

# AlumConnect

(An Alumni Association Platform)

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**Abstract**— This research presents **AlumConnect**, a web-based platform designed to strengthen communication and collaboration between alumni, students, and institutions. The system provides features such as alumni networking, event management, mentorship opportunities, and administrative analytics to streamline engagement within the academic community, ultimately fostering a more connected and supportive educational ecosystem.

professional networking. It focuses on centralized profile management, event organization, mentorship, job referrals, and real-time communication features to support collaboration and knowledge sharing. The platform also highlights the importance of secure authentication, role-based access, and scalable database design to ensure reliable and efficient alumni interaction within a digital environment.

## I. INTRODUCTION

In the modern educational ecosystem, maintaining meaningful connections between institutions, alumni, and students has become increasingly important for career development, mentorship, and knowledge exchange. However, many institutions still rely on fragmented communication systems and manual data management, leading to reduced engagement and missed opportunities. To address these challenges, this project introduces **AlumConnect**, a comprehensive web-based alumni and student engagement platform designed to centralize institutional networking and administrative operations.

[2] The platform focuses on solving issues related to manual data handling and fragmented alumni networks by providing features such as alumni registration, searchable directories, event announcements, and discussion tools through a responsive interface. Developed using Flutter for cross-platform compatibility and Supabase for backend services, the system emphasizes affordability, usability, and secure data management, making it suitable for smaller institutions with limited resources. The study demonstrates how lightweight digital solutions can enhance alumni participation, streamline institutional communication, and establish a scalable foundation for future alumni networking initiatives.

AlumConnect integrates modern web technologies, cloud databases, and artificial intelligence techniques to create a unified digital environment where students, alumni, faculty, and administrators can interact seamlessly. The system provides role-based dashboards, job and event management, mentorship programs, fundraising tools, and real-time communication features, enabling institutions to streamline operations while strengthening community participation.

[3] The study titled “*Alumni Association Platform Using Machine Learning*” proposes a web-based alumni engagement system that integrates artificial intelligence to improve communication, automation, and user support within academic communities. The platform connects alumni, students, administrators, and guests through features such as event participation, job posting, secure messaging, and institutional updates. A key contribution of the system is the integration of machine learning models, including an LSTM-based chatbot for automated query handling and a BART-based text summarization model to simplify job descriptions for students. The platform also incorporates secure authentication, automated notifications, and centralized data management to streamline administrative tasks while enhancing user experience. The study demonstrates how the inclusion of machine learning techniques can improve efficiency, personalization, and engagement in alumni networking platforms

A key aspect of AlumConnect is the incorporation of machine learning-driven recommendation systems that analyze user profiles, skills, and engagement patterns to suggest relevant alumni connections, career opportunities, and mentorship pathways. By combining automation, analytics, and intelligent matching, the platform transforms traditional alumni management into a data-driven, interactive, and scalable solution.

## II. REVIEW OF LITERATURE

[1] The study “*Reconnectify: An Alumni Association Platform*” proposes a web-based system that connects alumni, students, and faculty to enhance institutional engagement and

[4] The study titled “*Alumni Association Platform*” presents a web-based system designed to centralize alumni–student interaction through secure authentication, profile management, networking tools, and opportunity sharing features. The platform utilizes modern web technologies including React, MongoDB, JWT-based authentication, and Firebase Google Sign-In to ensure scalability, security, and ease of access. It supports functionalities such as discussion forums, job postings, mentorship communication, and role-based access control, enabling structured engagement within the alumni community. The study demonstrates that dedicated institutional platforms can improve communication, career support, and long-term alumni involvement while providing a scalable foundation for future enhancements such as AI-driven recommendations and mobile accessibility.

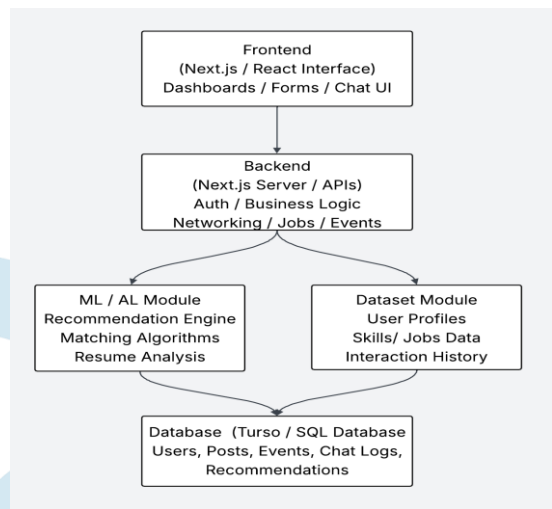


Figure 1: System Architecture

[5] The study titled “*AI-Powered Alumni Portal: Connect, Learn, Thrive*” proposes an intelligent alumni engagement platform that integrates artificial intelligence to enhance networking, mentorship, and career support within educational institutions. The system emphasizes personalized features such as AI-based career suggestions, resume analysis, event management, and job recommendation mechanisms to improve user engagement and professional growth. It also incorporates administrative dashboards, analytics, and secure user management to support scalable institutional deployment. The research highlights that while existing alumni platforms provide basic networking and communication features, the integration of AI-driven personalization and recommendation techniques can significantly improve interaction quality, career guidance, and long-term alumni participation within academic communities.

[2] Feature Engineering

- Generate skill vectors from user profiles
- Extract interest keywords from posts using NLP
- Create engagement score using likes, comments, activity frequency
- Build similarity features using cosine similarity
- Prepare structured dataset for recommendation models

[3] Profile Clustering

Multiple clustering algorithms (KMeans, Agglomerative, DBSCAN) were tested to group similar profiles.

- Cluster quality was evaluated using Silhouette, Davies-Bouldin, and Calinski-Harabasz metrics

III. PROPOSED SYSTEM

AlumConnect follows a layered architecture where the frontend manages user interaction, the backend handles logic and APIs, the database stores data, and the ML module provides intelligent recommendations. This modular design ensures scalability, security, and efficient system communication.

[1] Data Collection and Preprocessing

- Load dataset: user profiles, posts, skills, connections dataset
- Select relevant fields: user\_id, skills, branch, company, interests, posts, engagement
- Remove missing or duplicate records
- Normalize text fields (lowercase, remove stopwords, tokenization)
- Convert text to numerical form using TF-IDF vectorization

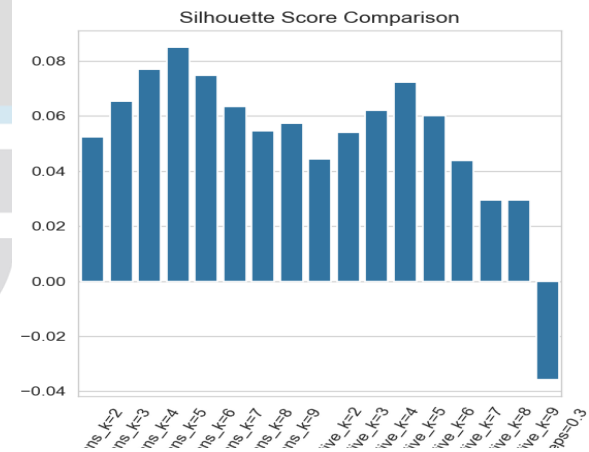


Figure 2: Silhouette Score Comparison

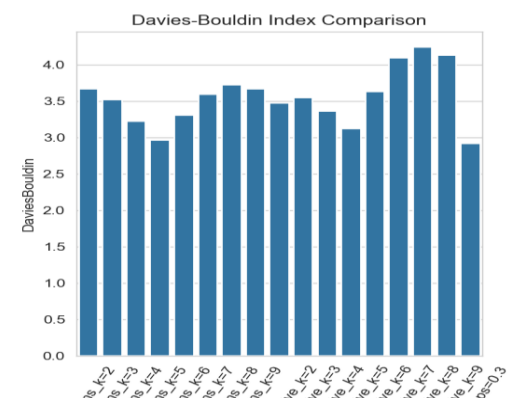


Figure 3: Davies-Bouldin Index Comparison

[4] Optimal Cluster Selection

- Elbow method and Silhouette analysis were used to determine the optimal number of clusters.
- The best-performing model was selected automatically based on evaluation metrics.

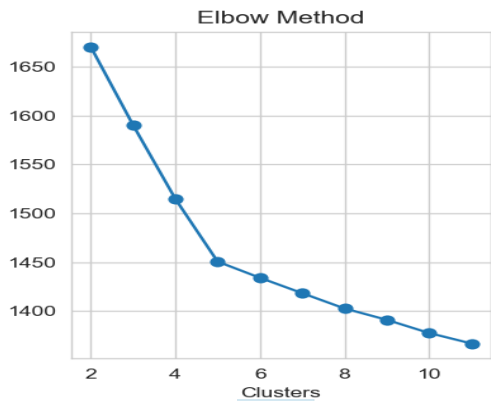


Figure 4:

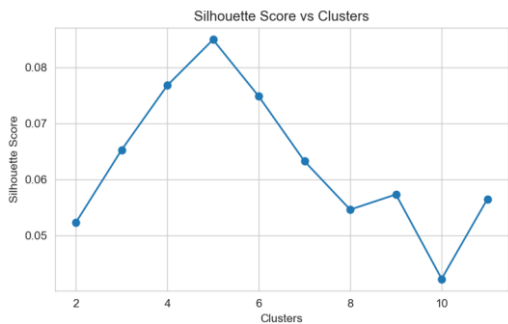


Figure 5:

[5] Cluster Interpretation

- PCA dimensionality reduction was applied to visualize clusters in 2D space.
- Domain distribution across clusters was analyzed to validate grouping quality.

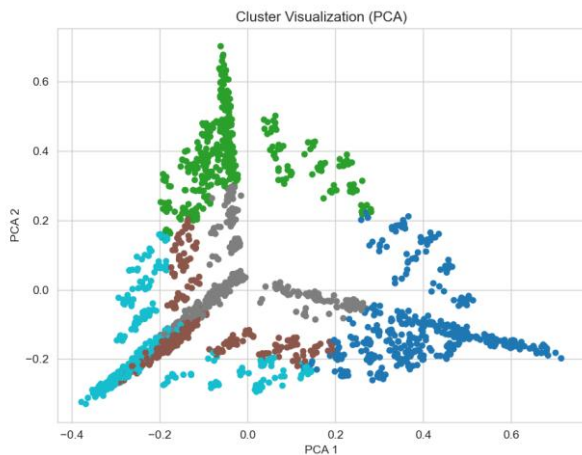


Figure 6:

[6] Recommendation System

- Cosine similarity was used to measure closeness between profiles.
- Top similar users were recommended based on similarity scores.

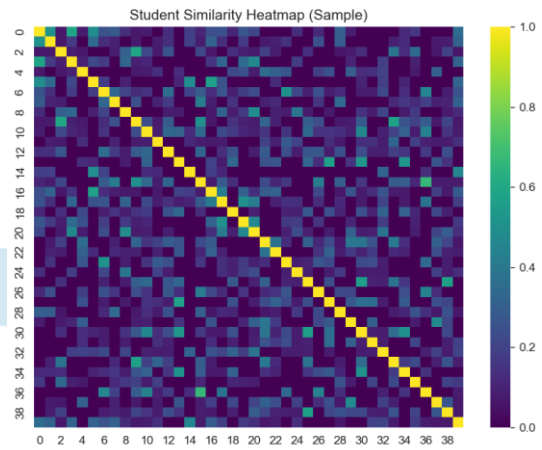


Figure 7:

[7] Final Model Evaluation

- A combined quality score was computed from clustering metrics.
- This ensured the final model selection was balanced and reliable.

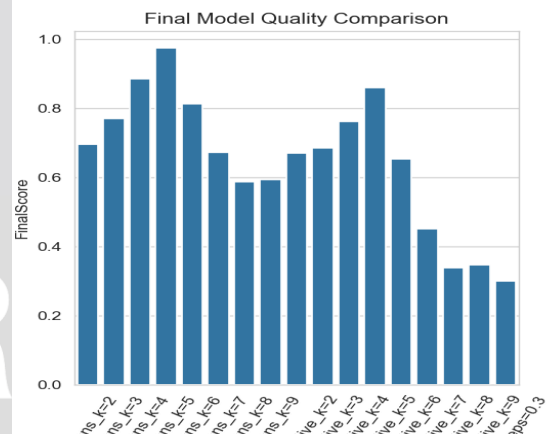


Figure 8:

**Categorize forum Posts:** To automatically categorize forum posts, a supervised machine learning model was implemented using Logistic Regression. The text data was converted into numerical form using TF-IDF vectorization to capture important keywords and context. The dataset was split into training and testing sets, and the model was evaluated using accuracy and F1-score metrics. A confusion matrix was generated to visualize the classification performance across different categories, demonstrating the effectiveness of the model in organizing forum content.

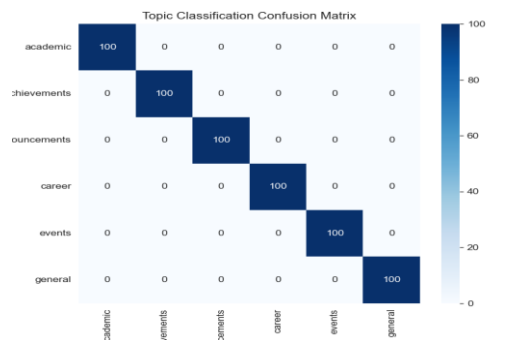


Figure 9:

**Résumé**

To automatically generate concise résumé summaries, an NLP-based summarization module was implemented. Uploaded résumés are first parsed and cleaned, after which the text is converted into contextual embeddings. A transformer-based summarization model is then applied to produce recruiter-friendly summaries that highlight key skills, experience, and education. This enables faster profile understanding and improves candidate matching within the platform.

**Summarization:**

**IV. Result and Implementation**

**Student Dashboard:**

Students interact with the AlumConnect platform by registering and logging into the system to access personalized features. They can manage their profiles, search for relevant alumni based on skills or domain, and apply for job opportunities shared by alumni. The platform uses machine learning to generate personalized networking recommendations by analyzing student skills, interests, and career goals, helping them connect with the most suitable alumni mentors. Students can also request mentorship, communicate through chat for guidance, and view upcoming events to stay engaged with the alumni network. The system thus supports career development, networking, and continuous learning for students.

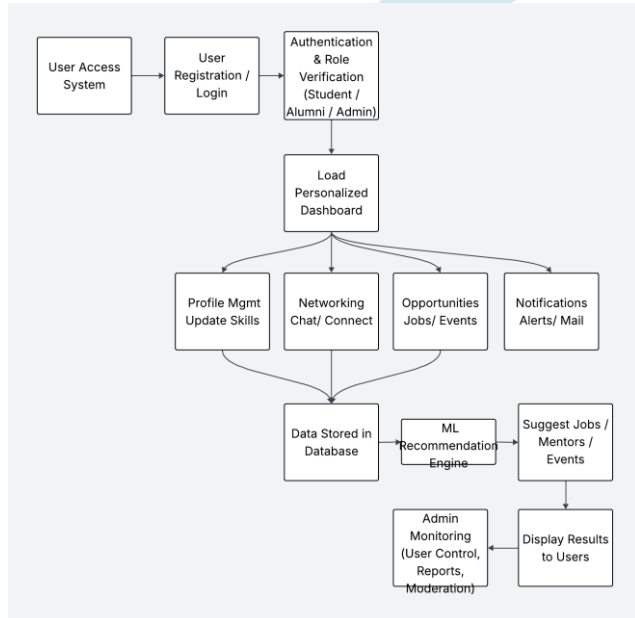


Figure 10: Block Diagram

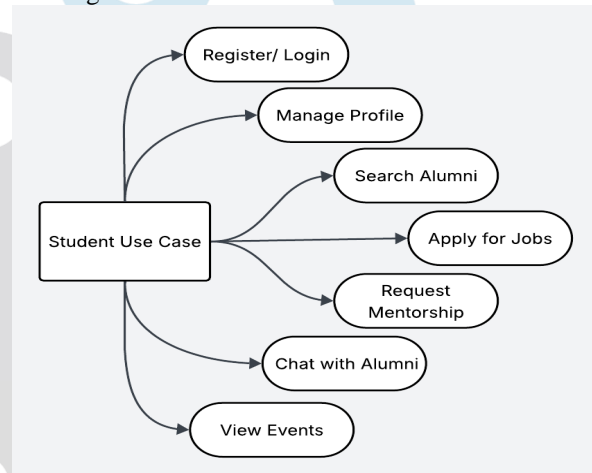


Figure 11:

- **User Interface Layer**  
Provides the entry point for students, alumni, and admins to interact with the platform.
  - Handles registration, profile updates, posting, and dashboard views.
- **Data Processing Layer**  
  - Collects user inputs such as profiles, posts, and résumés.
  - Performs cleaning, parsing, and feature extraction to prepare data for analysis.
- **Machine Learning Layer**  
  - Applies models for profile matching, topic classification, sentiment analysis, and résumé summarization.
  - Generates intelligent insights such as recommendations, summaries, and categorized posts.
- **Database Layer**  
  - Stores user profiles, posts, interaction logs, and ML outputs securely.
  - Ensures fast retrieval and consistency of platform data.
- **Output & Recommendation Layer**  
  - Displays personalized alumni matches, job opportunities, summaries, and categorized content.
  - Continuously updates results based on user activity and system learning.

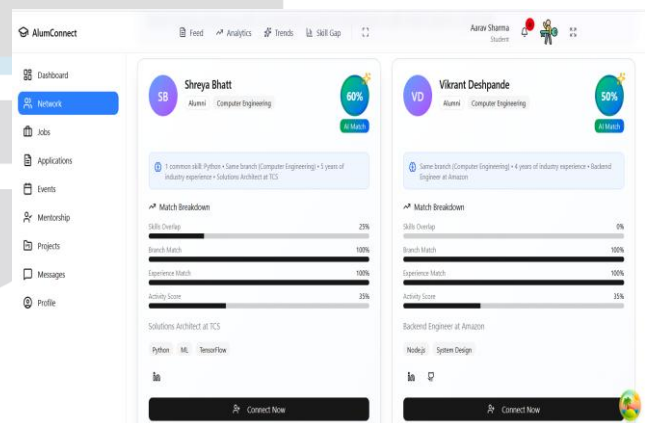


Figure 12:

**Alumni Dashboard:**

Alumni access the AlumConnect platform by registering and logging in to their accounts. They can manage their professional profiles, post job or internship opportunities, and mentor students by providing guidance and support. The platform uses machine learning to automatically summarize job descriptions and highlight key requirements, making postings clearer and easier for students to understand. Alumni can also communicate with students through chat and participate in institutional events, helping strengthen the alumni network and support student career growth.

V. Conclusion

AlumConnect is designed as an intelligent and scalable platform that strengthens the connection between students, alumni, and the institution through meaningful digital interaction. Unlike traditional alumni portals that function mainly as static directories or communication tools, AlumConnect incorporates machine learning techniques such as profile similarity analysis, personalized alumni recommendations, topic classification of posts, and automated résumé and job summarization. These intelligent features enable the system to deliver relevant opportunities, targeted mentorship connections, and clearer information flow, thereby enhancing user engagement and decision-making. The platform simplifies networking, improves career support, and automates administrative insights while maintaining a user-friendly interface and modular architecture. By integrating modern web technologies with data-driven intelligence, AlumConnect demonstrates how alumni management systems can evolve into dynamic ecosystems that promote professional growth, collaborative learning, and long-term institutional connectivity.

Acknowledgment

First and foremost, we would like to thank our guide Prof. Namrata Singh for her invaluable expertise, guidance, and support throughout our project. A debt of gratitude is also owed to our HOD Dr. Sujata Kadu and the Department of Information Technology for providing us with the opportunity as well as the support required to pursue this project. We would like to extend our appreciation to our colleagues for their assistance and discussions during the research.

REFERENCES

[1] Loganathan, E., et al. "AI-Powered Alumni Portal: Connect, Learn, Thrive." International Research Journal on Advanced Science Hub, vol. 7, no. 1, 2025.

[2] Parmar, Jay, et al. "Alumni Association Platform." International Journal of Engineering Development and Research (IJEDR), vol. 13, no. 4, 2025.

[3] Muralidhar, V., et al. "Alumni Association Platform Using Machine Learning." International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE), vol. 14, no. 3, 2025.

[4] Authors Unknown. "Alumni Association Platform for a Local College." International Journal for Research in Applied Science and Engineering Technology (IJRASET), 2024.

[5] Authors Unknown. "Reconnectify: An Alumni Association Platform." ResearchGate Publication, 2024.

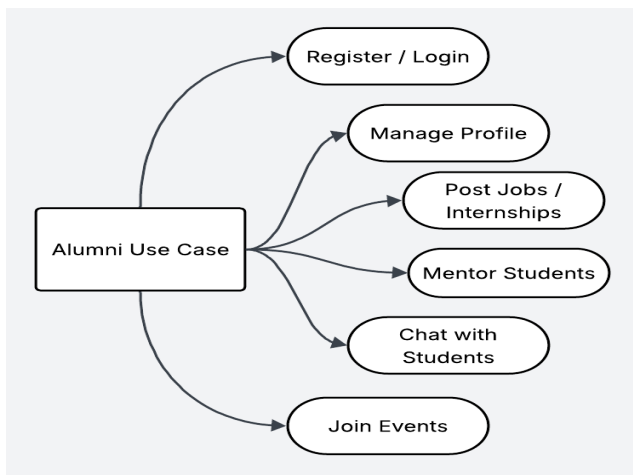


Figure 13:

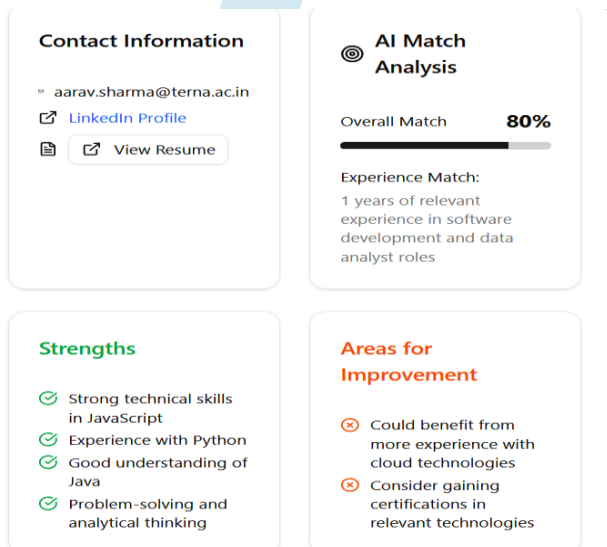


Figure 14:

Admin Dashboard:

The admin manages the overall functioning of the AlumConnect platform by approving new user registrations and moderating posts and job listings. They monitor platform activity to ensure proper engagement and system performance. Additionally, the admin organizes and manages events while generating analytical reports to track usage, growth, and platform effectiveness.

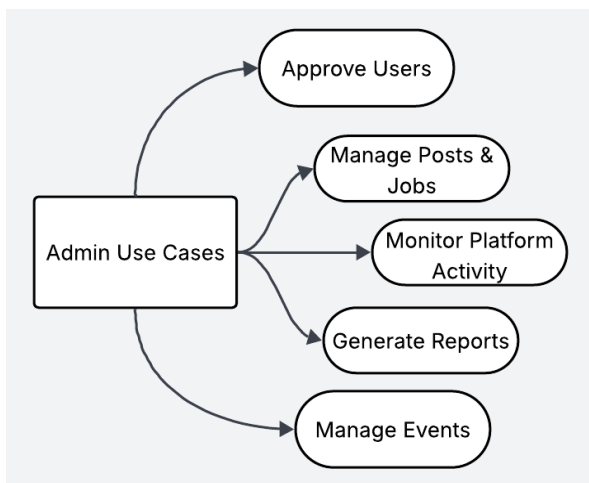


Figure 15: