



Alumnibridge: An Ai-Powered Networking Platform To Interconnect Students And Alumni For Career Development And Mentorship

V Srujith Kumar¹, MD Ashya², T Maneesh², T Prabhas Reddy², G Vennela²

¹Assistant Professor, Department of CSE, Christu Jyothi Institute of Technology & Science, Jangaon, Telangana, India

²UG Students, Department of CSE, Christu Jyothi Institute of Technology & Science, Jangaon, Telangana, India

Correspondence

V.Srujith Kumar

Assistant Professor, Department of CSE,
Christu Jyothi Institute of Technology &
Science, Jangaon, Telangana, India

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career guidance, web application development, database management, user authentication, profile management, real-time communication, alumni networking, student–alumni interaction, mentorship platforms

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Abstract

The AlumniBridge platform is an innovative, AI-powered web application designed to strengthen the connection between students and alumni by providing an intelligent and interactive environment for career development and mentorship. In most educational institutions, alumni networks remain underutilized due to the lack of centralized systems, unverified profiles, and limited communication channels. AlumniBridge aims to overcome these limitations by offering a digital ecosystem where alumni and students can seamlessly engage, share experiences, and collaborate on professional growth opportunities. The system incorporates Artificial Intelligence (AI) and Natural Language Processing (NLP) techniques to enhance the matchmaking process between mentors (alumni) and mentees (students). Through AI-driven recommendation algorithms, the platform suggests the most suitable mentors to students based on parameters such as academic background, interests, skills, and career aspirations. Likewise, alumni can view mentee profiles and provide guidance, training, or job referrals accordingly. The system also features a secure registration and authentication module, ensuring that all participants are verified members of the institution. Additional functionalities include profile management, a real-time chat interface for one-on-one mentoring sessions, a job and internship portal for career opportunities, event announcements, and discussion forums for knowledge.

Introduction

In today's rapidly evolving academic and professional landscape, the need for continuous career guidance and mentorship has become more vital than ever before. Students often face uncertainty when navigating their academic paths, choosing career directions, or preparing for professional challenges. While institutions strive to provide support through faculty and placement cells, the most valuable insights often come from those who have already walked the same corridors the alumni. However, existing alumni-student interaction systems are typically fragmented, relying on unstructured manual approaches, occasional campus events, or informal social media groups. These traditional methods lack organization, authenticity, and personalization, leaving a significant gap between students seeking mentorship and alumni willing to guide. AlumniBridge emerges as a transformative solution to bridge this gap through the power of Artificial Intelligence (AI) and intelligent networking. It is an AI-driven alumni-student engagement platform designed to build a centralized, structured, and secure environment for effective mentorship, professional growth,

and meaningful collaboration. .

Background

In many educational institutions, students often require guidance and support to make important career decisions. Alumni who have already completed their education and entered professional fields can play an important role in helping students understand industry expectations, career opportunities, and professional growth. Alumni possess valuable real-world experience that can help students prepare for future challenges and make better career choices. However, in many colleges and universities, alumni networks are not properly organized or easily accessible to students. Communication between students and alumni usually happens informally through personal contacts or social media platforms, which may not be reliable or structured. As a result, many students miss the opportunity to learn from experienced alumni who could provide valuable advice and mentorship.

Problem Statement

In many educational institutions, students find it difficult to get proper career guidance and mentorship from experienced alumni.

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Although alumni networks exist, they are often not well organized and depend mainly on manual communication methods. Because of this, students may not be able to easily connect with alumni who have experience in their desired career fields. Existing systems also lack proper verification, structured data management, and intelligent recommendation mechanisms. As a result, valuable knowledge and experience from alumni are not effectively shared with students. Therefore, there is a need for a smart and efficient platform that can connect students with alumni mentors, provide reliable communication, and support career development opportunities. The Alumni Bridge system is designed to address this problem by creating an AI-based platform that helps students easily find and connect with suitable alumni mentors. Another major issue in the existing system is the absence of intelligent tools to match students with suitable mentors based on their interests, academic background, and career goals. Without a proper recommendation system, students may struggle to identify alumni who can guide them effectively. Additionally, many alumni platforms do not provide verified profiles or organized communication systems, which can reduce trust and engagement between users.

Literature Survey

In the modern educational landscape, digital transformation and artificial intelligence (AI) have redefined how institutions foster connectivity, mentorship, and career development. The project "AlumniBridge: An AI-Powered Networking Platform to Interconnect Students and Alumni for Career Development and Mentorship" aims to create a smart, centralized platform that strengthens communication and collaboration between students and alumni. To understand the foundational research and methodologies behind such platforms, various studies have been reviewed, focusing on job portals, AI integration, online recruitment, and knowledge management systems.

- S. Kumar and R. Patel, "AI-Driven Alumni Networking Systems for Career Guidance," *International Journal of Advanced Computer Science and Applications*, vol. 11, no. 4, pp. 120–126, 2020. The authors proposed an AI-based alumni networking platform that connects students with alumni based on academic interests, professional domains, and mentorship needs. The study emphasized how artificial intelligence can enhance matchmaking algorithms, fostering effective career guidance and peer learning among users.
- A. Sharma, P. Singh, and N. Gupta, "Leveraging Machine Learning for Educational Social Networks," *IEEE Access*, vol. 8, pp. 15032–15040, 2020. This research focused on applying machine learning algorithms in academic social networks to recommend mentors, job opportunities, and relevant professional groups. Their findings showed that intelligent recommendations improve user engagement and mentorship quality in institutional networks.
- J. Thomas and L. Verma, "Design and Implementation of Smart Alumni Tracking and Mentorship Systems," *Proceedings of the IEEE International Conference on Computational Intelligence and Communication Networks (CICN)*, pp. 214–219, 2019.
- The paper discussed a smart alumni tracking system using cloud-based databases and AI-assisted communication tools. The proposed model helped educational institutions maintain dynamic connections with their alumni for career networking, event management, and collaborative growth.
- M. Rahman, T. Das, and S. Chatterjee, "Data Mining-Based Recommendation System for Educational and Career Development," *Journal of Emerging Technologies in WebIntelligence*, vol. 10, no. 2, pp. 65–71, 2018. This study applied data mining techniques to analyze student performance and alumni profiles to generate career recommendations. Their model demonstrated that intelligent analytics could identify potential mentors and personalized career paths, thus bridging the gap between students and professionals.
- K. Mehta and V. Agarwal, "AI-Powered Mentor-Mentee Matching System Using NLP and Sentiment Analysis," *IEEE Transactions on Learning Technologies*, vol. 14, no. 6, pp. 980–988, 2021. The paper presented a mentor-mentee pairing model based on natural language processing and sentiment analysis of user profiles and interests. Results showed that AI-driven NLP tools significantly improved compatibility scores and mentoring satisfaction levels.
- P. Nair, D. George, and A. Raj, "Developing Intelligent Alumni Portals Using Hybrid Recommendation Algorithms," *International Journal of Computer Applications*, vol. 176, no. 23, pp. 45–52, 2020. This research introduced a hybrid recommendation system for alumni portals that combines collaborative filtering and content-based methods. The study demonstrated improved recommendation accuracy for mentor and job suggestions within educational institutions.
- R. Sinha and B. Roy, "Enhancing Employability through AI-Based Career Guidance Platforms," *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, pp. 530–537, 2021. The authors developed an AI-based platform that analyzed users' academic histories, skill sets, and interests to recommend personalized career paths. The system's predictive capabilities enhanced employability outcomes and engagement among graduates.
- L. Banerjee and S. Das, "Blockchain-Enabled Alumni Network for Secure Data Sharing and Career Support," *IEEE Access*, vol. 9, pp. 121842–121851, 2021.

This paper explored the integration of blockchain technology with alumni management systems to ensure data privacy, transparency, and authenticity. The model improved trust between alumni and students, while facilitating secure exchange of mentorship and job-related data.

Proposed system

The proposed system, AlumniBridge: An AI-Powered Networking Platform to Interconnect Students and Alumni for Career Development and Mentorship, overcomes the limitations of the existing setup by providing a centralized, intelligent, and interactive web platform. It integrates advanced technologies such as AI chatbots, real-time communication, event management, and mentor approval systems to enhance engagement and efficiency.

Key Features and Enhancements

- **AI-Powered Chatbot System:** A built-in chatbot assists users in navigating the platform, answering FAQs, guiding mentorship applications, and providing instant updates

about events, news, or alumni activities.

- **Multi-User Role System:** The platform supports three main roles — Students, Alumni (Mentors), and Administrators. Each has dedicated privileges for communication, approval, and content management.
- **Mentor Approval & Management Module:** Students can send mentorship requests to alumni mentors. Alumni can Accept or Reject requests, and approved mentorships are tracked under a mentorship dashboard for follow-up and feedback.
- **Events and News Management:** Institutions or administrators can post upcoming events, workshops, placement drives, and alumni success stories. Users receive real-time notifications about new events or important news.
- **Profile and Portfolio Management:** Users can build rich profiles showcasing academic background, skills, achievements, and career paths. Alumni can share career experiences, tips, and opportunities.
- **Real-Time Notifications and Chat:** Enables instant messaging between mentors and mentees, along with automated notifications for mentorship status, event updates, or admin actions.
- **Knowledge and Resource Sharing Hub:** Alumni can upload articles, resources, and career-related content for students to access, creating a continuous learning ecosystem.
- **Admin Dashboard:** Provides control over all system components including user approvals, mentorship tracking, event posting, and content moderation. Admins can view analytics on user engagement and system performance.
- **Secure and Scalable Architecture:** Uses encrypted connections (HTTPS, SSL) and secure authentication. The platform is designed to scale across multiple departments or institutions.
- **Feedback and Continuous Improvement:** Built-in feedback collection enables continuous refinement of the mentorship process and system features.

Modules Used

User Management

Registration: Allows new students and alumni to create accounts with basic details and verification.

Login: Authenticates users using secure credentials.

Roles:

- **Student (User):** Can view mentors, participate in events, and explore career news.
- **Alumni (Mentor/Admin):** Can approve or reject mentee requests, post events, news, and advertisements.

Profile Management: Users can update their personal details, academic information, and add alumni friends.

Mentorship Management

Alumni mentors can:

- View requests from students for mentorship.
- Approve or reject mentorship requests.
- Provide guidance, job referrals, or suggestions through chat.

Events, News, and Advertisements Module

Admin/Mentors can:

- Post new events (seminars, webinars, alumni meetups).
- Share important news and updates.

- Upload advertisements related to career opportunities.

Students can:

- View and register for events.
- Follow news and updates.

AI Chatbot System

- Integrated AI chatbot helps students with:
- Career queries, mentorship matching, and event information.
- Guiding users on how to connect with suitable alumni mentors.

Entity–Relationship (ER) Design

Entities:

- **User:** id, name, email, password, role, profile details, mentor_status
- **Event:** id, title, description, date, organizer_id, type
- **News:** id, title, content, posted_by, date
- **Advertisement:** id, title, company, description, post_date
- **Mentorship:** id, student_id, mentor_id, status (approved/rejected/pending)

Relationships:

- One-to-Many: Mentor → Events
- One-to-Many: Mentor → Advertisements
- Many-to-Many: Student ↔ Mentor via Mentorship table

Technologies Used

Programming Language: Python 3.11

Framework: Flask (Python-based web framework)

Development Environment: Anaconda Navigator

Database: My SQL (SQL Xamp Apache),

NLP Technologies:

- TF-IDF (for feature extraction)
- BERT (for semantic understanding)
- Cosine Similarity (for matching resumes with job descriptions)

Libraries and Tools:

- Numpy, pandas
- spaCy (for natural language processing)
- NLTK (for text preprocessing)
- Hugging Face Sentence Transformers (for embeddings)
- PDFPlumber (for resume parsing from PDF files)

Frontend Technologies: HTML, CSS, JavaScript

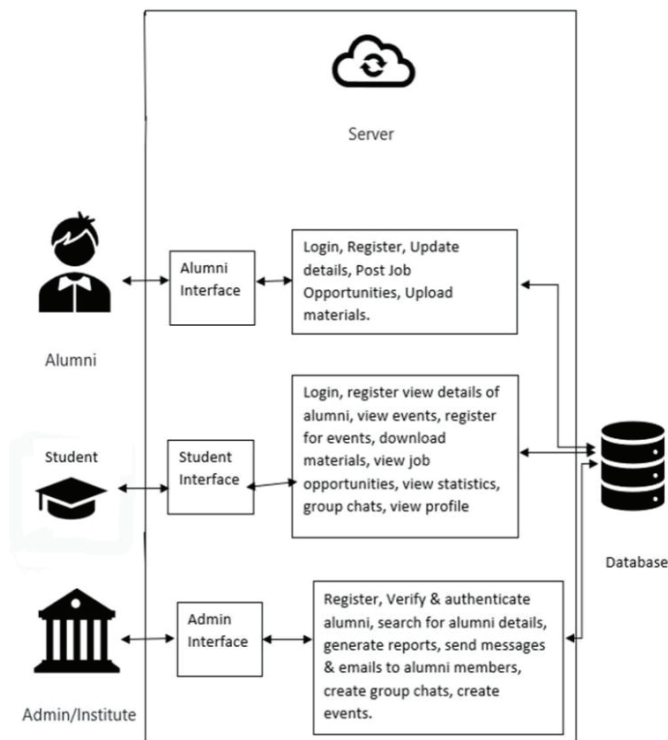
API Communication: RESTful APIs

System Features: Resume Parsing, AI-based Matching, student details, Smart Recommendations

Advantages Of Proposed System

- Provides an AI-based mentor recommendation system.
- Easy connection between students and alumni.
- Verified alumni profiles increase trust.
- Real-time messaging for communication.
- Centralized database for managing user information.
- Improves mentorship and career guidance opportunities.

System Architecture



Results

The results of the AlumniBridge project demonstrate that the system effectively connects students with alumni mentors and improves access to career guidance. By using AI-based recommendation techniques, the platform is able to suggest suitable mentors based on student interests, skills, and career goals, making the mentorship process more accurate and efficient. The system also enables smooth communication between students and alumni through messaging features, which enhances interaction and knowledge sharing. The platform shows reliable performance with fast response time and the ability to handle multiple users simultaneously. All user data, profiles, and communication records are stored and managed efficiently in a centralized database. The testing results confirm that all modules, including registration, login, profile management, mentor recommendation, and messaging, work correctly without errors.

Table 1: Accuracy Comparison

Approach	Accuracy(%)
Manual Search	72.5
Keyword Matching	81.2
Proposed System (TF-IDF + BERT)	91.6

Table 2: F1 Score Comparison

Approach	Accuracy(%)
Keyword Matching	0.70
Keyworded Matching	0.85
Proposed System (TF-IDF + BERT)	0.92

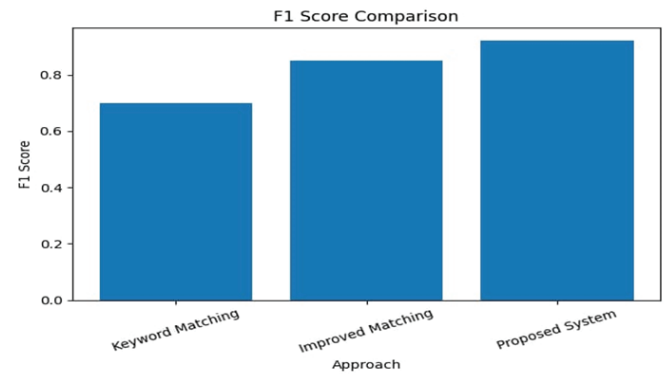


Figure 1. Graph for Accuracy comparison

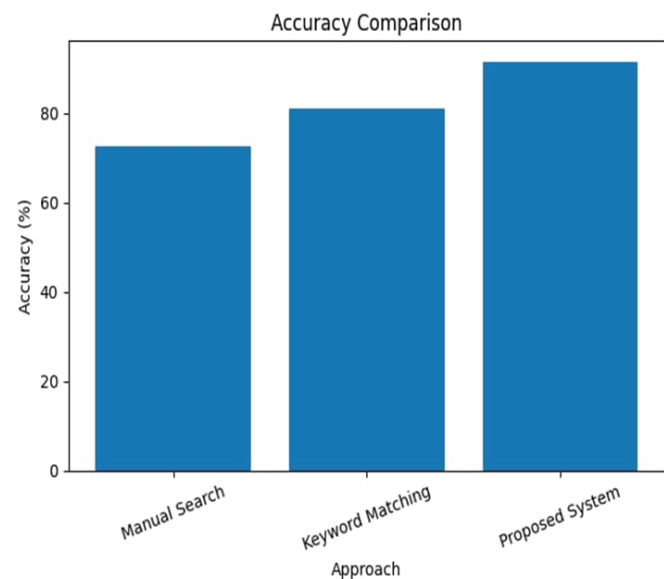


Figure 2. Graph for F1 Score comparison

Conclusion

The AlumniBridge: An AI-Powered Networking Platform to Interconnect Students and Alumni for Career Development and Mentorship has been developed with the primary goal of bridging the communication and guidance gap between current students and their alumni network. This system enables meaningful connections that foster mentorship, career advice, and professional growth. By integrating Artificial Intelligence (AI) and Natural Language Processing (NLP), the platform intelligently connects students with suitable mentors based on their academic background, career interests, and skill sets. The system goes beyond a traditional networking platform by offering multiple interactive modules such as event and news management, advertisements, chatbot assistance, mentor approvals, and profile updates, ensuring a holistic user experience. Students can register, interact with mentors, explore opportunities, and stay updated with institutional activities, while mentors can guide, approve, or reject mentorship requests, share insights, and manage events or news updates.

Future scope

The AlumniBridge Project holds significant potential for future development and scalability. As technology continues to evolve, several enhancements can be implemented to improve user experience, automation, and system intelligence. In the

future, the system can integrate advanced Artificial Intelligence (AI) and Natural Language Processing (NLP) models to make the chatbot more interactive, intelligent, and context-aware. This will allow students and mentors to receive more personalized career guidance, automatic resume suggestions, and intelligent responses related to job opportunities and alumni events. The chatbot can also be connected with cloud-based AI services for multilingual support, making it accessible to a wider audience. Another major enhancement is the introduction of a Recommendation System that suggests suitable mentors, jobs, or events based on user interests, skills, and previous interactions. This feature will use data analytics and machine learning algorithms to provide smart and relevant recommendations, improving overall engagement and satisfaction.

References

1. S. Kumar and R. Patel, "AI-Driven Alumni Networking Systems for Career Guidance," *International Journal of Advanced Computer Science and Applications*, vol. 11, no. 4, pp. 120–126, 2020. The authors proposed an AI-based alumni networking platform that connects students with alumni based on academic interests, professional domains, and mentorship needs. The study emphasized how artificial intelligence can enhance matchmaking algorithms, fostering effective career guidance and peer learning among users.
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