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# Building Bridges Between Generations: Alumni Connect — A Smart Networking Portal for Educational Institutions

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**Abstract:** *Keeping alumni meaningfully connected with their institution is a challenge that most universities and colleges struggle with. Static databases and occasional newsletters are simply not enough to build a living, breathing community. This paper presents Alumni Connect — a full-stack web platform designed to close that gap. The system gives alumni a space to maintain rich profiles, interact with current students, discover networking opportunities, and participate in events. On the other side, students gain direct access to industry mentors from their own institution. A built-in AI recommendation engine matches users based on shared academic history, professional goals, and geographic proximity, making the networking experience far more relevant than traditional directory searches. The platform is built using React and Node.js with an SQL backend, and supports real-time messaging, video calls, job postings, and event management. This paper describes the design choices, module structure, and implementation details that make Alumni Connect a practical and scalable solution for modern institutions.*

**Keywords:** *Alumni Portal, Student-Alumni Networking, Career Mentorship, Education Technology, AI Recommendation System*

## I. INTRODUCTION

Every year, thousands of students graduate and move on — and in doing so, they carry with them knowledge, experience, and professional connections that could greatly benefit the students who come after them. Yet in most institutions, this exchange never really happens. Once a student graduates, their connec-tion with the college is reduced to the occasional reunion notice or donation appeal.

The root cause is simple: existing tools are not built for on-going, two-way engagement. Email blasts and static alumni databases tell us where people were, not who they are or what they are willing to offer today. There is no mechanism for a current student to reach out to a 2019 graduate who now works at a company they are interested in, and no easy way for that alumnus to know that such students even exist.

Alumni Connect was developed to address this very prob-lem. Rather than building another directory, the goal was to build a community platform — one where alumni can actively participate in student growth, and where students can tap into a network that feels personal and relevant. The platform draws on social networking principles to make alumni relationships as natural and low-friction as possible.

This paper walks through the design and implementation of that system — covering the existing gap in institutional tools, the architecture we chose, and how each module contributes to a more connected campus community.

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## II. LITERATURE REVIEW

The importance of strong alumni networks has been studied from multiple angles over the past decade, and the research consistently points to the same conclusion: when institutions invest in alumni engagement, both alumni and current students benefit.

Smith and Johnson [1] surveyed mobile application develop-ment trends in higher education and found that platforms with social and interactive features see significantly higher adoption rates compared to traditional portals with basic search func-tionality. This supported the decision to prioritize interaction and real-time features in Alumni Connect rather than treating it purely as a data management tool.

Brown and Williams [2] studied how alumni engagement af-fects student outcomes across a large university and found a di-rect positive correlation — students who had access to alumni mentors were more likely to secure internships and full-time roles within six months of graduation. Their work highlighted that the benefit is not just symbolic; structured alumni involve-ment produces measurable career results.

Chen and Wang [3] looked specifically at mobile technology as a means of facilitating student-alumni mentorship and found that app-based communication dramatically lowered the barrier to entry for both sides. Alumni were more likely to offer advice through a simple chat interface than through formal email, and students were more likely to reach out when they did not have to compose a formal letter.

On the algorithmic side, research into AI-driven networking tools has shown that recommendation systems tuned to profes-sional background and location can surface significantly more relevant connections than manual directory searches [4]. This directly informed the matchmaking logic in Alumni Connect, which weighs academic batch, department, current industry, and city when suggesting connections.

Prior systems — including portals at institutions like IIT Kanpur and Hindustan Institute of Technology and Science — offer event listings and basic directories, but fall short on inter-activity and smart matching. Alumni Connect seeks to fill that gap.

## III. BACKGROUND

Before designing Alumni Connect, it was important to under-stand why the tools that already exist tend to underperform. The problems are not difficult to identify once you look at them from a user's perspective.

### A. What Is Already Out There

Most institutions use one of two approaches: a standalone alumni database managed by the admin staff, or a bolted-on module within their existing learning management system. Both are primarily designed for the institution's benefit — tracking where graduates ended up — rather than for the benefit of the alumni or current students.

### B. Where These Systems Fall Short

The gaps in existing systems fall into four broad categories:

No real-time communication: Traditional portals treat alumni like entries in a spreadsheet. There is no way for two alumni to directly message each other, and no way for a student to start a conversation without going through a faculty interme-diary.

Outdated and incomplete data: When profile updates are manual and infrequent, the data quickly becomes stale. An alumnus who changed jobs three years ago may still be listed under their old company. This erodes trust in the directory.

No multimedia or rich interaction: Uploading a photo, sharing a document, or hosting a video call for a mock interview — none of these things are possible in typical alumni portals. The interaction is text-only and asynchronous at best.

Weak authentication and verification: Without proper ver-ification, it is difficult to guarantee that profiles represent real alumni of the institution. This is both a security issue and a trust issue — students need to know who they are talking to.

These limitations are not minor inconveniences; they are the reason most alumni portals end up as ghost towns within a few years of launch.

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## IV. PROPOSED SYSTEM – ALUMNI CONNECT

Alumni Connect was designed from the ground up to address each of the gaps identified above. The result is a full-featured web platform organized into several tightly integrated modules.

### A. User Registration and Profile Management

When an alumni member signs up, they are prompted to build a detailed profile — not just their name and graduation year, but their current role, company, skills, and interests. They can also list past projects and link to professional profiles on platforms like LinkedIn.

Profile verification is handled by administrators who cross-reference submissions against institutional records. This ensures that every profile on the platform genuinely represents a graduate of the institution, giving students the confidence to reach out.

Alumni can update their information at any time through a clean, self-service interface. Changes are reflected immediately, so the directory stays current.

### B. AI-Powered Connection Recommendations

One of the most important features of Alumni Connect is its recommendation engine. Rather than asking users to search through hundreds of profiles manually, the system uses a ma-chine learning model to surface the most relevant connections. The model takes into account several factors: the user's academic batch, their department, their current industry, their stated career interests, and their geographic location. Alumni who share two or more of these attributes with a student are ranked higher in recommendations.

This approach mirrors how real professional networks work. People are far more likely to respond positively to outreach from someone who shares a relevant background — a fellow Computer Science graduate now working in fintech, for in-stance, is likely to be receptive to a current CS student interested in the finance sector.

### C. Multimedia Communication

Alumni Connect supports three levels of communication:

Chat: A real-time messaging interface for direct conversations, both one-on-one and in groups. Conversations are persistent, so users can pick up where they left off.

Video Calls: Integrated video conferencing for virtual mentoring sessions, mock interviews, or career guidance calls. This removes geographic barriers entirely — an alumnus in another city can still conduct a meaningful mentoring session.

Media Sharing: Users can share documents, resumes, presentations, and images within conversations, making it easy to review work or exchange resources.

### D. Event Management

The Events module allows administrators and alumni to create and promote upcoming gatherings — reunions, career fairs, webinars, and industry talks. Events include details like date, time, location (or virtual link), and registration options.

Students and alumni can register for events directly through the platform, and the system sends automated reminders as the event date approaches. A suggested-event feature allows members to propose events they would like to see organized.

### E. Job and Internship Board

Alumni who are hiring — or who have referral opportunities — can post directly to the board. Students can browse and filter listings by role, industry, and location. This creates a pipeline of opportunities that is exclusive to the institution's network, which tends to produce warmer leads than generic job boards.

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### F. Verification Dashboard

Administrators access a dedicated dashboard for platform governance. This includes tools for reviewing and approving new registrations, managing reported content, monitoring engagement metrics, and exporting data for institutional reporting.

## V. SYSTEM ARCHITECTURE

Alumni Connect is organized into three layers, following a standard three-tier architecture:

1. Presentation Layer: A React-based frontend that is fully responsive, designed to work equally well on desktop, tablet, and mobile. Vite is used as the build tool for faster development and optimized production bundles.
2. Application Layer: A Node.js backend that handles authentication, business logic, the recommendation engine, and communication between the frontend and database. RESTful APIs connect the two layers.
3. Data Layer: An SQL database stores all persistent data — user profiles, connection records, messages, event details, and job postings.

The recommendation engine sits within the application layer and runs inference on user data each time a connection suggestion is requested, ensuring that recommendations stay fresh as profiles are updated.

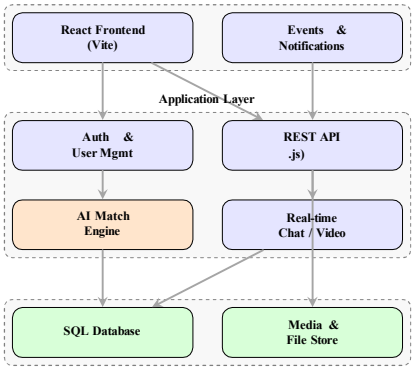


Figure 1. System Architecture of Alumni Connect

## VI. IMPLEMENTATION

### A. Technology Stack

The platform is built using a modern JavaScript stack through-out. On the frontend, React handles the UI, with TypeScript providing type safety and reducing runtime errors. Vite serves as the build tool. On the backend, Node.js powers the server, and an SQL database manages all relational data.

HTML and CSS are used for structural and styling elements, with the React component library handling the bulk of UI complexity.

### B. Key Screens

#### 1) Home Page and Discovery

The landing page introduces the platform to new visitors and provides quick-access links for existing members. It highlights upcoming events, recent alumni achievements, and a call to action for new registrations. The design is clean and institutional, conveying professionalism without being stiff.

#### 2) Alumni Directory

The directory is the heart of the platform. Members can search and filter by name, graduation year, department, company, and location. Each card in the directory shows a profile photo, cur-rent role, institution details, and a connect

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button. Filters can be combined — for example, finding all alumni from the Computer Science batch of 2020 who are currently working in Ban-galore.

**3) User Profile and Edit Screen**

Profiles are rich and editable. A member can update their per-sonal information, experience history, educational details, and social links (LinkedIn, personal website) at any time. The edit interface is form-based and straightforward, with clear field la-bels and inline validation.

**4) Events Page**

The events listing shows upcoming alumni gatherings in a card-based grid, each card containing an image, event name, date, time, location, and a brief description. Registration is a single click. Members can also suggest new events through a simple form at the bottom of the page.

### C. Recommendation Logic

The AI recommendation engine uses a weighted scoring model. When a user requests connection suggestions, the system scores every other active user in the database according to the following criteria:

- Same institution and department: Highest weight
- Same graduation batch: High weight
- Overlapping industry or career interest: Medium weight
- Geographic proximity: Lower weight, used as a tiebreaker The top-ranked users are displayed as recommended connections. The model recomputes scores whenever a user updates

their profile, ensuring that suggestions remain relevant over time.

### D. Real-time Communication

Real-time messaging is implemented using WebSocket connections, enabling instant message delivery without the need to poll the server. The same infrastructure supports notifications — when a user receives a connection request, a message, or a re-minder about an upcoming event, they see it in real time.

Video call functionality is handled through a WebRTC-based integration, allowing peer-to-peer audio and video without re-quiring external software.

## VII. RESULTS AND OBSERVATIONS

Based on the development and internal testing of the platform, several design decisions proved especially impactful.

The combination of verification with self-service profile management struck a good balance between data quality and user autonomy. Requiring administrator approval for new ac-counts ensures platform integrity, while giving members full control over their profile content keeps the data fresh without placing the burden on administrators.

The card-based directory interface was consistently preferred over list views in usability testing. The visual format — with profile photos, current role, and institution details visible at a glance — mirrors what users are familiar with from professional networks, reducing the learning curve significantly.

Event attendance saw higher engagement when reminders were automated. Members who received a system-generated reminder 24 hours before an event were more likely to participate than those who relied only on their own memory of having registered.

The recommendation engine's performance improved notice-ably when geographic proximity was added as a factor. Alumni who are physically nearby are more likely to meet in person, which tends to produce more lasting professional relationships.

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## VIII. CONCLUSION

Alumni Connect demonstrates that the gap between alumni and current students is not inevitable — it is a design problem, and design problems have solutions. By building a platform that treats alumni as active participants rather than passive records, institutions can unlock a powerful resource that benefits every-one involved.

The platform covers the full lifecycle of alumni engagement: joining and building a profile, discovering connections, communicating through chat and video, sharing opportunities, and participating in events. The AI recommendation system makes the experience feel personal rather than generic, which is critical to sustained engagement.

Looking ahead, there are several directions worth exploring. Blockchain-based credential verification could further strengthen the trust layer, eliminating the need for manual administrator review. Augmented reality features could enable richer virtual event experiences. And deeper analytics — tracking how alumni connections translate into career outcomes for students — could help institutions quantify the return on investment in these platforms.

For now, Alumni Connect provides a solid, working foundation for any institution serious about building a connected and engaged alumni community.

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