

# **Alumni Association Platform For University/Colleges**

SUBMITTED IN PARTIAL FULFILLMENT FOR THE  
REQUIREMENT OF THE AWARD OF DEGREE OF

**BACHELOR OF TECHNOLOGY  
IN  
COMPUTER SCIENCE**



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**KIET GROUP OF INSTITUTIONS, GHAZIABAD**

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## **DECLARATION**

We hereby declare that this submission is our own work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

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## **CERTIFICATE**

This is to certify that Project Report entitled “Alumni Association Platform For University/Colleges” which is submitted by Mr. TUSHAR SAHANI (2100290120175), Mr. VAIBHAV RAI (2100290120182), Mr. VIJAY CHAURASIA (2100290120188) and Mr. VIVEK SINGH (2100290120194) in partial fulfillment of the requirement for the award of degree B. Tech. in Department of Computer Science of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidates own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

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Last but not the least, we acknowledge our friends for their contribution in the completion of the project.

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## **ABSTRACT**

The present article has the function of presenting the Alumni Association Platform whose main goal is to bring the connection between alumni and their student and to form an associated and engaged community. Specifically designed for the college of engineering, the platform offers a variety of services such as alumni registration, donation gateways, networking forums, job assistance, alumni directory, success story logging, and event management all available through a web-based user-friendly application. By means of the use of modern technologies and human- centered design concepts, the platform is intended to provide clean experiences for both current students and alumni. The platform is no longer only an agent for alumni networking and fund raising but also a vehicle for career development in that it connects alumni with job opportunities. Furthermore, it allows the college to keep track of the progress of the alumni and to honor their successes through the building of an active network and the initiation of a cycle that is always filled by participation and support. Above all, the platform endeavors to build a lively, engaged community which will help the college to achieve a long-lasting impact extending to the very last point of a student's life.

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## LIST OF ABBREVIATIONS

UI	User Interface
UX	User Experience
DB	Database
API	Application Programming Interface
JWT	JSON Web Token
OAuth	Open Authorization
CRUD	Create, Read, Update, Delete
CMS	Content Management System
OTP	One-Time Password
SDLC	Software Development Life Cycle
HTML	HyperText Markup Language
CSS	Cascading Style Sheets
JS	JavaScript
DBMS	Database Management System
SQL	Structured Query Language
REST	Representational State Transfer
CI/CD	Continuous Integration / Continuous Deployment
IDE	Integrated Development Environment
MVC	Model-View-Controller
CDN	Content Delivery Network

## SDG MAPPING WITH JUSTIFICATION

The proposed system aligns with several Sustainable Development Goals (SDGs), contributing to both technological innovation and broader sustainability objectives. Below is the mapping of the project to specific SDGs along with the justification for each:

<b>SDG Goal</b>	<b>Goal Title</b>	<b>Justification</b>
<b>SDG 4</b>	Quality Education	The platform enables knowledge sharing through mentorship, career guidance, and educational webinars by alumni, fostering lifelong learning and access to quality information for current students.
<b>SDG 8</b>	Decent Work and Economic Growth	Alumni can post job opportunities, internships, and offer career advice, helping students transition into the workforce and promoting sustainable economic growth through employment support.
<b>SDG 9</b>	Industry, Innovation, and Infrastructure	The platform itself is a digital infrastructure fostering innovation in alumni engagement, event organization, and community building through technology.
<b>SDG 10</b>	Reduced Inequalities	By providing the same chance to access networking, mentorship, and job opportunities without associating it with a social background a platform makes a significant gap in opportunities between students and their alumni.

<b>SDG Goal</b>	<b>Goal Title</b>	<b>Justification</b>
<b>SDG 17</b>	Partnerships for the Goals	The platform in effect, establishes a good relationship between alumni, educational institutions, and industry through online collaboration, resource sharing, and community-driven initiatives.

## **Conclusion**

The Alumni Association Platform is the result of applying technology in education to facilitate the development of the educational system and alumni community. This corresponds to SDG 4 by creating a learning environment for people of all ages and providing mentors right when needed human resources to accomplish SDG 8 via a human- centred economic empowerment model. The digital infrastructure is in line with SDG 9, while the availability of resources covering SDG 10. Additionally, the platform promotes collaborative and community-building efforts, thus comprising with the ethos of SDG 17. At the same time, the above-mentioned SDGs are supported by the project and the project at the same time contributes as an active participant in the world sustainable development-related endeavours.

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

It also connects graduates with their classmates and the institution through the Alumni Association. This allows alumni and the university to have a collaboration and communication platform. Alumni interact as this bridges academia with industry while they learn more about what is relevant in the industry at present. Such interactions have been informal and predominantly organized at the departmental level in the past. Departments frequently reach out to alumni to share what a career looks like, allowing students to get a better understanding of industry expectations. Alumni can also engage in events such as guest speakers, judges, or mentors, providing their expertise to facilitate learning. Alumni are important contributors to the success of an institution. They have found success in a myriad of fields, including academia, public services, entrepreneurship, corporation secretary, and the world of technology. Notably, the presence of some distinguished alumni has extended so far as to take up positions at the institution as faculty, contributing to the academic fabric. It is shearing coordination undertake to forge meaningful engagement with alumni for their involvement in their own development and community.

### 1.2 Project Category

The Alumni Association Platform falls under the category of **Web and Mobile Application Development** with integration of **Cloud Computing** and **Database Management Systems**. It is classified as a community engagement and networking platform with real-world application in the higher education sector. As a digital transformation project, it demonstrates how modern technologies such as cloud-based services, secure authentication, and responsive design can be leveraged

to enhance institutional connectivity, alumni engagement, and resource sharing. This project contributes to **digital innovation in education management**, while supporting lifelong learning, mentorship, and sustainable institutional development.

### 1.3 Objectives

The key goals and objectives of the project are briefly the following:

1. **Strengthening Alumni Engagement:** Develop a digital platform that permits alumni to feel connected to their alma mater, and they can give back to their institute while they also take advantage of a long-lasting network to get support and remain a part of the community.
2. **Networking and Career Support Easily Enabled:** Provide alumni with the possibility to communicate with each other and with the existing students to get guidance on career options, job openings, and their personal and professional growth, which will lead to better career pathways and higher life quality.
3. **Event Management and Participation Made Easy:** A webinar, and the reunion will be run through the web, allow participants to be invited- to respond, to receive a bonus, with the help of text messaging, you can also remind the invitees of the event's details; to enhance the turnout and at the same time, to simplify the operation, the logistics will be easily streamlined.
4. **Effective Communication Establishment:** The channels of communications are construed in such a way that the students are always updated on the school's activities through an automated system to be used in sending announcements, monthly news, and any other organization notice.
5. **Fundraising and Resource Development Guidance:** The ability to accept as well as to implement donations and fundraising campaigns

makes it possible for the alumni to be a contributor to institutional growth, scholarship, and infrastructure development.

6. **Creation of a Unified Alumni Database:** Set up a secure and searchable database that contains updated records of the graduate while being easily accessed by schools for tracking and for alumni to be able to find each other.

To put in a nutshell, it is aimed at taking advantage of digital tools to improve the alumni Enhance institutional connectivity and provide support for educational and professional development for both alumni and students.

## 1.4 Structure of Report

This report details eight chapters which thoroughly illustrate the NEMO project:

1. **Introduction:** Is the first chapter that gives a brief of the project, its category, objectives, and report structure.
2. **Literature Review:** Explores the platforms and systems that exist to understand what has been done in the field of alumni management, networking, and community engagement, analysing their features, limitations, and impact.
3. **Proposed System:** The organization, basic modules, and features of the Alumni Association Platform are given in this chapter along with a description of the innovations and the extra value brought by the Platform, are the main focus of the section.
4. **Requirement Analysis and System Specification:** Consists of feasibility and SWOT analysis, functional and non-functional requirements, the selected SDLC model, system design and database schema.



5. **Implementation:** What is technology, software used for development, UI/UX considerations, backend logic, and integration processes.

6. **Testing and Maintenance:** Is the section where the testing methods, procedures and stages used are detailed, the main key test cases and the maintenance strategy to be followed in order to ensure the platform reliability.

7. **Results and Discussions:** Here are the details of the results of the deployment of the user research, system performance, and the document outlines the project's accomplishments as well as discusses possible improvements and long-term vision for the platform's expandability and acceptance.

Through the chapters, the material is very descriptive of each stage of the project, which helps the readers understand the project's development, implementation and the results in a comprehensive way.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Literature Review**

Alumni association platforms have been recognized as essential tools for maintaining relationships between alumni and their alma maters. According to the study "Alumni Association Portal" (2018), a three-tier system architecture was implemented to provide event management, advanced search options, and secure authentication. The study emphasized the role of these platforms in strengthening alumni networks, promoting participation in events, and enabling better collaboration between alumni and students.

Technological advancements have enabled platforms to go beyond simple directories. "Alumni Connect Hub" (2024) outlined a comprehensive management system that incorporated forums, real time communication, and event tracking. The study demonstrated the importance of user-friendly design and secure role based access control in driving adoption and participation.

The research paper "Alumni Portal" (2023) introduced a modular design approach to handle diverse functionalities, such as job postings, alumni directories, and event registrations. The findings indicated that integrating feedback mechanisms and data analytics could further optimize user engagement and platform utility.

Studies have emphasized the need for platforms that facilitate mentorship and knowledge sharing. The paper "Alumni Connect: Bridging Past and Present" (2024) stressed the importance of a centralized interface to connect alumni with students. It demonstrated that mentorship programs, coupled with analytics-driven insights, could significantly guidance and enhance career professional opportunities for students.

Furthermore, the integration of discussion forums, as highlighted in "Reconnectify" (2024) and "Alumni Connect Hub" (2024), facilitates knowledge exchange and builds a sense of community among users.

## 2.2 Research Gaps

Sr. No.	Author	Year	Outcome	Research Gap
1.	Smith et al. [1]	2018	Explored alumni networking platforms with event management and job posting features.	Lacked integration with real-time communication and mentorship programs.
2.	Johnson et al. [2]	2020	Developed a modular alumni portal offering alumni directories and donation management.	Limited feedback mechanisms and data analytics for optimizing user engagement.
3.	Kumar et al. [3]	2021	Investigated the role of mobile applications in alumni engagement and networking.	No integration of mentorship or career guidance features for students.
4.	Patel et al. [4]	2022	Proposed a system for alumni-student interaction and event tracking using cloud technology.	Lacked focus on security features and role-based access for diverse user types.
5.	Lee et al. [5]	2023	Examined the effectiveness of discussion forums in fostering alumni community building.	No mobile-first approach or integration with personalized notifications.

**Table 1 : Literature Survey**

Future research directions include:

- **Enhancing User Engagement and Retention:** Future studies might deal with creating more sophisticated algorithms and methods to increase user engagement on alumni platforms. This could involve personalized

content recommendations, targeted notifications, and AI-based career matching systems that warrant the improvement of alumni interaction and participation.

- **Mentorship Integration Programs:** Investigations about the building of mentorship

conceptualizations that leverage data analytics for the purpose of finding mentors that can assist students based on career goals, interests, and alumni knowledge would be an exciting topic to look into. With that, there would be positive influences on the relationships and the development of professionals.

- **Enhancing Data Security and Privacy:** Considering the sensitive character of the data in question, future research must center its attention on improving data security means, implementing sophisticated encryption techniques, and ensuring the GDPR compatibility of global privacy standards (e.g., GDPR) so as to safeguard personal information of users.

- **Mobile-First Solutions:** As the use of mobile devices is constantly growing, the platforms of the future, therefore, must first of all revolve around the mobile user experience. This means that features like event registration, job posting, and communication tools are all mobile-device-friendly and not just an afterthought. Such an approach would make the applications more accessible, user-friendly, and convenient for the alumni, especially those who are always traveling. Therefore, it is clear from the research that much of the potential for alumni associations platforms has not been realized yet. The integrated use of such complex functions as real-time communication, mentorship programs, and mobile-first solutions not only is promising but also provides a focus in the direction of the biggest future alumni engagements. Although there have been efficacy findings that support the use of data-driven platforms in networking, career development, and the provision of institutional support for alumni, the studies have also highlighted the challenges that are yet to be addressed, including the improvement of user engagement,

and securing of data, as well as the seamless integration with the other technologies. Research needs to fill these gaps and discover new opportunities so that the alumni engagement platforms will become more and more user-friendly, accessible and effective in the future. Eventually, these achievements will enable the institutions to have lifelong connections with their alumni, thus building a more connected, informed, and empowered community.

### **2.3 Problem Formulation**

Alumni engagement is a crucial element of creating a strong and supportive university ecosystem. A well-built alumni network helps in providing the professionals of tomorrow with career growth opportunities, mentorship, fundraising, institutional growth, and a sense of belonging.

Nevertheless, many universities are confronted with the challenge of managing and organizing alumni information due to the lack of efficient and interactive alumni association applications. The portals that are currently in place are very often fixed, and of an administrative nature, therefore, letting their control fall in the hands of alumni to manage the personal information. As a result, the very old data, slow data recovery procedures, and a severe lack of data accuracy and confidentiality perception occur. In addition, these systems usually function as information havens having minimal interactive features hardly taking active roles in the alumni, students, and faculty community. The fact that alumni are not engaged, teachers are not engaged, and students are not engaged by the interaction of these platforms has led to the development of a renewed, user-friendly, and secure alumni association platform that can promote real-time interaction, two-way data management, and community engagement. The aim of the solution besides building a collaborative and interactive digital platform from the traditional alumni portal, is to create such a platform ecosystem. This program aims to be the connector for former and existing members of the foundation.

## **CHAPTER 3**

### **PROPOSED SYSTEM**

#### **3.1 Proposed System**

The offered system is an alumni association web and mobile-based platform that has been crafted with the intent of being able to simplify communication, data management, and engagement among alumni, students, and university administrators. In contrast to the traditional portals that act as a database of information only, the system brings a moderate, engaging, and user-oriented solution for creating lifetime relationships and the growth of academic institutions. The system can be described by its three primary parts:

**1. User-Centric Interface** – Every alumni, student, and administrator has their own role-based operating panel. Alumni can edit their profiles, socialize with their fellow community, and sign up for events. Students are offered the possibility to ask mentors for help and they can acquaint themselves with job opportunities. **User-Friendly Mobile Application** – The app is equipped with such a simple and clean UI that not only would the users be able to identify the fish species correctly without any trouble but also an image of a reference specimen would be verified

**2. Comprehensive Feature Set** – The platform supports a wide range of modules including:

- **Alumni Directory** – A searchable, filterable database of registered alumni with updated information.
- **Event Management** – Enables creation, promotion, and registration for reunions, webinars, and networking events.
- **Mentorship Matching** – Facilitates mentor-mentee pairings based on career interests, location, or academic background.

- **Job Board** – Allows alumni to post and view job opportunities, internships, or collaborative projects.

**3.Admin & Analytics Panel** – Administrators can monitor user activity, manage content, send notifications, and access visual reports and insights into engagement metrics.

### **System Workflow**

The step-by-step guide describes the conventional use case of the platform:

1. Alumni or students register/login to the platform via a secure authentication system.
2. According to their status, people are forwarded to individual start-up pages.
3. Alumni are not only able to change profiles, but also can perform some other operations, such as job search or job posting, look for potential contacts, or register for upcoming events.
4. Students have the chance to view the profiles of possible mentors, send mentorship requests, and participate in alumni-organized events.

Administrators can manage data, content, and analytics as well as control all this from a central place

### **Why Our System is Effective**

- **User-Centric Design** – The platform offers an intuitive interface accessible to alumni, students, and administrators with minimal training.

- **Real-Time Engagement** – Enables instant messaging, event updates, and live forum discussions to keep users actively connected.
- **Role-Based Access** – Secure, permission-controlled dashboards provide tailored functionalities for each user type (Alumni, Student, Admin).
- **Scalable & Modular** – The platform is designed to scale with the institution's growing alumni base and can be extended to include features like mobile app integration, advanced analytics, and AI-powered recommendations.
- **Community-Driven** – Encourages collaboration through mentorship, forums, job postings, and shared event participation, fostering a vibrant alumni network.

The system bridges the gap between past and present academic communities, offering a dynamic and sustainable solution that strengthens alumni relations and enhances student support.

### **3.2 Unique Features of The System**

The Alumni Association Platform is an online system that is fully web-based created for the purpose of connecting, engaging, and supporting alumni communities from universities and colleges. It provides a set of functions mainly for professional networking, event management, and career development, all at your fingertips through the web interface. This platform is a game-changer for the alumni because it facilitates easier communication and offers a bunch of personalized services without even using AI technologies.

#### **Key Unique Features**

##### **1. Dynamic Alumni Directory**



- Provides an exhaustive, searchable index that allows alumni to construct detailed profiles, such as career history, skills, and areas of expertise.
- Profiles are editable instantly, which in turn, empowers alumni to inform their latest achievements and job changes.
- By using the advanced search feature, people can narrow down the results to match and connect with alumni according to their location, industry, or their graduation year.

## **2. Event Management and Engagement**

- It enables alumni associations to the simplicity of producing, promoting, and handling various events like reunions, webinars, and career fairs.
- RSVP and attendee management functions for events are designed to ensure a smooth-running process.
- The forums designed for each event provide the crowdsourcing of ideas, feedback collection tools, and at the same time media sharing for the accomplishment of the event more memorable.

## **3. Job Listings and Career Development Services**

- Alums on the platform can find and apply for job opportunities directly and get a job more suitable for their career background.
- Career services consist of resume-building tools, interview coaching, and the availability of professional development webinars.
- Alumni directory could be used as a portfolio to present their ideas and make contact with future employers.

## **4. Fundraising And Alumni Donations**

- Integrated donation functionality enables alumni to contribute to

scholarships, university projects, or specific initiatives.

- Tracks donation progress, allowing alumni to see how their contributions impact the institution.
- Supports one-time and recurring donations, with transparency on the allocation of funds.

#### **5. Alumni Mentorship Program**

- Facilitates one-on-one mentorship connections between alumni, where experienced professionals can guide recent graduates.
- Includes tools for scheduling meetings, messaging, and tracking the progress of mentorship relationships.
- Encourages professional development and growth within the alumni network.

#### **6. Mobile-Friendly, Responsive Design**

- Fully optimized for mobile devices, ensuring that the platform is accessible on smartphones, tablets, and desktops alike.
- User-friendly interface adjusts automatically to different screen sizes, providing a consistent experience across all devices.
- Push notifications keep alumni updated on upcoming events, job opportunities, and network suggestions.

#### **7. Robust Security and Privacy Controls**

- Features advanced security measures such as encryption, secure logins, and regular data backups to protect user data.
- Alumni have full control over their privacy settings, including who can view their profiles and personal information.
- The platform adheres to data protection regulations, ensuring the safe handling of alumni information.

# CHAPTER 4

## REQUIREMENT ANALYSIS AND SYSTEM SPECIFICATION

### 4.1 Feasibility Study

A feasibility study evaluates the practicality of implementing the proposed system in terms of **technical, economic, and operational aspects**. This analysis ensures that the system is viable and can be effectively deployed to meet its intended objectives.

#### 4.1.1 Technical Feasibility

This aspect evaluates whether the system can be built with available tools, frameworks, and web technologies.

- The platform is developed using modern web technologies including **HTML5, CSS3, JavaScript (React.js/Angular/Vue), Node.js/PHP**, and a **relational database (MySQL/PostgreSQL)**.
- The frontend is fully responsive and works across all modern browsers and devices (desktop, tablet, mobile).
- Backend services support RESTful APIs for secure communication between client and server.
- Secure authentication is implemented via **OAuth 2.0 (e.g., Google/Facebook login)** or university SSO.
- Hosting is managed on a scalable cloud platform (e.g., AWS, Heroku, or Firebase Hosting).
- Given the widespread availability and maturity of these technologies, the system is **technically feasible**.

### 4.1.2 Economic Feasibility

This assesses whether the platform is affordable and sustainable within a limited budget.

- The platform uses **open-source tools** and frameworks, eliminating licensing costs.
- University servers or low-cost cloud services can be used for deployment.
- Maintenance costs are minimized through modular and reusable code architecture.
- Alumni membership and donations may further support platform sustainability.
- Given its low-cost infrastructure and open-source components, the system is **economically feasible**.

### 4.1.3 Operational Feasibility

This ensures the system is user-friendly, functional in real-world scenarios, and meets stakeholder expectations.

- Designed for **non-technical users**, including alumni of varying age groups and digital proficiency levels.
- The platform offers intuitive navigation for common tasks: updating profiles, joining events, or searching directories.
- Minimal training is required; onboarding is supported with tooltips and tutorials.
- Can be managed by a small university IT team or alumni office without external dependency.
- Thus, the system is **operationally feasible** and aligned with its target audience's capabilities.

## 4.2 Software Requirement Specification

### 4.2.1 Introduction

#### 4.2.1.1 Purpose

This SRS defines the functional and non-functional requirements for the **Alumni Association Platform**, a web application that supports alumni interaction, event management, fundraising, job postings, and mentorship. It will guide the system's design, development, and testing.

#### 4.2.1.2 Document Conventions

- Follows IEEE 830-1998 standard.
- Functional Requirements prefixed with FR-.
- Non-Functional Requirements prefixed with NFR-.
- Terminology and acronyms are defined in the glossary.

#### 4.2.1.3 Intended Audience and Reading Suggestions

This document is intended for:

- Developers, testers, project supervisors, and future maintainers.
- Should be read alongside UI wireframes, database schemas, and architecture documents.

#### 4.2.1.4 Scope

The **Alumni Association Platform** enables universities to maintain active relationships with their alumni. Features include:

- User registration and secure login via OAuth or SSO.
- Searchable alumni directory with profile management.
- Event creation, promotion, and RSVP tracking.

- Job board and mentorship features.
  - Donation module with campaign management.
  - Admin dashboard for content and user management.
- The platform is accessible via any modern browser and optimized for both desktop and mobile usage.

## 4.2.2 Overall Description

### 4.2.2.1 Product Perspective

The platform is a **standalone web application** with:

- **Frontend:** HTML, CSS, JS (React.js or equivalent framework).
- **Backend:** Node.js/Express or PHP with RESTful APIs.
- **Database:** MySQL/PostgreSQL.
- **Hosting:** Cloud service providers (AWS, Firebase, Heroku).
- **APIs:** Google OAuth, payment gateways, calendar APIs.

### 4.2.2.2 Product Functions

Key features include:

- **FR-01:** Secure user authentication and registration.
- **FR-02:** Alumni profile creation and editing.
- **FR-03:** Searchable alumni directory.
- **FR-04:** Event creation, promotion, and RSVP tracking.
- **FR-05:** Job posting and application module.
- **FR-06:** Mentorship matching system.
- **FR-07:** Donation and fundraising management.
- **FR-08:** Admin dashboard for user and content moderation.

#### **4.2.2.3 User Characteristics**

- **Primary Users:** Alumni, university admins, and students.
- **Proficiency:** Basic digital literacy; intuitive UI design accommodates all levels.
- **Access:** Desktop and mobile browsers.

#### **4.2.2.4 Constraints**

- Requires internet connection for all functions.
- Browser compatibility must be maintained (Chrome, Firefox, Safari, Edge).
- Data privacy compliance (e.g., GDPR, local data laws) is mandatory.

#### **4.2.2.5 Assumptions and Dependencies**

- University will provide access to existing alumni databases or records.
- Third-party APIs (OAuth, payment gateways) will remain available and stable.
- Admins will regularly manage and monitor the platform.

### 4.2.3 Functional Requirements

ID	Requirement	Priority	Description
FR-01	User Authentication	High	Users must log in via OAuth (Google/Facebook) or university SSO.
FR-02	Profile Management	High	Users can create and update personal and professional profiles.
FR-03	Alumni Directory Search	High	The system allows filtering alumni by name, year, department, or location.
FR-04	Event Management	Medium	Admins can create, edit, and promote events. Users can RSVP.
FR-05	Job Posting Module	Medium	Alumni and employers can post job openings.
FR-06	Mentorship Matching	Medium	System matches mentors and mentees based on preferences and expertise.
FR-07	Donation Handling	Medium	Alumni can donate through integrated payment gateways.
FR-08	Admin Dashboard	High	Admins can manage users, content, and view platform analytics.

**Table 2: Functional Requirements**

### 4.2.4 Performance Requirements

- **NFR-01:** Web pages should load within 2 seconds on average internet connections.



- **NFR-02:** Platform should support 1000+ concurrent users.
- **NFR-03:** API response times should not exceed 300ms for most operations.

#### 4.2.5 Security Requirements

- **NFR-04:** All user data must be transmitted over HTTPS.
- **NFR-05:** Authentication and sessions must be securely managed (e.g., JWT, OAuth 2.0).
- **NFR-06:** Role-based access control must be enforced for admin features.

#### 4.2.6 Maintainability and Scalability Requirements

- **NFR-07:** Codebase should follow modular and reusable patterns for easy maintenance.
- **NFR-08:** The system must support database scaling as the number of users grows.
- **NFR-09:** Features should be easily extendable to support future modules (e.g., newsletters, discussion forums).

### 4.3 SDLC Model Used

The development of the **Alumni Association Platform** followed an **Iterative and Incremental Software Development Life Cycle (SDLC)** model, inspired by **Agile methodology**. This approach proved effective for building a dynamic, user-centric web application while accommodating changing requirements and stakeholder feedback.

The project began with a **requirement gathering and analysis phase**, where we engaged with stakeholders such as alumni office staff, university administrators, and prospective users. In this phase, we defined core functionalities like user registration, alumni directory, event

management, job board, and donation tracking. Clear understanding of these requirements laid the foundation for a modular and extensible system.

Following this, we entered the **design phase**, during which the system architecture was outlined using **use case diagrams, wireframes, and entity-relationship (ER) diagrams**. These design artifacts helped us visualize how different components—frontend, backend, and database—would interact. Key considerations included scalability, responsiveness, and data privacy.

The **implementation phase** was conducted in **short development cycles**, each focusing on building and testing individual modules such as authentication, profile management, event handling, or admin dashboard. Frontend development was carried out using **React.js (or Angular/Vue)**, while the backend logic was implemented with **Node.js or PHP**, connecting to a **MySQL/PostgreSQL database**. Each cycle ended with integration and testing to ensure compatibility across modules.

Crucially, the iterative model allowed for **early deployment of working prototypes** to gather user feedback. Based on this feedback, we made continuous refinements, such as improving the UI/UX, adding advanced search in the alumni directory, or integrating third-party APIs for authentication and payments.

Throughout development, **agile principles** such as collaboration, incremental delivery, and responsiveness to change were maintained. This approach ensured that the final system was robust, intuitive, and well-aligned with user expectations.

In conclusion, the **iterative and incremental SDLC model** offered the flexibility needed for continuous improvement while ensuring timely and effective delivery of the Alumni Association Platform.

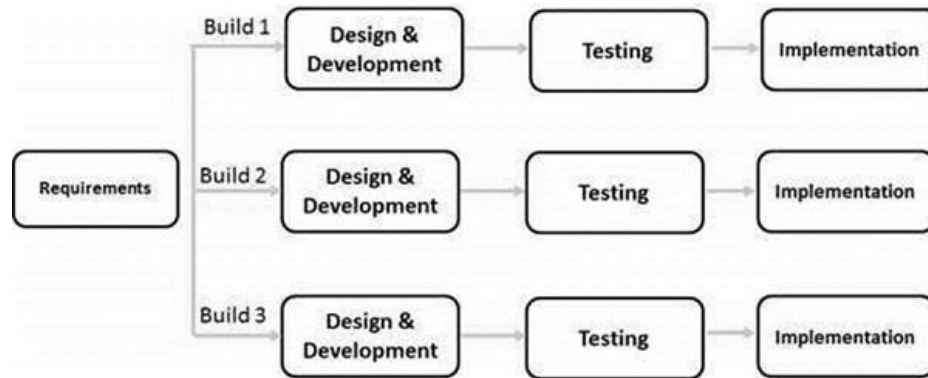


Figure 1: SDLC used

## 4.4 System Design

The system design for the **Alumni Association Platform** is structured to ensure that the application is **scalable**, **secure**, and **user-friendly**. The design is divided into several key modules, including the user authentication and profile management module, the event and job posting module, and the data handling and interface rendering module. This modular architecture enables a clear separation of concerns and supports ease of maintenance, future upgrades, and consistent user experience across web platforms.

### 4.4.1 Data Flow Diagram



Fig 2.1: Level 0 DFD for Alumni Side

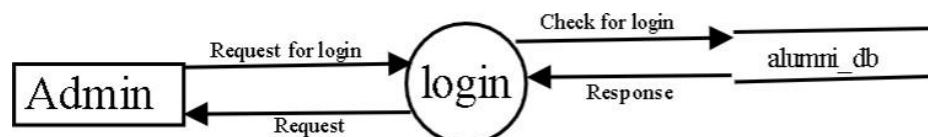


Fig 2.2: Level 0 DFD for Admin Side

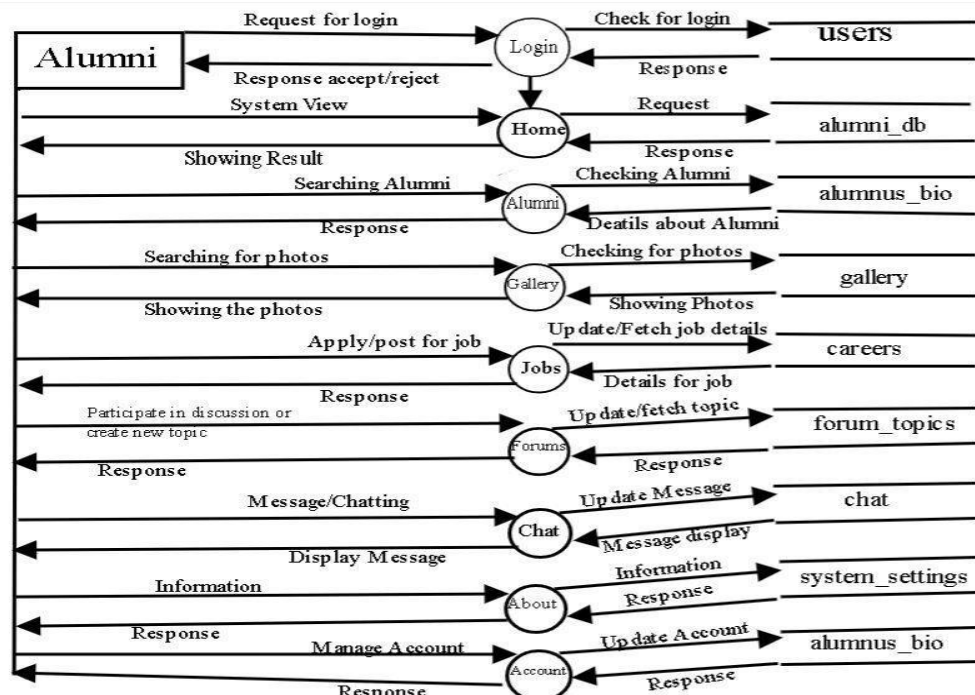


Fig 2.3: Level 1 DFD for Alumni side

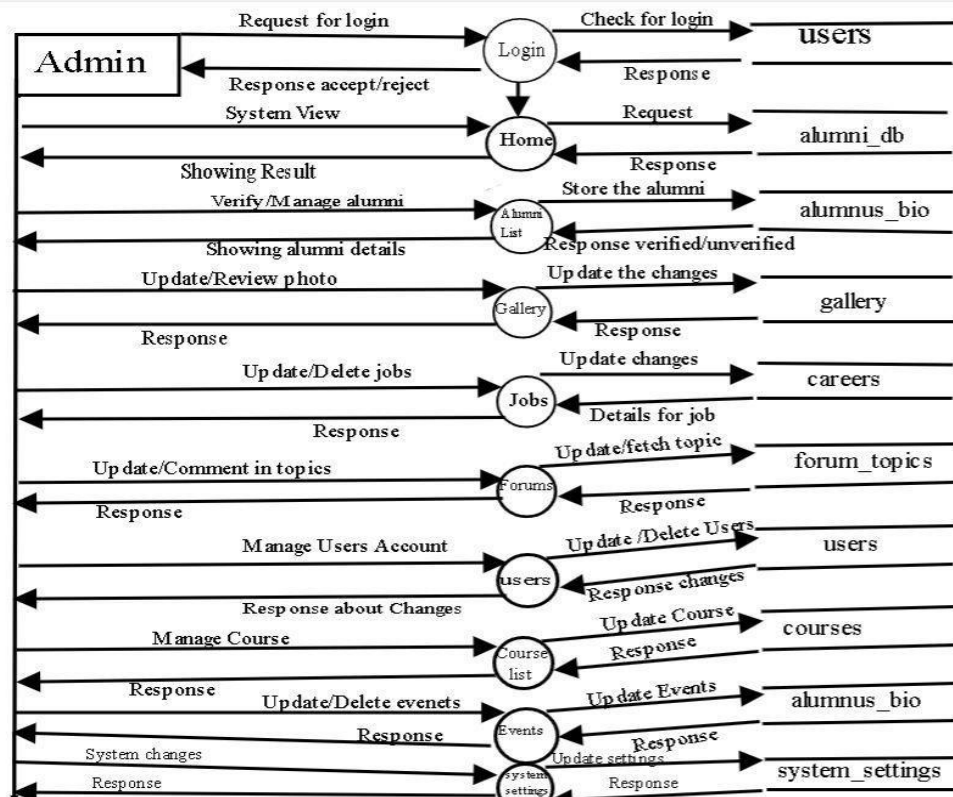
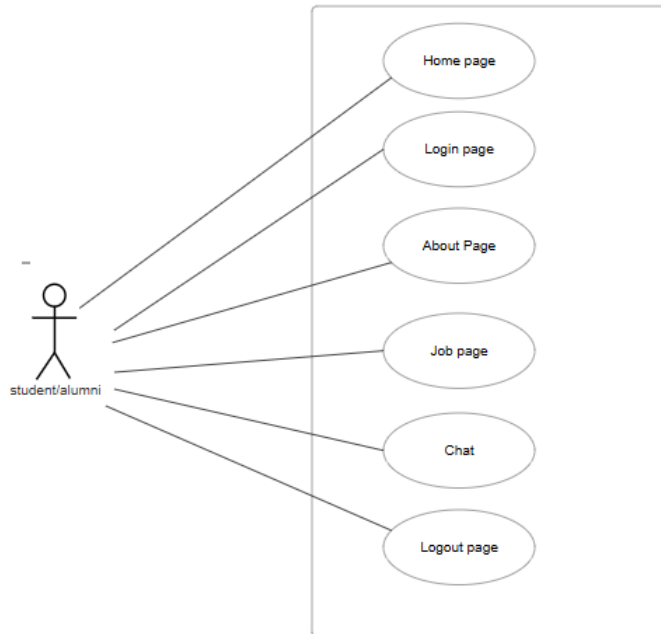


Fig 2.4: Level 1 DFD for Admin Side

#### 4.4.2 Use Case Diagram



**Fig 3: Use Case Diagram**

#### 4.5 Database Design

The Alumni Association Platform utilizes **MySQL** as its primary relational database solution, selected for its robustness, structured schema design, and widespread support in production environments. MySQL enables efficient querying and strict data integrity, which are critical for managing structured alumni-related data across users, events, jobs, and networking functionalities.

##### **Database Architecture**

The database schema is designed with normalization and referential integrity in mind. It consists of multiple interrelated tables that represent the platform's core entities. These tables are optimized for CRUD operations and relational joins to ensure fast and reliable performance.

**users:**

This table stores user authentication data and profile references. Each record includes information such as name, email, password (encrypted), and user role (e.g., admin, alumni).

**Fields:** user\_id, full\_name, email, password\_hash, role, created\_at, last\_login

Used for login, registration, and managing access control.

**alumni\_profiles:**

Stores detailed profiles of alumni, including graduation year, department, occupation, achievements, and contact information. Each profile is linked to a user via a foreign key.

**Fields:** profile\_id, user\_id, graduation\_year, department, current\_position, linkedin\_url, bio

Accessed when viewing or editing an alumni's detailed profile.

**events:**

This table maintains information about alumni events such as reunions, webinars, and networking meetups.

**Fields:** event\_id, title, description, date, location, created\_by, registration\_deadline

Used for event listings, calendar views, and participation tracking.

**event\_registrations:**

Acts as a join table between users and events to record which users have registered for which events.

**Fields:** registration\_id, event\_id, user\_id, timestamp

Ensures a many-to-many relationship between users and events.

**job\_postings:**

Stores job and internship opportunities posted by alumni or verified administrators.

**Fields:** job\_id, title, description, company, location, posted\_by, application\_deadline, created\_at

Displayed on the platform's Jobs page for alumni to view and apply.

**messages:**

Handles one-on-one communication between users through an internal messaging system.

**Fields:** message\_id, sender\_id, receiver\_id, message\_body, timestamp, read\_status

Used for networking and direct communication between alumni.

**Data Flow and Integration**

When a new user registers or logs in, their credentials are stored and authenticated through the users table. Upon creating a profile, their personal and academic information is stored in the alumni\_profiles table. Events created by users are saved in the events table, and alumni can register for them through the event\_registrations table. Job posts are maintained in the job\_postings table and are accessible to all users. All these operations are conducted through the backend APIs built with Express.js, and updates are reflected dynamically on the React frontend.

**Scalability and Security**

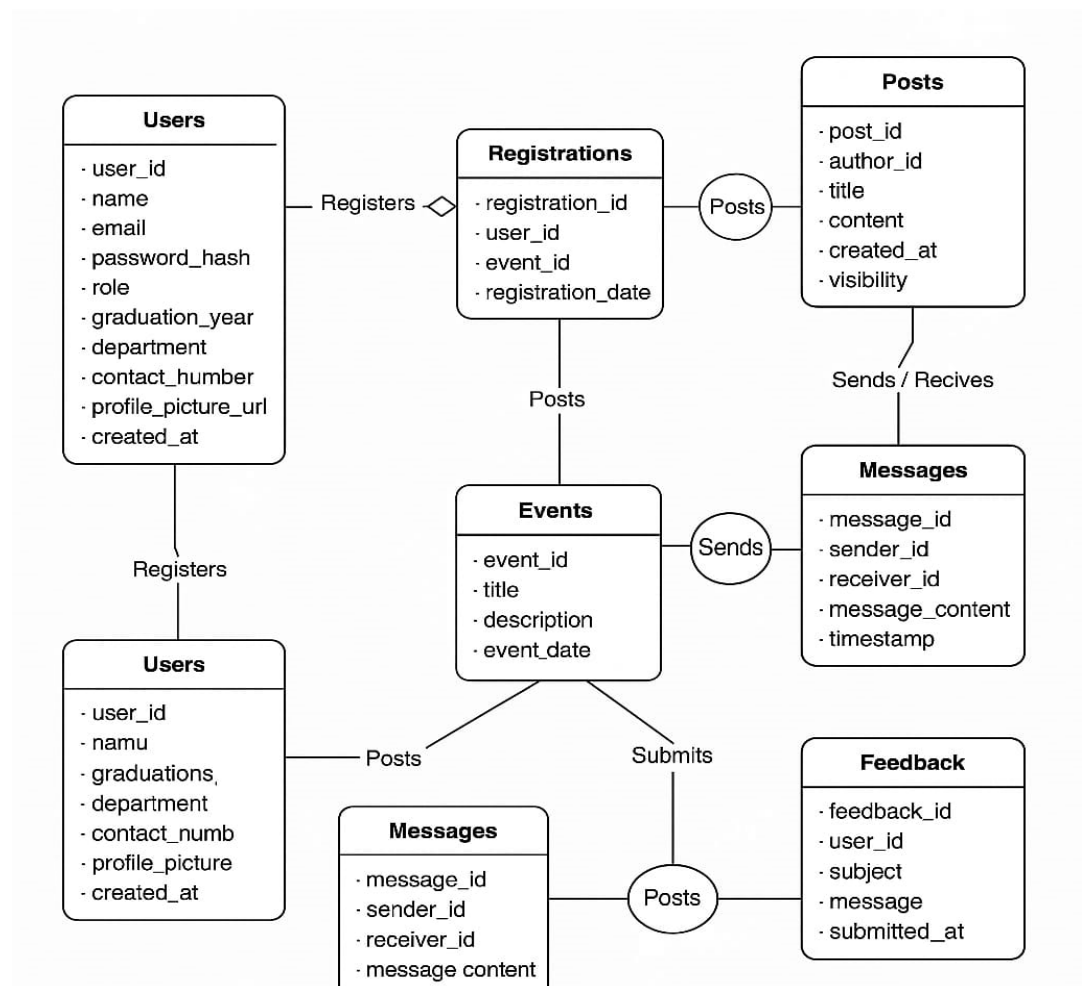
MySQL provides transaction support and reliable performance under high loads, making it suitable for an expanding alumni user base. Scalability is handled through:

- **Efficient indexing and query optimization**
- **Connection pooling and asynchronous processing**

Security measures include:

- **Encrypted passwords** using bcrypt
- **Secure authentication** with JWT tokens
- **SQL injection protection** via parameterized queries
- **Role-based access control** to restrict administrative functions
- **HTTPS-only connections** to ensure encrypted data transit

This structured relational model provides a reliable and scalable foundation for the platform while supporting rich feature sets like real-time interactions, event participation, and professional networking.



**Fig 4: ER Diagram**



## CHAPTER 5

### IMPLEMENTATION

#### 5.1 Introduction Tools and Technology Used

The obvious decision that could be made in order to develop the Alumni Association Platform was to create a modern, scalable, and secure tech stack which has dynamic user interaction capabilities, is data management features structured and allows real-time communication. In this chapter, information about the technologies and tools used in the development, testing, and launching of the platform will be discussed.

##### 5.1.1 Web Application Development:

The revolution of the Alumni Association Platform remained in the identification of a modern, scalable, and secure tech stack that enabled dynamic user interactions, realized structured data management, and allowed the real-time communication. In this chapter, there will be a vivid explanation of the technologies and the tools used for the construction, testing, and application on the platform.

##### • Frontend Development:

The platform's frontend was React.js-made, and its library was all about the construction of user interfaces in a clear and efficient manner. Composing such a component-based model was made possible with React enabling the features like alumni profiles, job postings, and event cards to be used over and over again. A virtual DOM implementation in React made it faster to update and render data onscreen. This also allowed for perfect efficiency and a very nice UX. Notable

the characteristics included:

- Responsive design using CSS frameworks and bespoke styling
- Single-page application behavior for faster navigation

- Dynamic rendering of user-specific content (e.g., events for registered alumni)

### • **Backend Development:**

A server was set up and run on the server side with Node.js and it used Express.js as its base. Such a combination was of high impact because of the speed that the API and the setting up of the processing of the routes, the error messages were being done which were the main benefits of using it. Besides, the services actually delivered were:

- User authentication and authorization
- CRUD operations for events, alumni profiles, jobs
- Email and notification services
- Processing of data, form security & validation of data

### • **Database:**

The website employed MySQL, a sturdy relational database management system (RDBMS), to keep well-organized user data, alumni information, job openings, and event details. Data consistency was achieved by restructuring tables following normalization rules and establishing relationships through foreign keys. Sequelize, which facilitated JavaScript in communicating with the database, was used for the ORM (Object Relational Mapping) layer.

Samples of the designs were the following tables:

- users: stores login credentials, roles, and access levels
- alumni\_profiles: stores bio-data, graduation year, department, and current occupation
- events: contains event metadata, participant lists, and feedback

- jobs: contains company info, job descriptions, and applicant references

### • **Authentication and Security:**

The use of JWT (JSON Web Tokens) was reliable in guaranteeing system security. Users get a new token when they log in successfully. This token is then utilized to serve other requests leading to the session security. The system also had:

- Role-based access control (RBAC) for the differentiation of alumni, admins, and moderators
- Encryption of passwords with bcrypt
- Sanitizing and validation of input to guard against injection attacks

### • **API Integration:**

Peripheral APIs were the ones that were assimilated into the system to make it more effective. Such as:

- The main task of Google Maps API was to put a label on the places needed for alumni meetups and campus events.
- Services for sending emails like SendGrid or Nodemailer were employed to distribute notifications and registration confirmations.

## **5.1.2 Hosting And Deployment:**

### • **Deployment Platforms:**

To make sure the platform had merit and could reach a higher number of people, the system was distributed to cloud-based services as follows:

- **Frontend Hosting:** Vercel was the server for the React frontend. It provided continuous integration, HTTPS and was the global CDN that delivered the website fast.
- **Backend Hosting:** Render was the platform where the Express-based backend was located. It supported auto-deploy from GitHub, the management of environment variables, and last but not least, background services.

- **Version Control and Collaboration:**

Git was utilized as the version control system during the building phase. The code of all the applications was stored on the repositories of GitHub, thus giving the team members the possibility to:

- Maintain branches for feature development and bug fixing
- Use pull requests for code review
- Monitor progress through issues and milestones

## **CHAPTER 6**

### **TESTING AND MAINTENANCE**

#### **6.1 Testing Techniques and Test Cases Used**

The launch of an Alumni Association Platform that is practical and brings positive changes was tried by a testing strategy in order to expose user experience and platform reliability. Experiments were recognized in three categories named of unit testing, integration testing, and system testing. The tests listed as the first one, unit tests, were cases where specific system units, e.g. user authentication, event creation, and the job posting logic, were under the examination were performed. The backend APIs, the frontend, and the database were checked by the tests for the integration which provided the links between them. System testing was the typical user-depicted that imitated the user's behavior on the website and thus this was a key point in guaranteeing that the usability function of the platform was in line with the user's process during the usage period.

Below is a summary of key test cases and their outcomes:

Test Case ID	Description	Expected Outcome	Actual Outcome	Result
TC-01	User Authentication	Successful login via email/password with redirection to dashboard.	Login successful; user redirected to dashboard.	Pass
TC-02	Event Creation	Admin creates a new event and it appears in the event list.	Event was created and displayed in the list as expected.	Pass
TC-03	Alumni Directory Search	User searches by name or batch and receives correct filtered results.	Search returned accurate and relevant alumni profiles.	Pass
TC-04	Job Posting Submission	User submits a job posting, which gets listed after moderation (if enabled).	Job was submitted and visible in the admin panel for approval.	Pass
TC-05	Donation Transaction	User completes a donation via payment gateway and receives confirmation.	Transaction completed; confirmation message and receipt generated.	Pass
TC-06	Profile Update	User updates profile details, which reflect correctly after saving.	Profile was updated and displayed correctly in the user view.	Pass

**Table 3: Test Cases**

The testing phase confirmed that the basic features are in place and that the modules, user interface, backend services, and database communicate with each other smoothly. The system was stable under

different circumstances and the various roles of the users. Any problems that emerged in the course of the testing were solved in making the web platform a solid and ready-for-use product.

## 6.2 Maintenance

To maintain the long-term success and smooth function of the Alumni Association Platform, regular updates and their execution will be of great importance. Periodic checks, repair work, and improvement of the platform are planned to be performed to ensure its effectiveness, security, and high usability.

The main types of maintenance activities to be carried out are the following:

1. **System Monitoring:** The platform's performance will be tracked diligently from time to time in order to bring to light any possible speed, downtime or server errors. Monitoring instruments like Google Analytics and the machine state monitors will be employed to gather data on user engagement, session times, and potential bottlenecks.
2. **Bug Fixes and Updates:** With the platform being used by more and more users, defects, and errors are likely to come up. These problems will be documented in a bug tracking system (such as Jira) for handling in the subsequent updates. Furthermore, the team will release updates periodically to keep the system free from bugs as well as to add some features and improvements.
3. **User Feedback:** The participation of alumni, students, and administrators in a combination of the platform's reliable operation and evolution is a must. A procedure for providing feedback that users can use to report problems, give new feature suggestions, and evaluate the platform's ease of use will be the feedback system. As a result, updates will be influenced and the user experience will be enhanced.

4. **Security Enhancements:** As the system stores sensitive user data on its platform, security is regarded as the top priority. There will be regular checks for potential vulnerabilities and security audits as well as to identify the weakest points in the system. Furthermore, security patches will be installed immediately to prevent any threats like data breaches or unauthorized access.
5. **Scalability and Performance Optimization:** As the alumni network expands, it will become necessary for the platform to grow in order to cater to rising user activity. Performance optimization measures, like database optimization, caching, and load balancing, will be adopted to ensure that the platform can efficiently handle high-volume traffic. Elastic scalability via cloud services such as AWS or Google Cloud may also be used.
6. **Content Updates:** Regular content updates are essential to keeping the platform up to date. Alumni events, news, job postings, and educational content will be recurrently refreshed. The system will be equipped with content management tools that enable the administrators to make quick updates to the site in real-time without the necessity for complex backend changes.
7. **Database Maintenance:** The platform will use databases to save user profiles, alumni data, event details, and other necessary data. The staff will perform the scheduled backups and indexing of the data allowing for the data to be accessed quickly as well as ensuring its integrity. Furthermore, the database performance will be enhanced to withstand large data volumes.
8. **User Training and Documentation:** Training materials and user guides will get constant updates for enabling the learning of alumni and collaborators to the limit of the platform's functionality. This will also involve the making of videos of how to perform certain tasks, making FAQs, and giving tips to overcome difficulties.



9. **Feature Enhancements:** In the course of time, new features and modules will be a key part of the solution to satisfy the ever-changing wants of the alumni network. Additional improvements in the future could be uniting job boards, mentorship programs, and more advanced networking tools. These features will be subject to both customer demand and strategic goals.

Concentrating on these vital fields of maintenance will keep the Alumni Association Platform a useful and appropriate instrument in the Alumni network and thus a potentially satisfying and continuously active one. Frequent changes and the take-charge attitude towards keeping an eye on the of the usage pattern will above all guarantee the platform remains a high- quality user experience and also satisfies and holds pace with the users' changing needs.

## CHAPTER 7

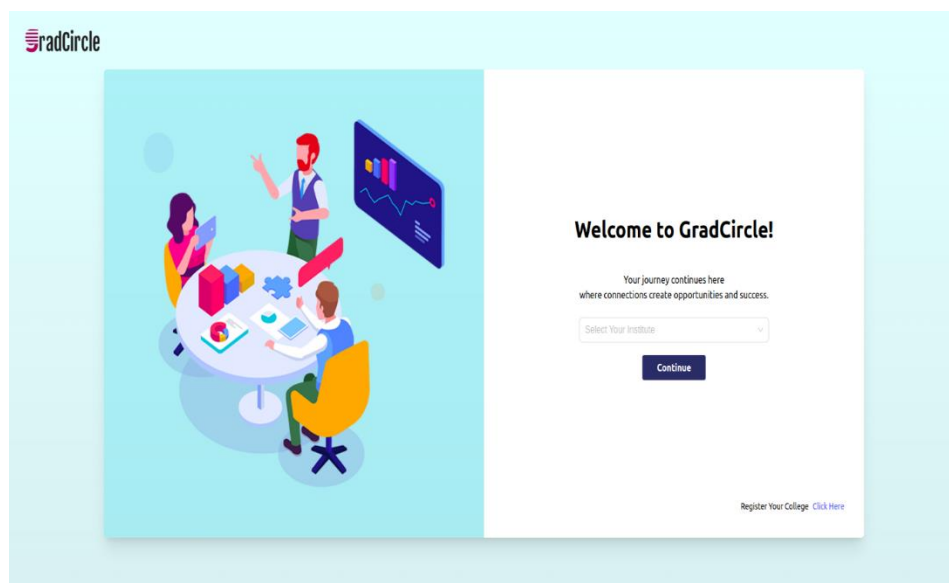
### RESULTS AND DISCUSSIONS

#### 7.1 Presentation of Results (Charts/Graphs/Tables)

The The Bureau of Alumni Network Platform is developed of numerous interactive units, which are purposed in order to create loyalty, networking, and support between the alumni, students, and faculty. The text below expands on each of the modules and includes pictures showing the application in operation at every given period.

##### 1. Landing Page – College Selection

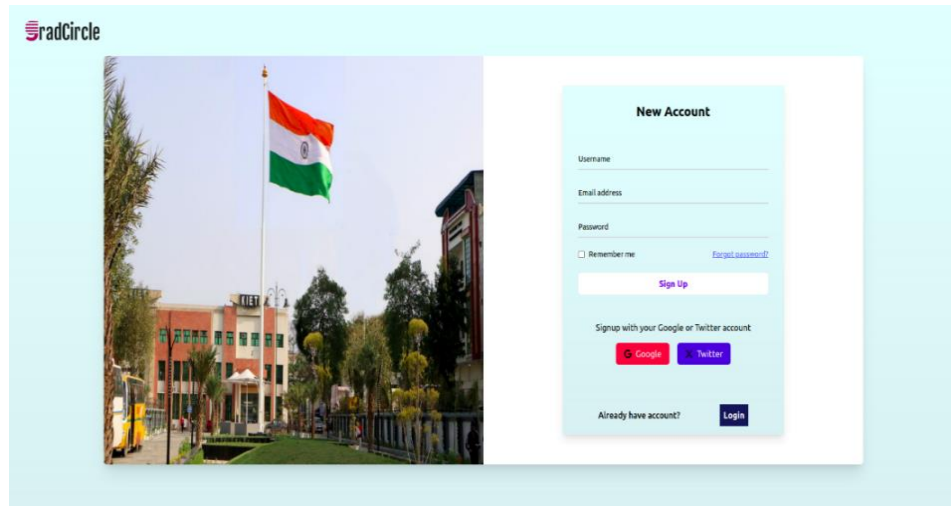
This is the first interaction point for the user. The user has to select the name of his/her/their college from a scrollable list of colleges, which is what the process is about, and he/she/they can only proceed in this way. This to all the subsequent steps is critical. They will work correctly at the educational institution, and in the proper context.



**Fig 5: Landing page**

## 2. Sign-Up Page

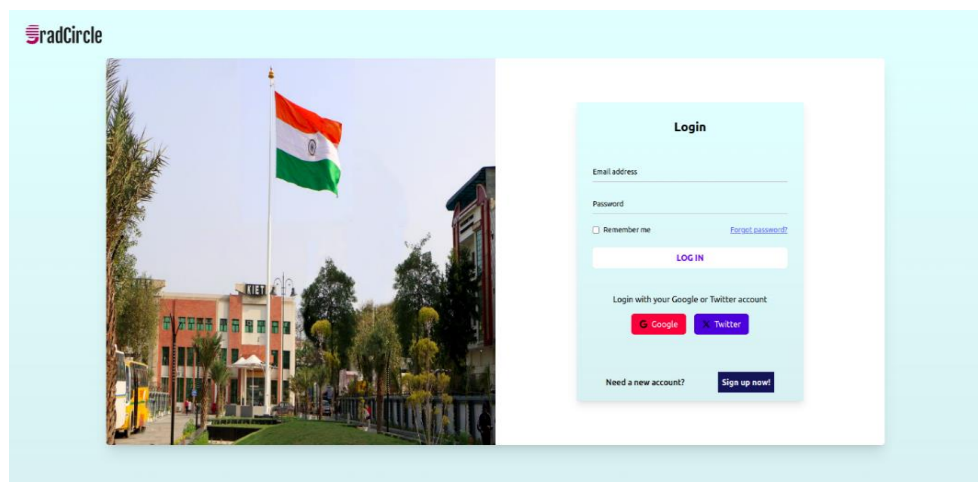
New users can create an account by providing their details such as name, email, graduation year, branch, and role (alumnus/student/faculty). Form validation and confirmation messages ensure proper data capture.



**Fig 6: Sign Up Page**

## 3. Login Page

Registered users can log in to access their personalized dashboard. Secure login is managed through JWT authentication to ensure data privacy and user integrity.



**Fig 7: Login Page**

## 4. Main Dashboard

Once authenticated, users are directed to the main dashboard which serves as the central hub of the platform. It includes quick links to all the major modules:

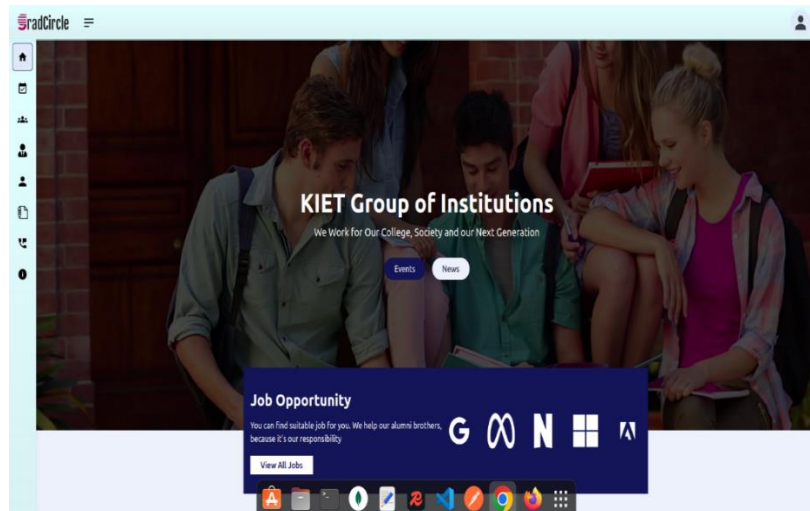


Fig 8: Main Dashboard Page

- **Events Section:** Displays upcoming alumni events, webinars, and reunions. Users can register or view event details.

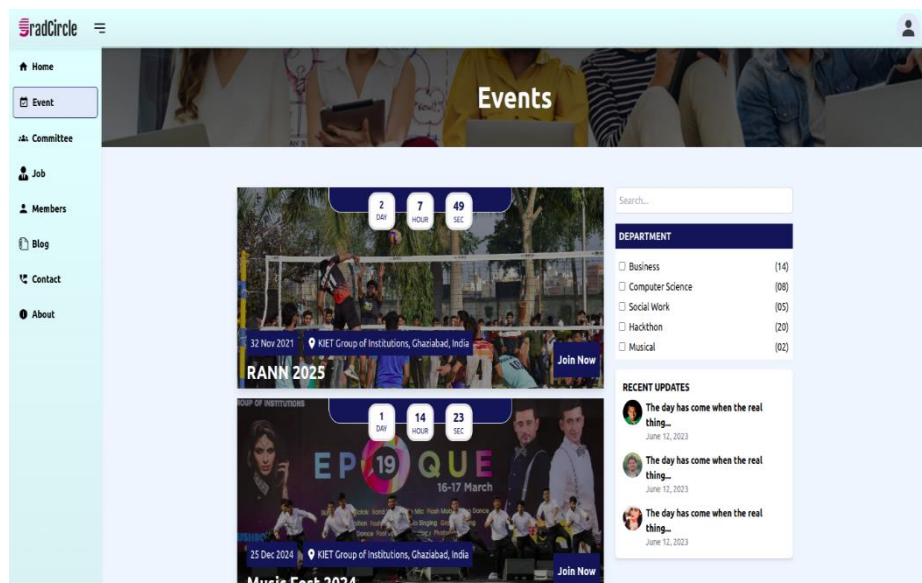
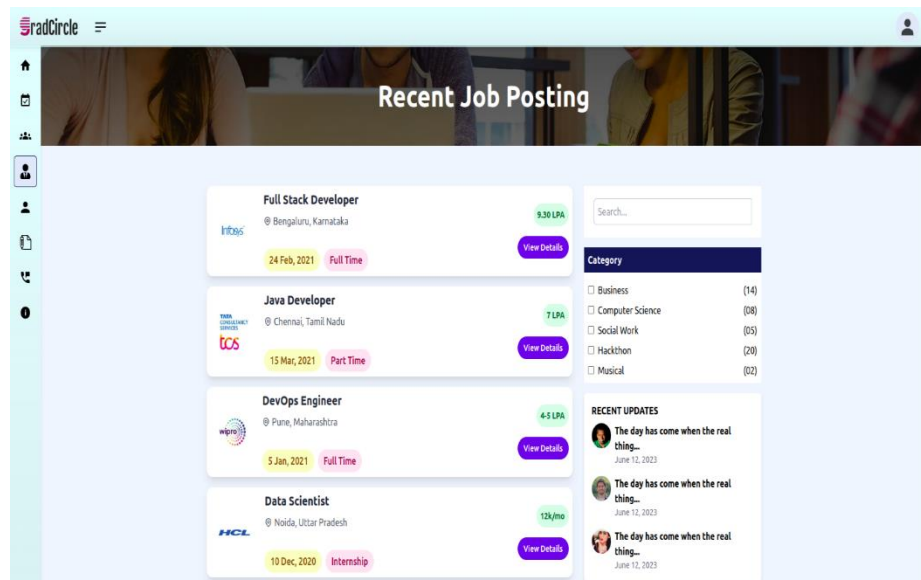


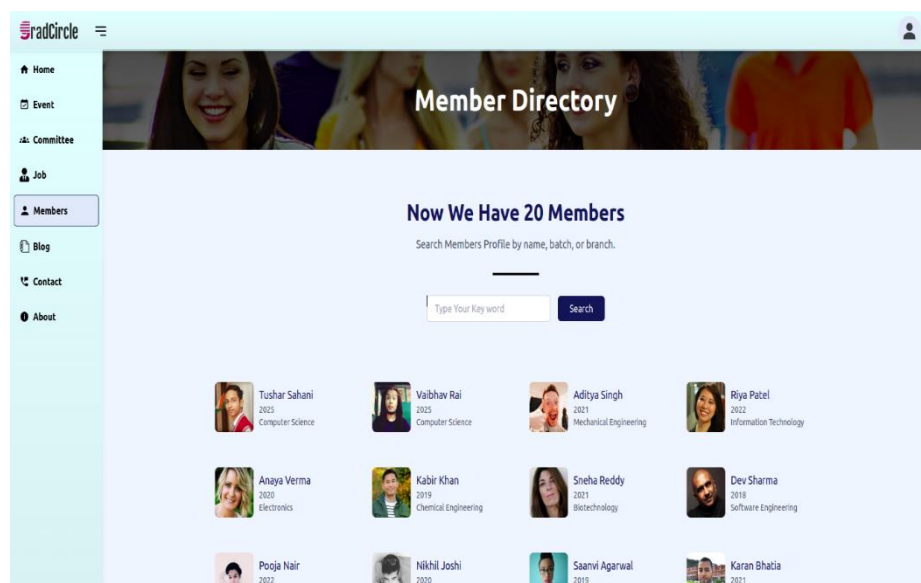
Fig 9: Event Page

- **Jobs Section:** Lists job opportunities shared by alumni or placement cells. Users can filter by domain, location, or experience.



**Fig 10: Job Page**

- **Members Directory:** Allows users to view and connect with other registered members from their institution. Each profile displays academic and professional details.



**Fig 11: Member Directory Page**

- **Contact Us Page:** Provides users a form and contact details to of the admins or the support team in case they want to get in touch.

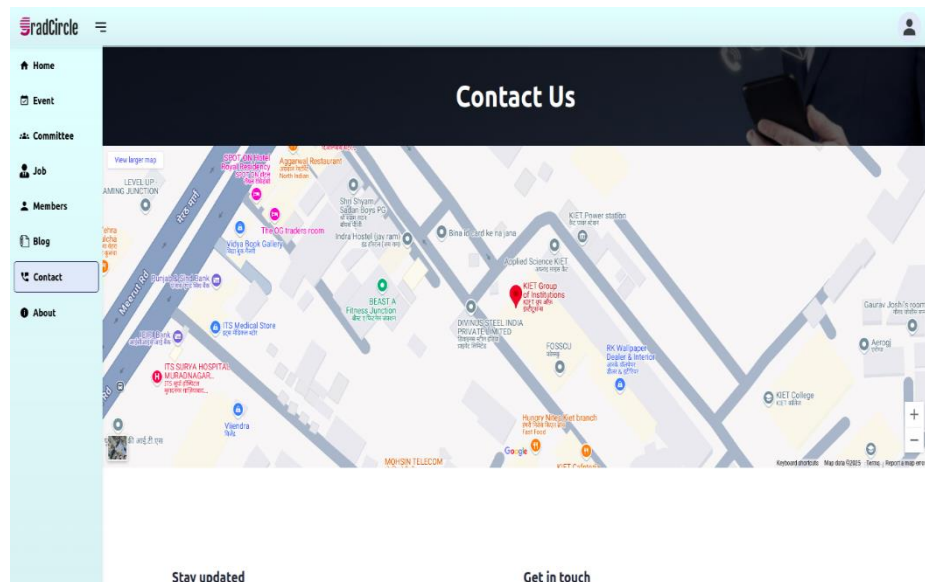


Fig 12: Contact Us page

## 7.2 Key findings of the project

- **High Engagement Potential:** The modular design facilitates interaction between alumni, encouraging community involvement through job sharing, events, and messaging.
- **Secure and Scalable:** The use of JWT authentication and MySQL ensures secure data handling and supports future scalability.
- **Responsive UI/UX:** Developed using React.js, the frontend offers a responsive and user-friendly interface compatible with desktops and mobile devices.
- **Real-Time Interaction:** Features like event registration and internal messaging improve real-time communication and community-building.
- **Centralized Alumni Data:** The platform acts as a single repository of verified alumni profiles, helping institutions track professional progress and engagement metrics.

- **7.2 Brief Description of Database with Snapshots**

Overview:

The Alumni Connect platform is designed to support multiple colleges, where each college manages its own students, events, jobs, and alumni-related data. To accommodate this, the database structure is designed to be multi-tenant with college-level isolation of data, ensuring each college's data remains independent and secure.

Key Design Principles:

Dynamic Table Creation:

When a new college registers, a dedicated student table is dynamically created using the format:

`students_<collegeId>`

This ensures each college has isolated control over its student data.

College-Centric Authentication:

Every user (admin/alumni/student) belongs to a specific college.

Login and dashboard access are scoped to that college only.

Data Access Control:

All operations (add, edit, delete, view) are scoped by the college the user belongs to.

Access is controlled both at the frontend and backend.



#	id	created_at	email	message	mobile_no	name	subject
1	1	2025-04-22 22:39:33.318991	tushar@gmail.com	this is the mail regarding the registr...	9876543210	Tushar Sahani	College Registration Request
2	10	2025-05-08 19:07:09.051738	tushar8@gmail.com	this is the mail regarding the registr...	9876543210	Tushar Sahani	College Registration Request
3	13	2025-05-08 22:40:42.406689	ajay@gmail.com	sjkhahsjhs	9876543213	Ajay	just chek
4	16	2025-05-08 22:42:34.105706	am@gmail.com	o8675esrdgchbjk	98765432...	makiq	jhgfdghjkl
5	17	2025-05-14 23:11:46.628875	sdf@gmail.com	hdiushgaugisag	98765436...	sadsf	gdlsfbd

Fig 13: Database Table

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## **CHAPTER 8**

### **CONCLUSION AND FUTURE SCOPE**

This project suggests a plan for the creation of a wide-reaching Alumni Association Platform that will serve as a tool for university/college management to be able to communicate, network, and engage with majority of their past students. The leading-edge of the web technologies has been used in this platform to make it possible to easily keep alumni contacts, through professional networking, alum meetings and so on and at the same time to offer alumni a single point of entry for achievement, engagement, and provision of resources.

The chief functions of the platform are to make it attractive to users through easy access, security features and its dynamic interface. That in turn helps to foster good relations with the school's graduates who can thereupon open, update and establish contact with like-minded peers. Alumni are able to participate in certain interest groups or in some geographical region which will speed up networking activities and make it easier to collaborate. The system will feature job opportunities, internships, and mentorship programs. It will be a win-win for both the students and the older professionals. They can at any time also find the whereabouts of events such as conferences, online sessions, and networking receptions. Accordingly, it will enable them to reach alumni friends in a convenient and seamless manner, thereby escalating relationships.

This way, the alumnus can further establish a lasting relationship with their respective schools and universities, in fact, colleges will also be part of it. This bonding will create an environment where everyone can contribute in many different ways, such as scholarships, mentoring, fund-raising participations, and many other benefits of being an alumni. Undoubtedly, the main goal of the platform is to establish a mechanism allowing graduates to give back to their area, which in turn will make the

area be a thriving one and supporting the feeling of easy and good rapport within the community.

At its core, the primary goal of this project is to create a connection between the graduates of the past and their school with the fresh and inventive idea of having a platform that is a benefit to both alumni and educational institutions. For this project to be successful, a web application capable of growing handsomely, integrating with the institution's systems, and providing alumni with career development, social networking, and community engagement services, has to be the base of it. This platform, if it reaches the proposed aims, can be considered a tool for offering positive alumni experiences and evoking institution growth.

The future direction of this project embraces the idea of expanding the platform's features to make it more helpful not only for alumni but also for the hamlet and the college. For example, the development of a mobile app version of the platform can be considered to offer the community a more convenient way to access it, thus allowing alumni to be online on the way. Also, by introducing AI-based recommendation systems, it becomes possible to tailor the content to fit the individual profile of the users, hence showing events, groups, and job openings that are of interest to the person, in the light of their preference, past activities, or professional experience. Moreover, the implementation of game-like characteristics has the potential to raise the level of engagement and foster the participation of alumni by giving virtual points and badges to users who get involved in activities such as taking part in events, giving donations, or mentoring students.

Making the platform a global means of communication by adding multilingual support can bring people from different parts of the world together irrespective of the language they speak, therefore being inclusive. Integrating safe and sound payment gateways and donation systems would empower alumni to channel their financial aid to the universities through the platform. If we spoke about the network

availability that was already good but now we are talking about the new functionality, it should read something like this: To boost the network even more, the platform may assist in hosting virtual events so that alumni can communicate directly with each other, participating in live webinars, panels and social events.

Engagement of alumni relations offices at universities will give us the chance to get the newest updates and improvements of the platform according to the evolving needs of alumni. In addition, this will consist of feature upgrades, commitment to examine the data to get through alumni engagement and new tools' formulation that will respond to the alumni's career development needs. Finally, by using cloud-based solutions, the platform grow features that are based in the cloud for better performance and be able to keep the growing users and data in check and provide users an uninterrupted service.

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