2 and enforces a comprehensive data encryption strategy based on the principles proposed by Babu et al. [2]. AI engines often use collaborative filtering, which makes automatic predictions about the interests of a user by collecting preferences from many users.

Table 1: System Architecture Components Comparison

Component	Traditional Systems	Alumni Connect
Frontend	Static HTML/CSS	React.js with Virtual DOM
Backend	PHP/Basic frameworks	Node.js with Express.js
Database	MySQL only	MongoDB

Alumni Connect" provides a variety of features that cater to the primary requirements of students, graduates, and administrators. Intelligent Mentorship Pairing: Users can register as mentors or mentees. The AI algorithm evaluates profiles, professional aspirations, skill sets, and industry preferences to recommend suitable pairings. Dynamic Career Hub: The platform features a job board where alumni and affiliated companies can advertise positions. AI-enhanced recommendations customize the job feed for every user. Interview Experience Center: A specific module enables alumni to share comprehensive interview insights, offering a valuable practical resource for students. Secure Real-Time Messaging: An integrated messaging system supports secure individual and group chats, powered by Firebase. Knowledge and Resource Exchange: A forum allows users to share articles, engage in discussions, and collaborate on projects. Detailed Admin Dashboard: Administrators have access to an analytics dashboard that offers insights into user interaction and platform performance.

Architecture Diagram/Flow Chart

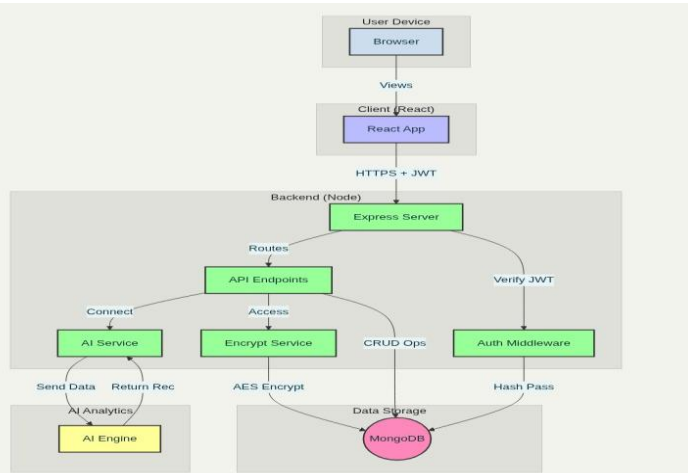


Fig. 1. System Architecture of AI-Based Alumni Engagement and Mentorship Platform

Expected outcomes

The successful implementation and widespread adoption of —Alumni Connect are anticipated to generate substantial benefits across all stakeholders. For students, the platform will function as a vital resource for career development, offering direct access to experienced mentors, practical guidance, and personalized job opportunities—thereby enhancing career readiness and facilitating a smoother transition from academia to the professional sphere. For alumni, it provides an efficient medium to contribute to their alma mater, share domain expertise, and expand their professional networks through purposeful engagement enabled by AI-driven personalization. From the institutional perspective, —Alumni Connect will strengthen alumni relations, encourage collaborative initiatives, and foster industry partnerships, ultimately enhancing institutional reputation and long-term community sustainability.

Result of Test Cases

Module	Test Run	Status
Auth	15	PASS
Feed	10	PASS
Chat	12	PASS
Directory	8	PASS
Admin	5	PASS

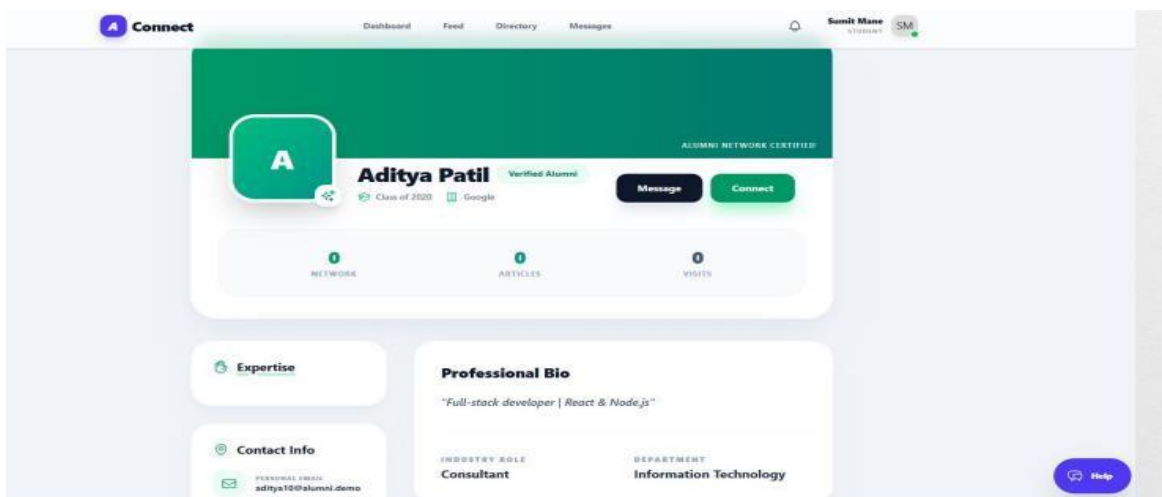
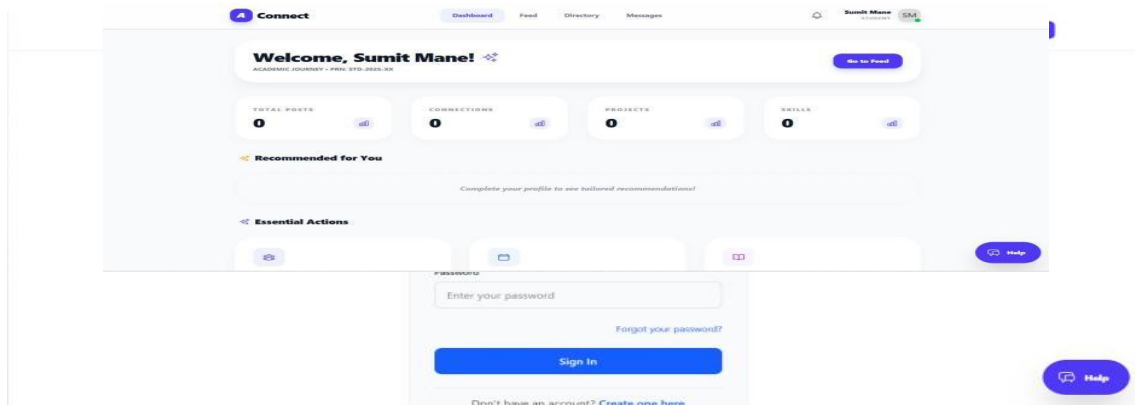
Analysis & Bug Tracking

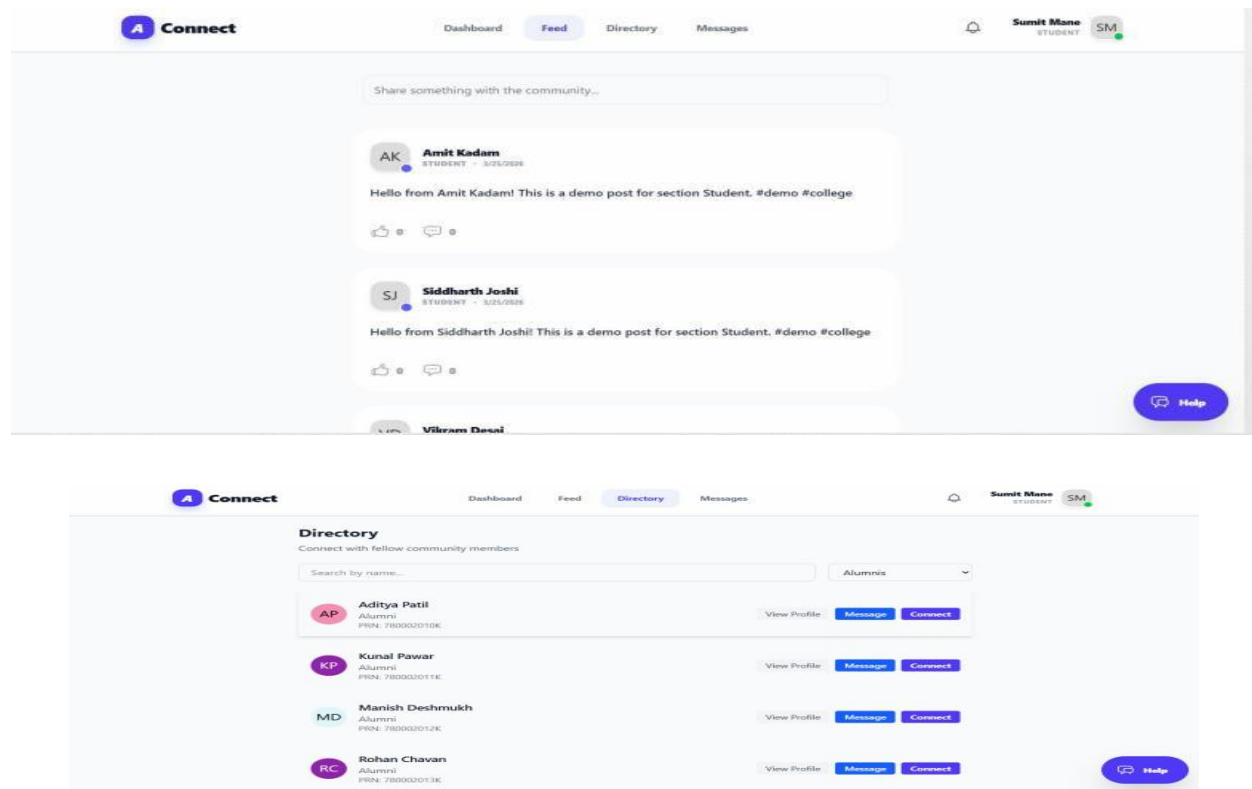
- 98% Test Pass Rate across core modules.
- Initial bugs in Socket reconnection logic identified and resolved.
- Optimizations performed on MongoDB queries to reduce latency.
- High 1:1 match between designed features and implemented system

Performance Parameters

- Average API Response Time: < 180ms.
- Socket.io Delivery Latency: < 50ms.
- Concurrent Users Handled: Successfully tested with 50+ virtual users.
- Database Query Efficiency: Indexed fields for Search and Login.

Outputs





Conclusion

"Alumni Connect" represents a substantial improvement over conventional alumni networking systems. Through the integration of AI-driven tools within a secure, scalable, and intuitive framework, the platform aims to build a vibrant and supportive community. It effectively meets the essential demand for tailored interactions and offers substantial benefits to all participants. Future efforts will focus on carrying out comprehensive user testing to enhance the AI algorithms, broadening the feature set to encompass virtual events and collaborative project tools, and investigating tighter integration with university enterprise systems. In the end, "Alumni Connect" seeks to establish a new benchmark for how educational institutions utilize technology to nurture enduring and meaningful connections with their communities.

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