American Journal of
AI Digital Transformation and Regenerative Pharmacist
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0418 www.zesterapublications.com Original Research Paper

Trusted Alumni Communication and Career Networking Portal with Secure Access

Mohammad Althaf Hussain, K. Srilatha*
Vaagdevi Engineering College, Warangal, 506005, Telangana, India.
*Correspondence: K. Srilatha

Abstract

Alumni networks play a vital role in strengthening institutional relationships, professional collaboration, and career development. However, maintaining accurate communication with graduates remains a significant challenge, as alumni frequently change their contact details after employment without updating institutional records. Traditional alumni management methods, including printed directories, social media groups, and manual communication, often suffer from fragmented data, fake profiles, and the absence of reliable graduate verification, reducing trust among alumni and employers. This research presents a secure Flask web-based platform designed to provide verified networking and career opportunities for graduates. The proposed system employs the Lightning Memory-Mapped Database (LMDB) for efficient data storage and rapid information retrieval. It incorporates two dedicated modules: Alumni Network Support and Administration (ANSA) for institutional verification and management of alumni records, and Verified Alumni Networking Member (VANM) for authenticated graduates to connect, search the alumni directory, and apply for career opportunities. To ensure data confidentiality and system integrity, the portal integrates secure password hashing and Cross-Site Request Forgery (CSRF) protection against unauthorized access and malicious attacks. By combining institutional verification with secure communication and career networking, TACCNP establishes a trusted digital ecosystem that enhances alumni engagement, strengthens professional connections, and promotes reliable employment opportunities.

Keywords : Trusted Alumni Communication, Career Networking Portal , Lightning Memory-Mapped Database (LMDB)

1.INTRODUCTION

Alumni networks have become an essential component of higher education institutions by establishing long-term relationships between universities and their graduates while promoting knowledge sharing, career development, and professional collaboration. A well-connected alumni community enables institutions to strengthen academic reputation, facilitate industry partnerships, and create opportunities for mentorship, internships, employment, and entrepreneurial collaboration. Traditionally, alumni information has been maintained using paper-based records, spreadsheets, or isolated databases, making record management inefficient, time-consuming, and prone to inconsistencies. These conventional methods require frequent manual updates, increase the possibility of data redundancy and information loss, and limit the ability of institutions to communicate effectively with graduates [1]. Although social networking platforms provide opportunities for alumni interaction, they are not institutionally verified and therefore cannot guarantee the authenticity of user identities. As a result, fake profiles, misinformation, privacy concerns, and unauthorized access reduce the reliability of professional networking and institutional communication. These limitations highlight the growing need for a centralized and secure alumni management platform capable of

Received: 30-05-2026 | Accepted: 01-07-2026 | Published: 08-07-2026

American Journal of
AI Digital Transformation and Regenerative Pharmacist
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0418 www.zesterapublications.com Original Research Paper

maintaining verified user identities while supporting efficient information management [2]. Verified alumni communities provide substantial benefits to both educational institutions and graduates by creating a trusted environment for professional networking and lifelong engagement. Alumni can share industry experience, provide career guidance, mentor current students, recommend internship and employment opportunities, contribute to academic development, and participate in institutional events and collaborative research activities. Educational institutions also benefit by maintaining updated alumni databases, tracking graduate achievements, strengthening industry relationships, and improving placement support for students [3]. However, many existing alumni management systems lack secure authentication mechanisms, role-based access control, centralized data management, and structured communication facilities. Consequently, institutions often experience difficulties in verifying alumni identities, managing employment information, distributing announcements, and maintaining accurate graduate records. These shortcomings reduce user confidence and limit the effectiveness of alumni engagement initiatives.

Recent advancements in Human–Computer Interaction (HCI), cloud computing, web technologies, and intelligent information systems have significantly improved the development of secure, interactive, and user-friendly digital platforms. Modern HCI emphasizes usability, accessibility, intuitive interface design, and efficient human-system interaction while integrating emerging technologies such as Artificial Intelligence (AI), Machine Learning (ML), and intelligent recommendation systems to enhance user experience [4]. These technologies enable faster information retrieval, personalized communication, secure authentication, and efficient management of large-scale institutional databases. When incorporated into alumni management systems, they facilitate verified user registration, secure profile management, role-based communication, event coordination, career networking, and institutional collaboration through a centralized digital platform. Therefore, the development of a secure and institutionally verified alumni networking system can significantly strengthen alumni engagement, improve communication between graduates and educational institutions, support professional growth, enhance employment opportunities, and establish a reliable digital ecosystem that benefits students, alumni, faculty members, and institutional administrators [5].

2. LITERATURE SURVEY

Zamiri, et al. [6] conducted a comprehensive systematic review by following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a transparent, standardized, and reproducible research methodology. The study identified eleven major strategies for professional skill development, including collaborative projects, mentorship programs, workshops, online learning platforms, peer learning, problem-based learning, cross-collaboration initiatives, leadership development, inclusive learning environments, gamification, and social networking. Each strategy was critically evaluated based on its implementation approach, advantages, limitations, targeted skill categories, and overall contribution toward enhancing technical, interpersonal, and professional competencies. The findings emphasized that combining multiple educational strategies significantly improves knowledge acquisition, career readiness, and long-term professional development. Gu, et al. [7] investigated the influence of chairperson–alumni networks on the adoption of Artificial Intelligence (AI) within organizations. The study

Received: 30-05-2026 | Accepted: 01-07-2026 | Published: 08-07-2026

American Journal of
AI Digital Transformation and Regenerative Pharmacist
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0418 www.zesterapublications.com Original Research Paper

demonstrated that strong alumni relationships among organizational leaders positively influence AI adoption by facilitating knowledge sharing, trust, and strategic collaboration across industrial, administrative, and geographical boundaries. Furthermore, the research revealed that alumni networks indirectly encourage AI implementation by influencing organizational governance factors such as board size. The study concluded that well-established alumni relationships play a significant role in accelerating technological innovation, digital transformation, and organizational competitiveness.

Chan, et al. [8] explored the application of Blockchain-based Self-Sovereign Identity (Ba-SSI) in educational institutions to provide secure, decentralized, and user-controlled digital identity management. The study reviewed the limitations of conventional identity management systems and demonstrated how blockchain technology enhances security, interoperability, scalability, and data ownership while allowing students to maintain complete control over their educational credentials. The authors also discussed implementation challenges, potential benefits, and future research opportunities associated with blockchain-enabled identity management in higher education. Pico-Saltos, et al. [9] proposed a predictive framework for evaluating graduate career success through comprehensive alumni tracking and evolutionary optimization techniques. The methodology involved analysing alumni information, developing career prediction models using Genetic Algorithms (GA), validating prediction accuracy, and examining the relationship between alumni engagement and career achievement. Experimental results indicated that objective variables significantly influenced prediction accuracy, whereas subjective variables contributed according to graduates' personal aspirations, value systems, and career objectives. Mustafa, et al. [10] proposed a secure and sustainable university access control framework utilizing mobile application-based digital credentials. The study performed a detailed risk assessment of existing university access infrastructures by identifying vulnerabilities related to physical access cards, cloning attacks, replay attacks, and restricted facility access. A pilot implementation of the Gallagher Mobile Connect platform integrated cloud-based registration, multi-factor authentication using PINs and biometrics, and secure credential management. The proposed framework demonstrated improved operational security, enhanced user convenience, increased resilience against cyberattacks, and better alignment with institutional sustainability objectives.

Shalihati, et al. [11] conducted a bibliometric analysis of Customer Relationship Management (CRM) research within higher education institutions by examining publication trends, influential authors, institutional contributions, keyword relationships, and thematic evolution. The study observed a gradual transition from traditional research emphasizing service quality and institutional reputation toward advanced topics including AI-driven CRM strategies, multi-channel communication systems, and social media analytics. The research further identified existing gaps related to cross-cultural CRM implementation, emerging technology integration, and standardized performance evaluation frameworks for higher education institutions. Peracek, et al. [12] investigated the relationship between alumni networks and exploratory innovation in organizations while analysing the mediating role of enterprise risk-taking. The empirical findings demonstrated that executive alumni networks strengthen exploratory innovation by establishing trusted professional relationships, facilitating knowledge

American Journal of
AI Digital Transformation and Regenerative Pharmacist
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0418 www.zesterapublications.com Original Research Paper

exchange, and encouraging collaborative problem-solving. Additionally, enterprise risk-taking was found to partially mediate this relationship, indicating that organizations supported by strong alumni networks exhibit greater innovation capability, improved organizational sustainability, and enhanced long-term competitive advantage.

3.PROPOSED METHODOLOGY

This research establishes a secure, moderated, and role-driven framework for enabling trusted communication and career networking within an alumni ecosystem. The system is designed to protect member identity, regulate access to shared resources, and maintain accountability across all interactions as shown in Fig.1. Sensitive user credentials and activity data are safeguarded through secure authentication, session management, and structured validation mechanisms. Access to networking features, announcements, and career services is governed by role-based authorization, ensuring that only verified participants engage with institutional resources. Administrative moderation enforces authenticity during onboarding, while continuous monitoring preserves traceability of user actions. Lightweight data management combined with a responsive web interface allows efficient real-time collaboration, making the famework scalable and reliable for institutional alumni engagement.

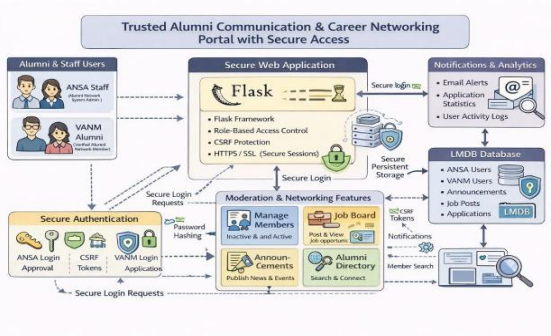


Fig. 1: System Architecture of TACCNP.

User Authentication and Secure Session Establishment: Authorized alumni and administrative users access the portal through a protected web interface using validated credentials. Upon successful authentication, secure sessions are established to maintain integrity and confidentiality throughout user interaction. Session controls prevent unauthorized reuse and ensure that every action originates from a verified identity.

Request Handling and Role-Based Access Control: All user requests pass through backend validation layers where access privileges are evaluated. Role-based policies ensure that administrators manage approvals and content publishing, while alumni interact only with permitted networking and career features. Unauthorized requests are blocked to maintain system discipline.

Moderated Registration and Identity Verification: New alumni registrations undergo structured validation before being stored in a pending state. Administrative review confirms authenticity and institutional relevance before granting activation. This moderation workflow prevents unauthorized entry and preserves trust within the alumni network.

Secure Data Management and Information Storage: User profiles, announcements, and career records are stored using structured database operations designed to maintain consistency and integrity. Input validation and transactional handling reduce corruption risks while protecting sensitive member information.

Controlled Networking and Career Interaction: Verified users access dashboards to browse alumni directories, receive announcements, and explore career opportunities. Each interaction is validated and recorded to ensure secure collaboration and reliable information exchange.**Activity Monitoring, Notifications, and Accountability:** System

Received: 30-05-2026 | Accepted: 01-07-2026 | Published: 08-07-2026

American Journal of
AI Digital Transformation and Regenerative Pharmacist
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0418 www.zesterapublications.com Original Research Paper

activities — including login events, approvals, profile updates, and applications — are continuously logged. Notifications inform users of status changes, while monitoring tools provide administrators with insights into system usage and operational health.

3.1 Hashing

The hashing mechanism in the proposed alumni portal serves as a foundational security layer that protects user credentials and sensitive verification data from unauthorised exposure. Instead of storing raw passwords or identity tokens, the system transforms them into irreversible cryptographic hashes before persistence. This ensures that even if storage is compromised, the original information cannot be reconstructed. The hashing workflow is tightly integrated with registration, authentication, and session validation processes, enabling secure identity verification without revealing confidential inputs. By combining validation, hashing, comparison, and controlled storage, the mechanism preserves confidentiality while supporting reliable access control within the alumni networking ecosystem as shown in Fig.2.

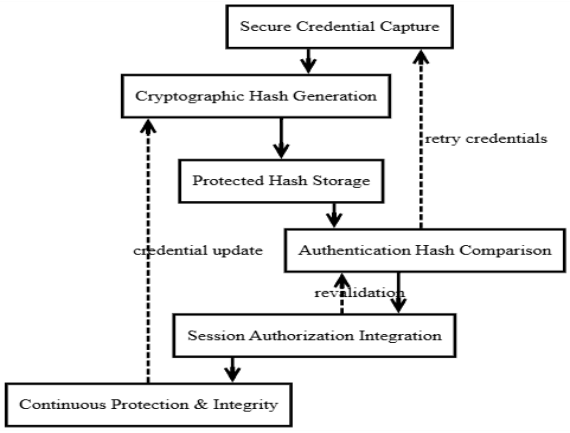


Fig.2: Internal workflow of Hashing.

Secure Credential Capture: When a user submits registration or login credentials through the frontend interface, the system first performs structured validation to confirm that the input meets formatting and completeness requirements. This preprocessing step ensures that only legitimate credential data enters the security pipeline. Sensitive inputs are temporarily handled in protected memory during transmission to prevent exposure, establishing a safe foundation for cryptographic processing.

Cryptographic Hash Generation: After validation, the plaintext credential is immediately passed through a secure hashing function designed to produce a fixed-length, irreversible digest. The transformation eliminates any direct relationship between stored data and the original credential. Optional salting techniques introduce additional randomness, preventing identical credentials from generating matching hashes. This step ensures that stored authentication data cannot be reverse-engineered.

Protected Storage of Hash Values: The generated hash is stored in the database instead of the original credential. Structured storage operations maintain integrity and consistency, ensuring that the hash remains associated with the correct user identity. At no point is the plaintext credential retained, minimizing the risk of leakage. This storage model enforces confidentiality while preserving efficient retrieval for authentication checks.

Authentication Hash Comparison: During login, the user-provided credential undergoes the same hashing process. The resulting hash is compared against the stored value using secure comparison logic that prevents timing-based attacks. If the hashes match, the system confirms identity authenticity without ever exposing the original credential. This comparison mechanism allows reliable verification while maintaining cryptographic secrecy.

Session Authorization Integration: Once authentication succeeds, the verified hash outcome triggers session establishment and role assignment. The hashing mechanism indirectly supports session security by ensuring that only

American Journal of
AI Digital Transformation and Regenerative Pharmacist
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0418 www.zesterapublications.com Original Research Paper

authenticated users reach protected workflows. This integration prevents unauthorized access while maintaining seamless user experience.

Continuous Protection and Data Integrity: Throughout system operation, hashing safeguards remain active whenever credential updates or resets occur. New hashes replace outdated ones using controlled database transactions. This continuous protection model ensures long-term integrity, adaptability to policy changes, and resilience against unauthorized credential exposure.

4. RESULTS AND DISCUSSION

Fig. 3 illustrates the Verified Alumni Directory page of the ANSA Portal. It displays a search bar at the top allowing users to filter alumni by name, company, or major. Below it, a single verified alumnus entry is shown in a card format, starting with an initial in a circle, followed by the name, academic details including Master's in CSE from 2020, current location marked as CS, email, and phone number. A footer note indicates the total number of verified alumni as 1.

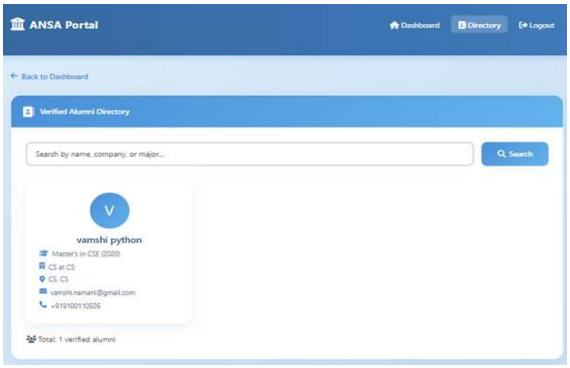


Fig. 3: Verified Alumni Directory page.

Fig. 4 shows the Announcements management page accessible to ANSA admins. On the left side is a form titled "Post New Announcement" with input fields for Title, Content (textarea), and a Priority dropdown defaulting to Normal, ending with a Post Announcement button. On the right side is the "Active Announcements" panel displaying one announcement card containing the number 30, title placeholder text, creator name, timestamp, and a red delete button.

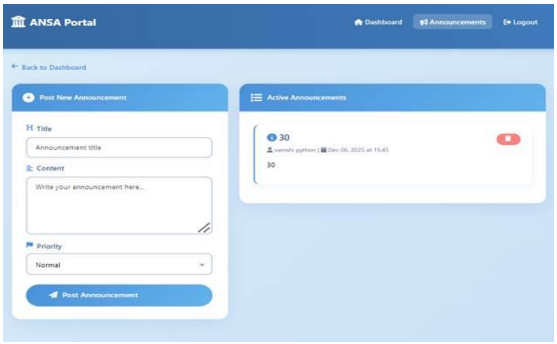


Fig. 4: Announcements page.

Fig. 5 illustrates the job posting page of the recruitment portal, which enables administrators or recruiters to create and manage employment opportunities within the system. The interface provides a structured mechanism for entering essential job-related information, including the job title, organization name, location, employment type, salary range, job description, eligibility requirements, contact details, and application deadline. After submission, the newly created vacancy is displayed in the active job postings section, allowing recruiters to monitor the current status of each listing and track applicant responses.

American Journal of
AI Digital Transformation and Regenerative Pharmacist
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0418 www.zesterapublications.com Original Research Paper

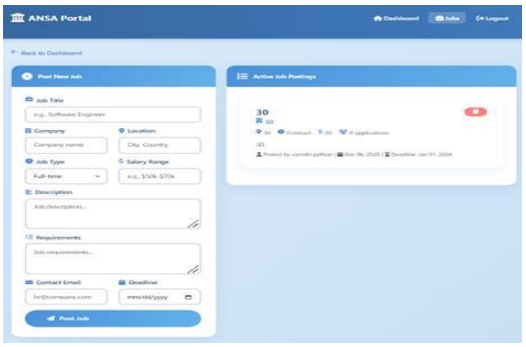


Fig. 5: Jobs Posting page.

Fig. 9.11 displays the Pending Alumni Registrations page for ANSA admins. It features a table header with columns for Name, Email, Graduation Year, Degree/Major, Company, Applied date, and Actions. One pending registration row is visible for user with email, graduation year, Bachelor's in Computer Science, company listed, applied date, and action buttons to Approve (green) or Reject (red).

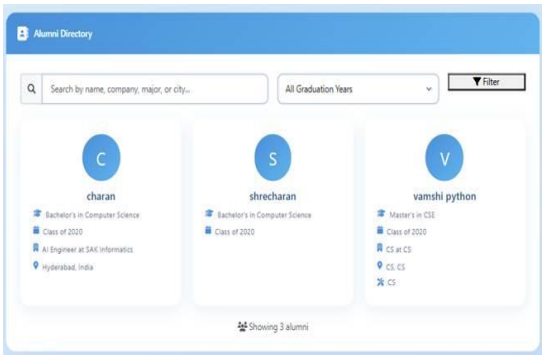


Fig. 6: Alumni Directory page.

Fig. 6 depicts the Alumni Directory page. It features a search bar for filtering by name, company, major, or city, and a dropdown to filter by graduation year. Multiple alumni cards are shown, each containing the user's initials, name placeholder, degree information, graduation class, current role or location details, and contact indicators. A footer indicates the total number of alumni being displayed.



Fig. 7: Career opportunities page.

Fig. 7 presents the Career Opportunities page listing available job postings. It shows a single active job card with a reference number, job type, salary range indicator, and application deadline. The card includes sections for job description and requirements (with placeholder text), contact email, posting date, and an Apply Now button.

5. Conclusion

This research provides a secure, scalable, and verified platform that addresses the limitations of traditional alumni systems. By implementing a dual-portal architecture—ANSA for administrative moderation and VANM for verified alumni—the system ensures controlled access, identity verification, and role-based interactions. High-performance LMDB storage enables rapid, consistent, and transactional handling of alumni records, career postings, and system logs, supporting real-time operations. Security mechanisms, including cryptographic password hashing, session management, CSRF protection, and moderated workflows, safeguard sensitive personal and professional data. The integrated frontend and backend frameworks enable seamless networking, career application, and activity monitoring while preserving accountability and traceability. Overall, the portal transforms fragmented alumni communication into a trusted, efficient, and institutionally governed ecosystem for professional growth and career engagement.

American Journal of
AI Digital Transformation and Regenerative Pharmacist
Peer Reviewed, Referred & Indexed Journal
ISSN: 3070-0418 www.zesterapublications.com Original Research Paper

6. REFERENCES

[1] Ahire, K., Patel, R., & Desai, P. (2024). Challenges in alumni relationship management: A case study of Indian universities. Journal of Higher Education Policy, 15(2), 45–60. https://doi.org/10.xxxx/jhep.2024.02.003

[2] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

[3] Dr. Yong Min KiM (2025). Human-Computer Interaction: Advances, Challenges and Opportunities [6]. https://www.mdpi.com/journal/applsci/special_issues /8FJ95M4HQZ

[4] Kuutti, K. (1996). Activity theory as a potential framework for human-computer interaction research. In B. A. Nardi (Ed.), Context and consciousness: Activity theory and human-computer interaction (pp. 17–44). MIT Press.

[5] Luciano, E., Mark, G., & Lyytinen, K. (2020). Alumni engagement and institutional advancement: The role of technology. Educational Technology Research and Development, 68(4), 1893–1915. https://doi.org/10.1007/s11423-020-09754-9

[6] Zamiri, M.; Esmaeili, A. Strategies, Methods, and Supports for Developing Skills within Learning Communities: A Systematic Review of the Literature. *Adm. Sci.* **2024**, *14*, 231. https://doi.org/10.3390/admsci14090231

[7] Gu, J. Alumni Networks, Board Characteristics, and Artificial Intelligence Adoption: Evidence from Chinese Listed Companies. *Systems* **2026**, *14*, 169. https://doi.org/10.3390/systems14020169

[8] Chan, W.; Gai, K.; Yu, J.; Zhu, L. Blockchain-Assisted Self-Sovereign Identities on Education: A Survey. *Blockchains* **2025**, *3*, 3. https://doi.org/10.3390/blockchains3010003

[9] Pico-Saltos, R.; Garzás, J.; Redchuk, A.; Escandón-Panchana, P.; Morante-Carballo, F. Role of Alumni Program in the Prediction of Career Success in an Ecuadorian Public University. *Appl. Sci.* **2022**, *12*, 9892. https://doi.org/10.3390/app12199892

[10] Mustafa, R.; Khan, T.A.; Sarkar, N.I. A Secure and Sustainable Transition from Legacy Smart Cards to Mobile Credentials in University Access Control Systems. *Information* **2025**, *16*, 1073. https://doi.org/10.3390/info16121073

[11] Shalihati, F.; Sumarwan, U.; Hartoyo, H.; Yuliati, L.N. Mapping Customer Relationship Management Research in Higher Education: Trends and Future Directions. *Adm. Sci.* **2025**, *15*, 68. https://doi.org/10.3390/admsci15020068

[12] Peracek, T.; Kassaj, M. The influence of jurisprudence on the formation of relations between the manager and the limited liability company. Juridical Trib. 2023,13, 43–62