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Intelligent platform to Interconnect Alumni and Student For Educational Institutes

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Abstract

The absence of structured alumni-student engagement channels in educational institutions limits mentorship, networking, and career development. Traditional methods are often inconsistent, leaving students without access to alumni guidance and alumni without clear incentives to stay involved. To address these gaps, our platform leverages artificial intelligence (AI) and machine learning (ML) to create a centralized, dynamic "give-and-take" model. Alumni receive incentives such as access to educational resources, paid webinars, and opportunities to engage through mentorship, while students benefit from real-time connections with relevant mentors. AI-driven matchmaking and event management tools enhance the quality and relevance of these connections, building a sustainable network that supports both professional growth and career readiness for students and alumni alike.

INTRODUCTION

Alumni-student interaction plays a crucial role in bridging the gap between academia and industry, enabling students to gain insights, motivation, and guidance from experienced graduates. However, there is currently no unified platform within the Technical Education Department of Rajasthan that lists all alumni and students, resulting in fragmented communication and missed opportunities for collaboration. This lack of structured engagement limits the benefits students could gain from mentorship, career guidance, and professional networking.

This paper proposes a solution to these challenges through a centralized platform designed specifically to connect alumni and students in a structured and effective manner. Leveraging AI and machine learning, the platform will dynamically match students with alumni based on various factors, such as industry, field of study, and areas of expertise, to facilitate meaningful interactions. The platform also follows a "give-and-take" model, providing alumni with incentives like library access, paid webinars, workshops, and career services to maintain their engagement and willingness to guide students.

LITERATURE REVIEW

The development of platforms to enhance

student-alumni engagement has garnered considerable attention in recent research. Many studies have explored the design, implementation, and impact of web portals aimed at bridging communication gaps between students and alumni, focusing on features such as data security, social matching, and interaction enhancement.

Sabri, Ahmad, and Abdulrazaq (2017) presented a web portal to facilitate alumni-student engagement, addressing the need for an online platform that enables structured communication and resource sharing. Their portal emphasized ease of access to resources and networking capabilities, offering a foundation for more sophisticated platforms. Similarly, Gowthamraj and Sankar (2019) proposed a web application designed to strengthen student-alumni communication. This application used a centralized approach to enhance interaction, providing various functionalities that could foster mentorship and knowledge sharing, while also noting the importance of a user-friendly interface and responsive design to ensure wide adoption.

Another significant contribution in this domain was provided by Sher (2009), who investigated the impact of interaction on student learning satisfaction in web-based environments. Sher's study highlighted the correlation between increased student-instructor and student-student interactions with greater satisfaction and learning outcomes. This finding supports the rationale for a platform dedicated to alumni-student engagement, as improved interaction channels can enhance the educational experience.

Babu, Sandhiya, and Preetha (2021) focused on the design of alumni portals with robust data security measures. Their study, presented at the International Conference on Electronics and Sustainable Communication Systems, addressed key security issues such as data privacy and user authentication, which are crucial in alumni-student platforms. This focus on security is particularly relevant to the proposed platform, as it underscores the need for secure data handling practices to protect user information.

Wang, Camacho, and Goel (2022) explored the potential of AI-based social matching systems to enhance social interactions among online learners. Their research demonstrated the effectiveness of AI in facilitating targeted, meaningful connections, which is central to the proposed platform's approach to dynamic alumni-student matching. By leveraging machine learning algorithms, the platform aims to offer personalized connections that align with users' professional backgrounds, enhancing the relevance and quality of alumni-student interactions.

Finally, Nishanth et al. (2021) discussed the use of cloud architecture for managing student-alumni networks, focusing on scalability and data accessibility. The platform described in this study incorporated cloud-based solutions to efficiently manage user data, ensuring reliable access and smooth interaction. This approach aligns with the proposed platform's architecture, which will employ a similar structure to manage alumni and student information securely and efficiently.

Collectively, these studies illustrate the growing interest in developing comprehensive platforms that support secure, efficient, and meaningful alumni-student engagement. By integrating AI-based social matching and prioritizing data security, the proposed platform builds on these foundational studies, advancing the concept of a centralized system designed to meet the unique needs of both alumni and students.

PROBLEM STATEMENT

Alumni-student engagement in educational institutions is often hindered by fragmented communication channels and a lack of structured support for mentorship, career guidance, and professional networking. Within the Technical Education Department of Rajasthan, there is currently no unified platform to streamline and foster meaningful interaction between alumni and students. This gap limits students' access to experienced alumni, which could otherwise aid in career development, professional networking, and mentorship. Additionally, institutions face challenges in maintaining active alumni participation due to a lack of engagement incentives. There is a pressing need for a centralized platform that can bridge these gaps by using modern technological solutions to facilitate dynamic, secure, and effective alumni-student connections.

PROBLEM SYSTEM

The proposed Alumni-Student Dashboard platform is a robust, AI-driven networking tool designed to support alumni-student engagement through mentorship, professional development, and event participation. With a focus on accessibility, interactivity, and security, the platform incorporates a comprehensive set of features:

The platform leverages AI-powered matchmaking and recommendations, using machine learning algorithms like collaborative filtering and NLP to connect students with relevant alumni, mentors, and job opportunities. It prioritizes security through two-factor authentication, JWT, OAuth, and Role-Based Access Control (RBAC) for user privacy and access control. Event management features allow

users to browse, register, and engage in events with automated reminders and feedback collection. The platform also includes NLP-based content filtering, fake profile detection, and a comprehensive Learning Management System (LMS) for archived workshops and resources. A donation portal facilitates alumni contributions, while an incentive system rewards user participation. An AI chatbot provides support, and cloud infrastructure ensures scalability and reliability.

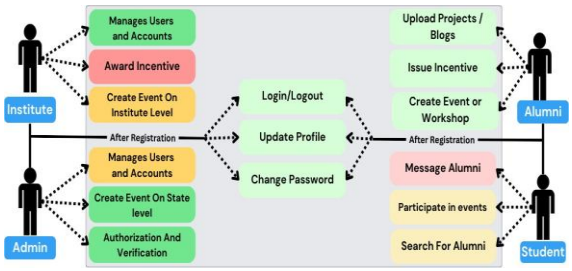

Fig 1. Key Features of website

METHODOLOGY

This project utilizes a comprehensive approach to develop a centralized alumni-student engagement platform. Key technologies include Express.js and Node.js for backend development, ensuring a robust and scalable server environment. MongoDB serves as the database for efficient storage and retrieval of user profiles, events, and communication logs. JWT (JSON Web Token) and OAuth are employed for secure authentication, along with two-factor authentication (2FA) for additional security measures. The front-end is designed using React, enhanced with Bootstrap and Tailwind CSS for a responsive and visually appealing interface. AWS or Azure cloud platforms provide a reliable hosting environment, facilitating real-time scalability and access to AI and ML tools.

The platform incorporates various core functionalities:

- User Profiles: Separate profiles for students, alumni, and institute and government admins.
- AI-Based Smart Matchmaking: AI and ML algorithms are used to dynamically match students with alumni based on industry, graduation year, and interests.
- Event Management: Features like an event calendar, forums, and webinars enable active engagement.
- LMS Integration: A Learning Management System (LMS) to store and access recordings of missed workshops and webinars.
- Security Measures: Implementation of RBAC (Role-Based Access Control) ensures a secure, multi-tiered access control system for managing different user roles.

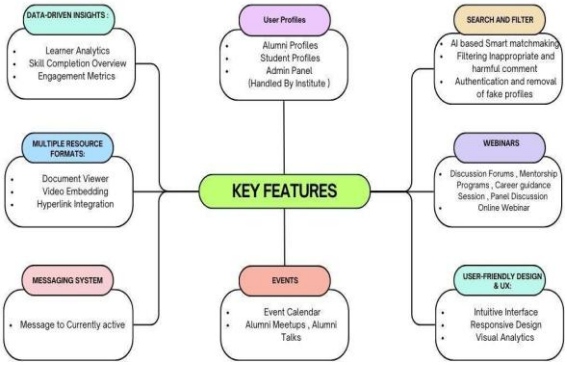

Fig 2. Use Case of website

This structured methodology allows the development team to address scalability, security, and ease of use while integrating essential functionalities for alumni-student engagement.

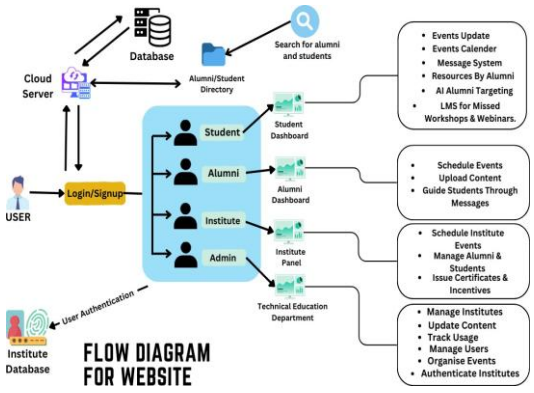

Fig 3. Flow-Diagram of proposed approach

STRUCTURE AND ARCHITECTURE

This section outlines the design of the Alumni-Student Dashboard platform, emphasizing a modular, microservices-based architecture to ensure maintainability, scalability, and efficient management of diverse functionalities. The architecture is divided into six main components: Frontend Layer, Backend Layer, Database Layer, Authentication and Authorization, AI-Based Services, and Cloud Infrastructure.

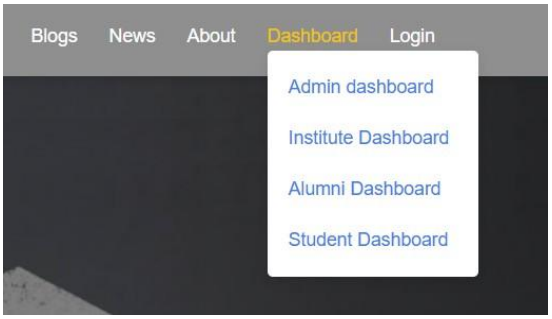

Fig 4. Role Based Dashboard of users Profile on Alum-Connect

The backend layer, developed using Node.js and Express.js, acts as the foundation for API management and server-side processing. This layer is responsible for

Microservices Structure: Ensures each functionality—such as user authentication, event management, or content moderation—is handled independently, enabling easy scalability and seamless integration of additional services.

RBAC Collection: Manages Role-Based Access Control, defining roles and permissions for secure, differentiated access across students, alumni, and admin levels.

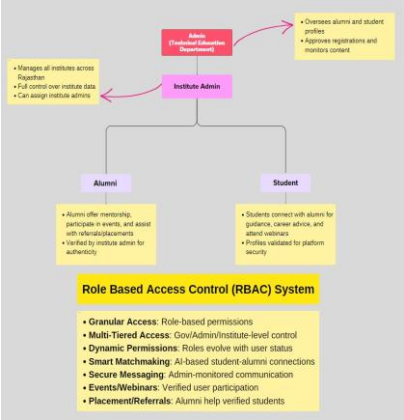

Fig 5. Role Based Architecture of Profiles

FUTURE SCOPE

Future developments for the platform include leveraging advanced AI for refined matchmaking and personalized recommendations, as well as launching mobile applications for greater accessibility. Expanding to additional institutions could broaden the network and collaboration opportunities, while gamification—such as badges and rewards—could boost alumni engagement. Industry partnerships could bring sponsorships, internships, and co-hosted events, further enhancing career pathways for students. These enhancements will enable the platform to evolve with educational needs and technological innovations, fostering a more connected alumni-student community.

RESULT AND DISCUSSION

The developed platform successfully addresses the needs for structured alumni-student engagement within the Technical Education Department of Rajasthan. The AI-based matchmaking feature has enabled personalized, relevant connections between alumni and students, increasing the effectiveness of mentorship and career guidance. The event management and RSVP system has facilitated increased attendance in webinars and workshops, fostering meaningful interactions. The system's security measures, such as two-factor authentication and RBAC, have been effective in ensuring data privacy and protecting user information

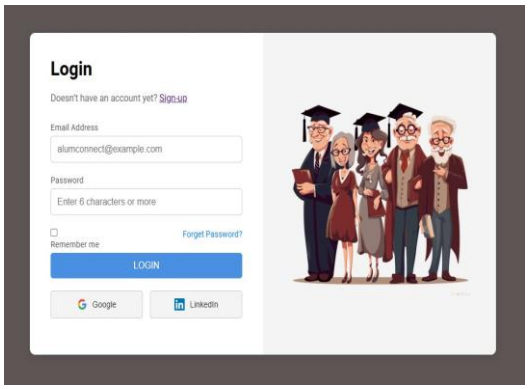

Fig 6. Login Page of Alum-Connect

Conclusion

The proposed platform successfully addresses the need for structured, meaningful interaction between alumni and students within the Technical Education Department of Rajasthan. By integrating AI-driven matchmaking, incentives for alumni, and secure, cost-effective technology, it facilitates a sustainable model of mentorship, guidance, and collaboration. This initiative promises to enhance alumni engagement, providing students with valuable career insights and professional support. The platform thus serves as an impactful bridge between alumni experience and student ambition, fostering a cohesive educational community.

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