

# Minor Project On

# Design and Implementation of an

# Alumni Website

*A Project Report Submitted in Partial Fulfilment of Requirements for the Degree of*

**Bachelor of Technology in Information Technology**  
**(Batch : 2020 - 2024)**

By

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Under the Supervision of  
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**13<sup>th</sup> December 2023**

# Abstract

The “Design and Implementation of an Alumni Website” is a Minor Project aimed at creating a dynamic and user-centric web platform. The project focuses on catering to three distinct user roles: Guest, Alumni, and Admin, each with unique features and functionalities.

The Alumni Website serves as a comprehensive hub fostering seamless communication and engagement between the university and its alumni. Alumni users gain access to personalized profiles, enabling them to showcase their personal and professional details, give social media links, upload announcements and can do filtered search.

The "Development of Alumni Website" not only addresses the current challenges in alumni communication and engagement but also lays the groundwork for a dynamic and evolving platform that aligns with the needs of both the university and its alumni community.

# Acknowledgements

We are highly thankful to our project guide Prof. Bubu Bhuyan for his valuable time and guidance throughout the course of project which has ultimately lead us towards a fruitful result. His consistent mentoring and inspiration has borne enthusiasm in us which made it possible for completion of the project in right time.

We are grateful to Prof. Debdatta Kandar, Head of the Department of Information Technology, NEHU for providing us with all the facilities available in the department for carrying out this work. We would like to thank all the faculty and staff members of IT Department for providing us with the required facilities and support for completion of our project.

We feel extremely happy to acknowledge and express our sincere gratitude to our parents for their constant support and encouragement and last but not the least, friends and well wishers for their help, cooperation and solutions to problems during the course of the project.

# Declaration

This is to certify that we have properly cited any material taken from other and have obtained permission for any copyrighted material included in this report. We take full responsibility for any code submitted as part of this project and the contents of this report.

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# Certificate

This is to certify that **Sagarjyoti Das** (Roll No. 20BTechIT14), **Dimpal Das** (Roll No. 20BTechIT16), **Kimkimbai K. Marak** (Roll No. 20BTechLIT15) and **Priti Halam** (Roll No. 20BTechLIT16) worked in the project **DEVELOPMENT OF ALUMNI WEBSITE** from August to December, 2023 and has successfully completed the minor project, in order to partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Information Technology under my supervision and guidance.

**Dr. Bubu Bhuyan**

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# Certificate

This is to certify that **Sagarjyoti Das** (Roll No. 20BTechIT14), **Dimpal Das** (Roll No. 20BTechIT16), **Kimkimbai K. Marak** (Roll No. 20BTechLIT15) and **Priti Halam** (Roll No. 20BTechLIT16) worked in the project **DEVELOPMENT OF ALUMNI WEBSITE** from August to December, 2023 and has successfully completed the minor project, in order to partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Information Technology.

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# Chapter 1

## Introduction

### 1.1 Background

Alumni relations play a pivotal role in the growth and reputation of educational institutions. Building and sustaining connections with graduates contribute not only to the institutional legacy but also to the success and engagement of alumni themselves. Recognizing this importance, IT Department of North-Eastern Hill University aims to address the challenges of alumni communication and engagement through the development of a dynamic and user-centric Alumni Website.

Over the years, the conventional methods of alumni communication, primarily relying on emails and social media, have proven to be inefficient and lack a personalized touch. The need for a dedicated platform to streamline alumni interactions, foster networking, and provide a centralized hub for engagement has become increasingly apparent. This project seeks to bridge this gap by introducing a comprehensive Alumni Website, leveraging the capabilities of the MERN (MongoDB, Express.js, React, Node.js) stack.

### 1.2 Objectives of the Project

The primary objective of this project is to create an Alumni Website that serves as a multifaceted platform, catering to the diverse needs of three distinct user roles: Guest Users, Alumni, and Administrators. The platform aims to provide alumni with a space to reconnect with their alma mater, showcase their achievements, etc.

Additionally, it aims to enhance the university's ability to manage alumni data efficiently and leverage alumni support for initiatives and fundraising activities.

By adopting the MERN stack, the project intends to capitalize on the advantages of full-stack development, real-time updates, scalability, and the widespread adoption of this technology stack in modern web development. This choice ensures that the Alumni Website not only meets current needs but is also future-proof, capable of evolving with emerging trends in the digital landscape.

## **1.3 Scope of the Project**

The scope of the project encompasses the complete development lifecycle of the Alumni Website, from conceptualization to implementation. Key features include user authentication, dynamic alumni profiles and administrative tools. While the initial focus is on establishing these features for the IT department of NEHU but the project design allows to scale it for other departments also.

This project represents a collaborative effort between North-Eastern Hill University and the project team, with the aim of creating a user-friendly, secure, platform that redefines the way alumni connect with the university. As we dive into the subsequent sections, the report will provide a detailed account of the methodologies employed, the technical aspects of implementation, and the outcomes achieved.

# Chapter 2

## Requirements Analysis

### 2.1 Software Requirements Specification

#### 2.1.1 Functional Requirements:

##### **User Authentication:**

- Users should be able to register and log in securely.
- Differentiate user roles (Guest, Alumni, Admin) with specific permissions.
- Implement password recovery mechanisms.

##### **Alumni Profiles:**

- Allow alumni to create, update, and manage their profiles.
- Include fields for social profiles, educational history and career details.
- Enable alumni to upload and manage profile pictures.

##### **User Interface:**

- Responsive interface for easy navigation.
- Ensure accessibility across various devices.

##### **Alumni Data Filtering:**

- Implement an advanced search feature for alumni profiles.
- Allow users to filter alumni based on graduation batch, graduation year, and department.
- Provide a user-friendly interface for selecting and applying multiple filters simultaneously.
- Ensure efficient and fast retrieval of filtered data from the database.

### **2.1.2 Non-Functional Requirements:**

#### **Security:**

- Implement secure data storage and transmission.
- Ensure compliance with data protection regulations.

#### **Performance:**

- Ensure fast loading times for all features.
- Optimize database queries for efficient data retrieval.
- Scale the system to handle concurrent user interactions.

#### **Scalability:**

- Design the system to accommodate a growing number of users.
- Plan for future feature additions without compromising performance.

#### **User Experience:**

- Gather user feedback for continuous improvement.
- Ensure cross-browser compatibility.

## **2.2 Operating Environment**

### **2.2.1 Server:**

- Utilize a server running Node.js for back-end operations.
- Implement MongoDB as the database for data storage.

### **2.2.2 Client:**

- Ensure compatibility with modern web browsers (Chrome, Firefox, Safari).
- Optimize for various screen sizes and resolutions

### **2.2.3 Technology Stack:**

- MERN stack (MongoDB, Express.js, React, Node.js) for full-stack development.
- Use industry-standard libraries and frameworks for enhanced functionality.

## 2.3 Use Case Diagram

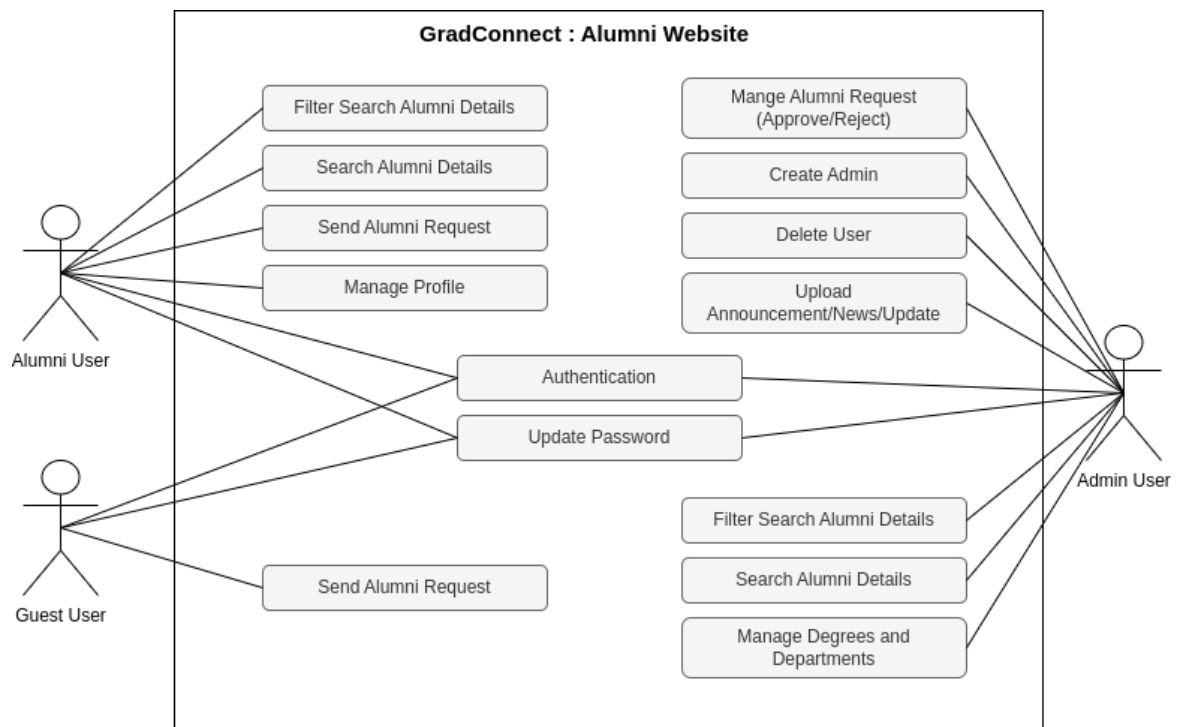


Figure 2.1: Use Case Diagram

# Chapter 3

## Design

### 3.1 System Architecture

#### 3.1.1 Introduction:

In the architectural design phase, the decision to utilize the MERN stack (MongoDB, Express.js, React.js, Node.js) was driven by the need for a scalable, flexible and efficient system. The MERN stack offers a comprehensive solution for building modern, full-stack web applications.

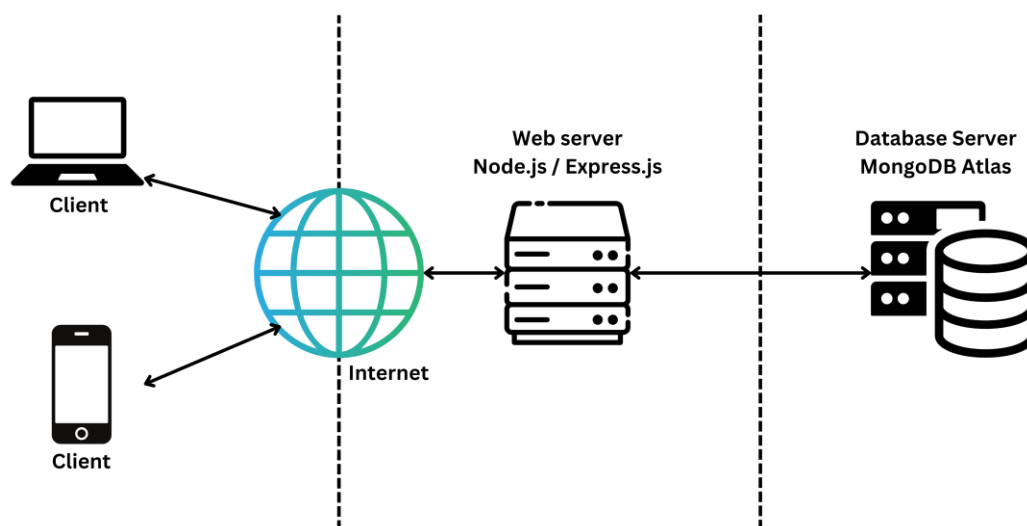


Figure 3.1: System Architecture

#### 3.1.2 Components of the MERN Stack:

##### MongoDB:

MongoDB was chosen as the database for its schema-less, document-oriented structure, allowing for easy storage and retrieval of alumni data. Its scalability and flexibility make it an ideal choice for handling diverse data types within our application.



**Express.js:**

Express.js serves as the backend framework, providing a robust and streamlined way to handle server-side logic. Its minimalist approach allows for quick development and easy integration with MongoDB.

**React.js:**

React.js is employed for creating dynamic and interactive user interfaces. Its component-based architecture enhances code reusability and facilitates a seamless user experience.

**Node.js:**

Node.js is utilized for server-side scripting, enabling the execution of server-side logic. Its component-based architecture enhances code reusability and facilitates a seamless user experience.

**3.1.3 Scalability and Flexibility:**

Our system is designed with growth in mind. Scalability ensures that as more alumni join, and the community expands, our platform remains responsive and efficient. Flexibility is our ability to adapt and evolve, incorporating new features seamlessly to enhance user experience and meet emerging needs.

## **3.2 User Roles and Features**

**3.2.1 Introduction:**

User roles define the experience each individual has within our Alumni Website. Whether you're a visitor, an alumni member, or an administrator, each role offers a unique set of features tailored to your needs. The modular nature of React.js components also contributes to the system's flexibility, allowing for easy integration of new features.

### 3.2.2 Guest Users:

Guest users play a crucial role in initiating connections within our Alumni Website. Their features include:

**Request Submission:** Guests can send requests to the admin by providing personal and academic details, facilitating the creation of a robust alumni network.

**Password Update:** For added security, users have the ability to update their passwords, ensuring the confidentiality of their accounts.

### 3.2.3 Alumni:

Once a user's request is approved, they transition into the alumni role, unlocking a plethora of enhanced features:

- **Fellow Alumni Search:** Alumni can search and connect with fellow alumni, fostering a strong and interconnected community.
- **Multiple Requests:** Alumni can send requests for multiple degrees, reflecting their diverse academic achievements.
- **Filtering Alumni Data:** The platform allows alumni to filter data, making it easy to find and connect with alumni who share similar academic or professional backgrounds.
- **Social Links and Professional Details:** Alumni can personalize their profiles by adding social links, professional details, and a profile picture, providing a comprehensive snapshot of their journey.
- **Access to Announcements:** Alumni gain access to announcements, news, and updates posted by admin users, ensuring they stay informed about the latest happenings within the community.

### 3.2.4 Admin:

Admin users wield comprehensive control over the platform, ensuring its smooth operation and security. Their features include:

- **Alumni Request Management:** Admins can review and manage all alumni requests, approving or rejecting them based on the provided details.
- **User Management:** Admins have the authority to manage all registered users, including the ability to delete accounts when necessary.
- **Admin Creation:** They can create new admin users, empowering trusted individuals to share in the responsibility of managing the platform.
- **Approved Alumni Management:** Admins can oversee and manage all approved alumni, ensuring the community maintains a high standard of engagement.
- **Announcement Upload:** Admins can upload announcements, news, and updates, keeping the community informed about important events.
- **Degree and Department Management:** Admins have the power to update the list of degrees and departments, shaping the academic landscape of the platform. Alumni can send requests for these specific degrees and departments.

## **3.3 Database Design**

### **3.3.1 Introduction:**

The database design is a critical aspect of the Alumni Website, influencing data organization, retrieval efficiency, and overall system performance. MongoDB, a NoSQL database, was chosen for its scalability and ability to handle diverse data types.

### **3.3.2 Schema Design:**

#### **User Collection:**

- This collection stores basic user information, including authentication details, user role, and references to alumni requests and details.

#### **Alumni Request Collection:**

- Keeps track of alumni requests, including academic details and request status.

#### **Department Collection:**

- Stores department names for organizational purposes.

#### **Degree Collection:**

- Contains names of degrees for academic classification.

#### **Alumni Collection:**

- Holds comprehensive information about alumni users, including social links, professional details, profile pictures, and references to announcements.

### **Alumni Request Collection:**

- Captures details submitted by users when sending requests to become alumni, including academic information and request status.

### **Announcements Collection:**

- Manages information related to announcements, including titles, descriptions, attachments, and creation timestamps.

### **Degree-Dept Collection:**

- Contains arrays of degree names and department names, which are modifiable by admin users.

### **3.3.3 Data Security:**

Ensuring data security is paramount:

- **Encryption:** Passwords are hashed for security, preventing unauthorized access.
- **Access Control:** User roles dictate access levels. Admins manage, alumni access personalized info, and guests have limited access.
- **Verification Flags:** "isVerified" flag in the User collection ensures a verified email before full access.

### 3.3.4 Database Schema:

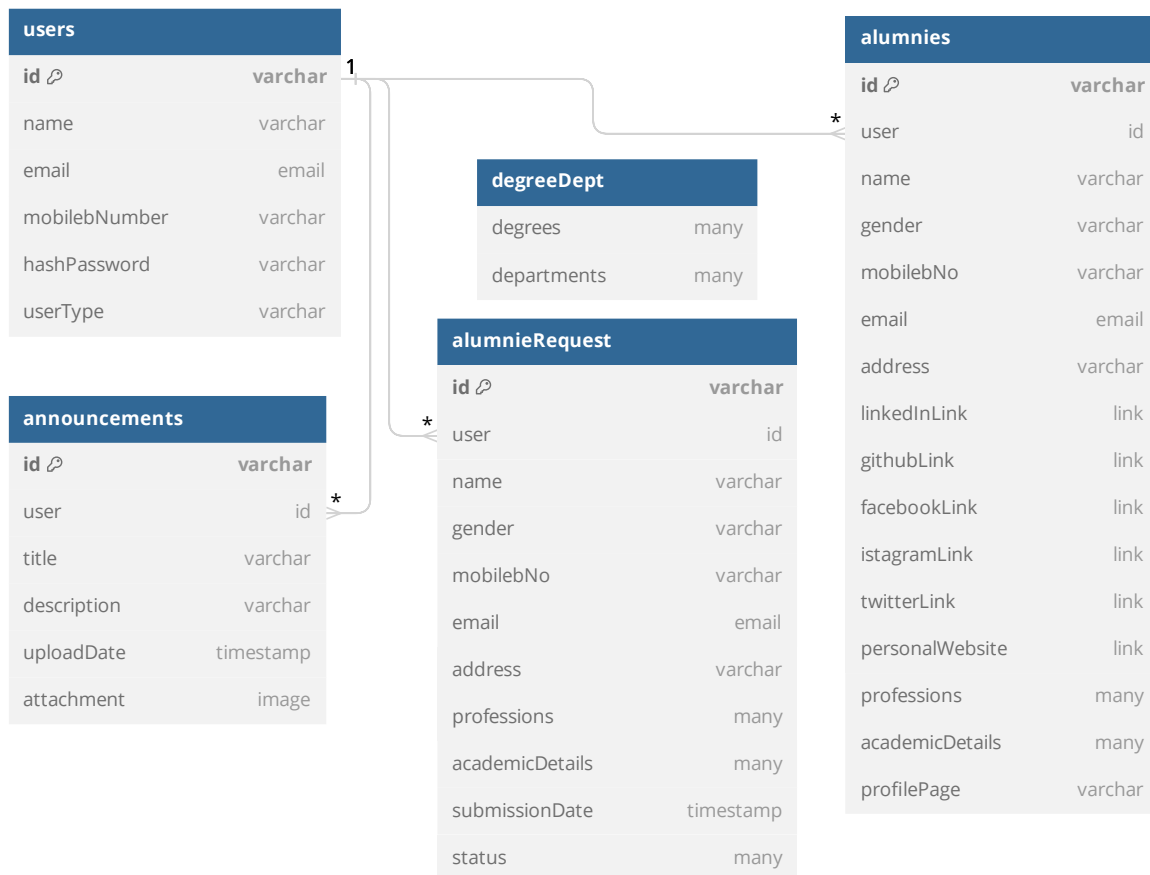


Figure 3.2: Database Schema

# Chapter 4

## Implementation

### 4.1 Frontend

In the development of our Alumni Website, we carefully selected modern technologies to ensure a dynamic and engaging user experience:

#### 4.1.1 React.js:

- React.js serves as the primary frontend library, enabling the creation of a dynamic and responsive user interface.
- The component-based architecture of React facilitates modular development and enhances code reusability.

#### 4.1.2 Tailwind CSS:

- For styling, we adopted Tailwind CSS, employing its utility-first approach to streamline the styling process.
- The utility classes provided by Tailwind CSS allowed for rapid development and easy maintenance.

#### 4.1.3 Chakra UI:

- We integrated Chakra UI as a UI component library, enhancing the aesthetics and functionality of our user interface.
- Chakra UI provides a set of accessible and customizable components that seamlessly integrate with React applications.

## 4.2 Backend

The backend plays a crucial role in handling data, user authentication, and business logic:

### 4.2.1 Node.js:

- Node.js serves as the backend runtime environment, allowing for the execution of JavaScript on the server side.
- Its event-driven architecture contributes to efficient handling of concurrent requests.

### 4.2.2 Express.js:

- Express.js is our chosen web application framework, streamlining the development of robust and scalable APIs.
- Middleware functions are implemented for handling requests, authentication, and error handling.

## 4.3 Database

The choice of a reliable database is crucial for efficient data storage and retrieval:

### 4.3.1 MongoDB:

- MongoDB, a NoSQL database, is selected for its flexibility and scalability.
- The document-oriented structure of MongoDB facilitates the storage of user information, alumni details, and requests.



## **4.4 Tools**

### **4.4.1 Visual Studio Code (VS Code):**

- VS Code, a lightweight, cross-platform code editor, is used with built-in support for JavaScript, TypeScript, and Node.js.
- It offers a user-friendly interface with features like syntax highlighting, autocompletion, and integrated Git support.

### **4.4.2 NPM (Node Package Manager):**

NPM is utilized to manage project dependencies efficiently, simplifying the installation and updating of libraries and packages.

### **4.4.3 React Vite:**

- React Vite is employed as the frontend build tool, offering fast and efficient development and building processes.

### **4.4.4 Chakra UI:**

- Chakra UI is utilized as a UI component library, enhancing the aesthetics and functionality of our user interface.

## **4.5 Security Measures**

### **4.5.1 User Data Security:**

#### **Encryption Techniques:**

It is important to ensure the security of user data. Encryption techniques are used to protect the data. All communication between the client and server is done over HTTPS to encrypt data during transmission.

**Access Controls:**

Role-based access controls are implemented to restrict access to certain features based on user roles. For example, only administrators have access to features like create admin, etc.

## 4.6 Challenges and Solutions

**Challenge:**

Storing images for various elements of the website, such as profile pictures and announcement attachments, posed a challenge in terms of choosing a suitable storage solution.

**Solution:**

In response to this challenge, we opted for a base64 technology-based solution. This approach involves encoding the image data into base64 format, which can then be embedded directly into the HTML or stored as text. By using base64, we ensured a simplified and efficient method for storing images without the need for a separate storage service. This solution addressed our image storage requirements and contributed to the overall optimization of our application.

# Chapter 5

## Results

### 5.1 Homepage

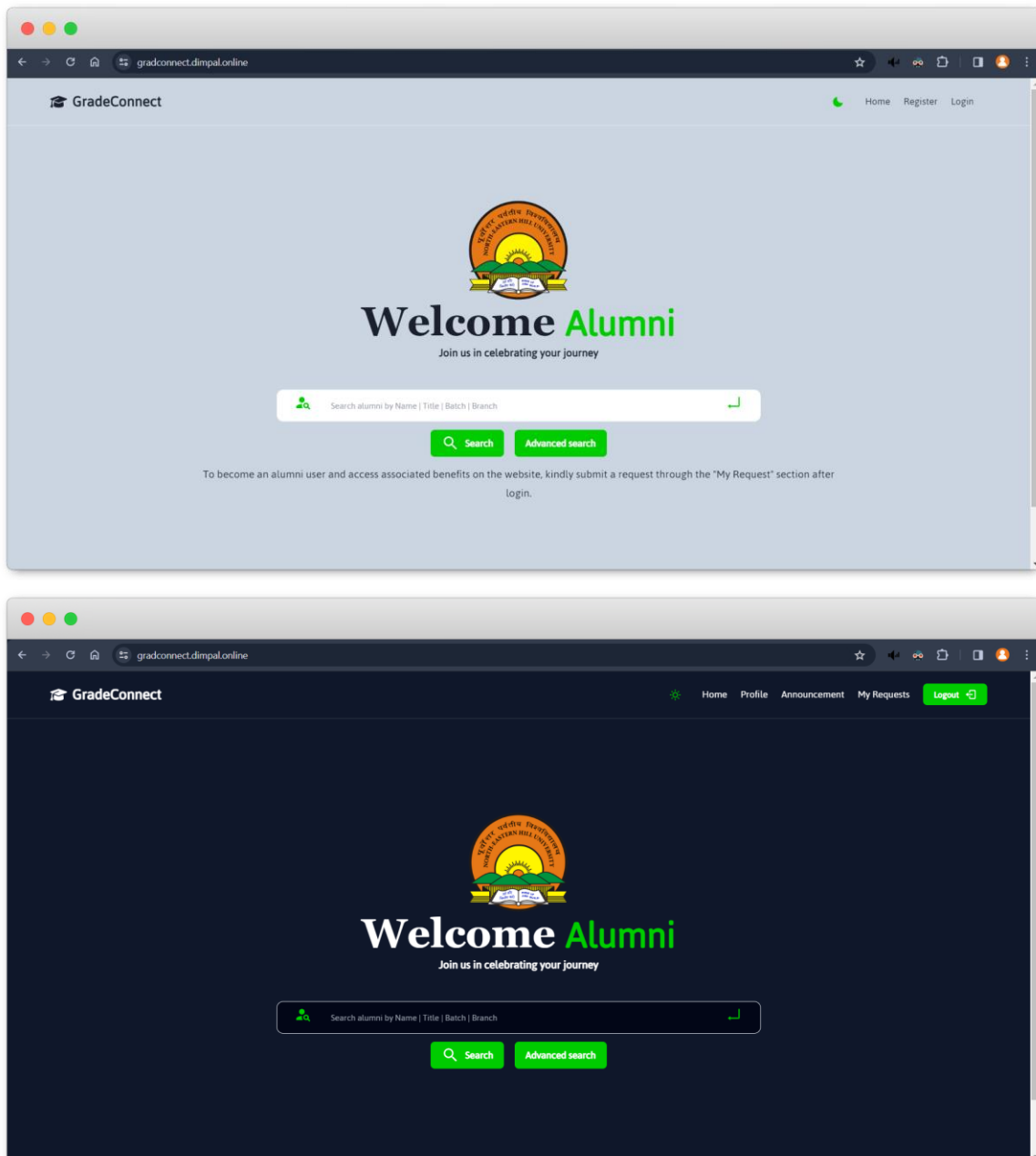
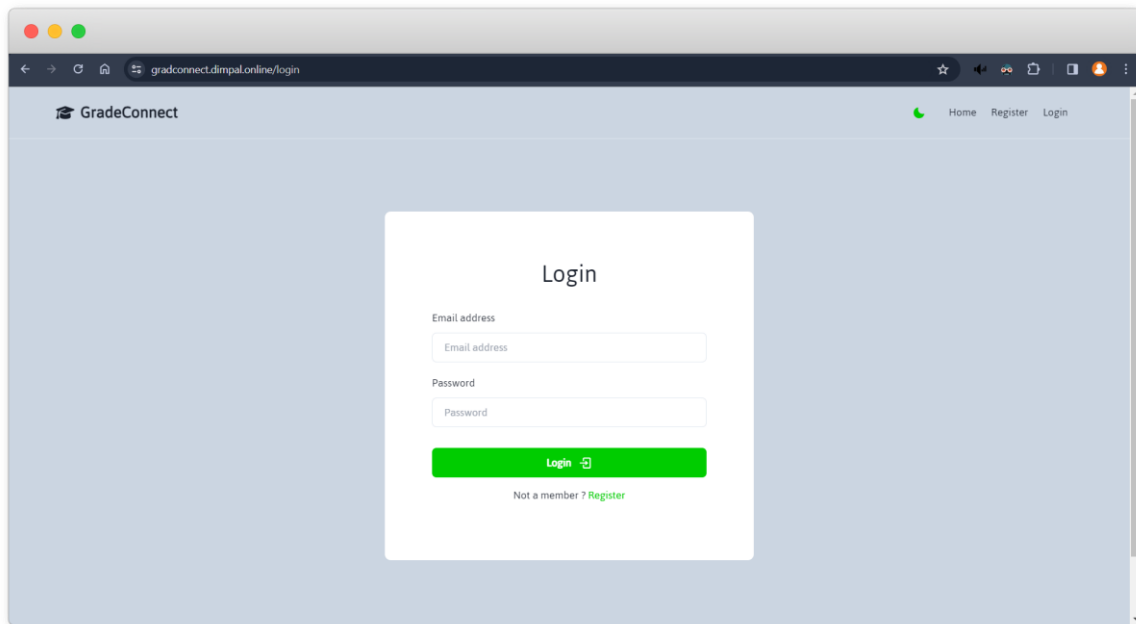


Figure 5.1: Homepage

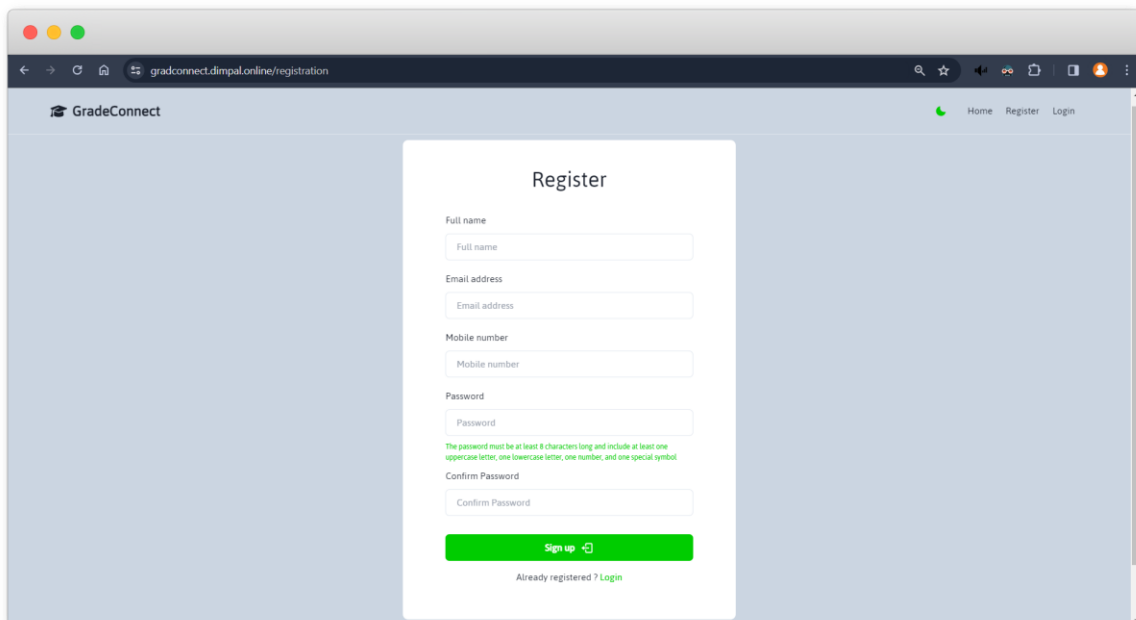
## 5.2 Login page



The screenshot shows a web browser window with the URL `gradconnect.dimpalonline/login`. The page features a light blue header with the GradeConnect logo on the left and navigation links (Home, Register, Login) on the right. A central white box contains the login form. The form has a title "Login", followed by an "Email address" label and a text input field. Below that is a "Password" label and another text input field. A prominent green "Login" button with a right-pointing arrow is positioned below the password field. At the bottom of the form, there is a link that reads "Not a member ? Register".

Figure 5.2: Login page

## 5.3 Registration page



The screenshot displays a web browser window with the URL `gradconnect.dimpalonline/registration`. The header is identical to the login page. The registration form is centered in a white box. It begins with a "Register" title, followed by four input fields labeled "Full name", "Email address", "Mobile number", and "Password". Below the password field, a green text note specifies: "The password must be at least 8 characters long and include at least one uppercase letter, one lowercase letter, one number, and one special symbol". This is followed by a "Confirm Password" label and its corresponding input field. A green "Sign up" button with a right-pointing arrow is located below the confirm password field. At the very bottom of the form, a link states "Already registered ? Login".

Figure 5.3: Registration page

## 5.4 Mobile View

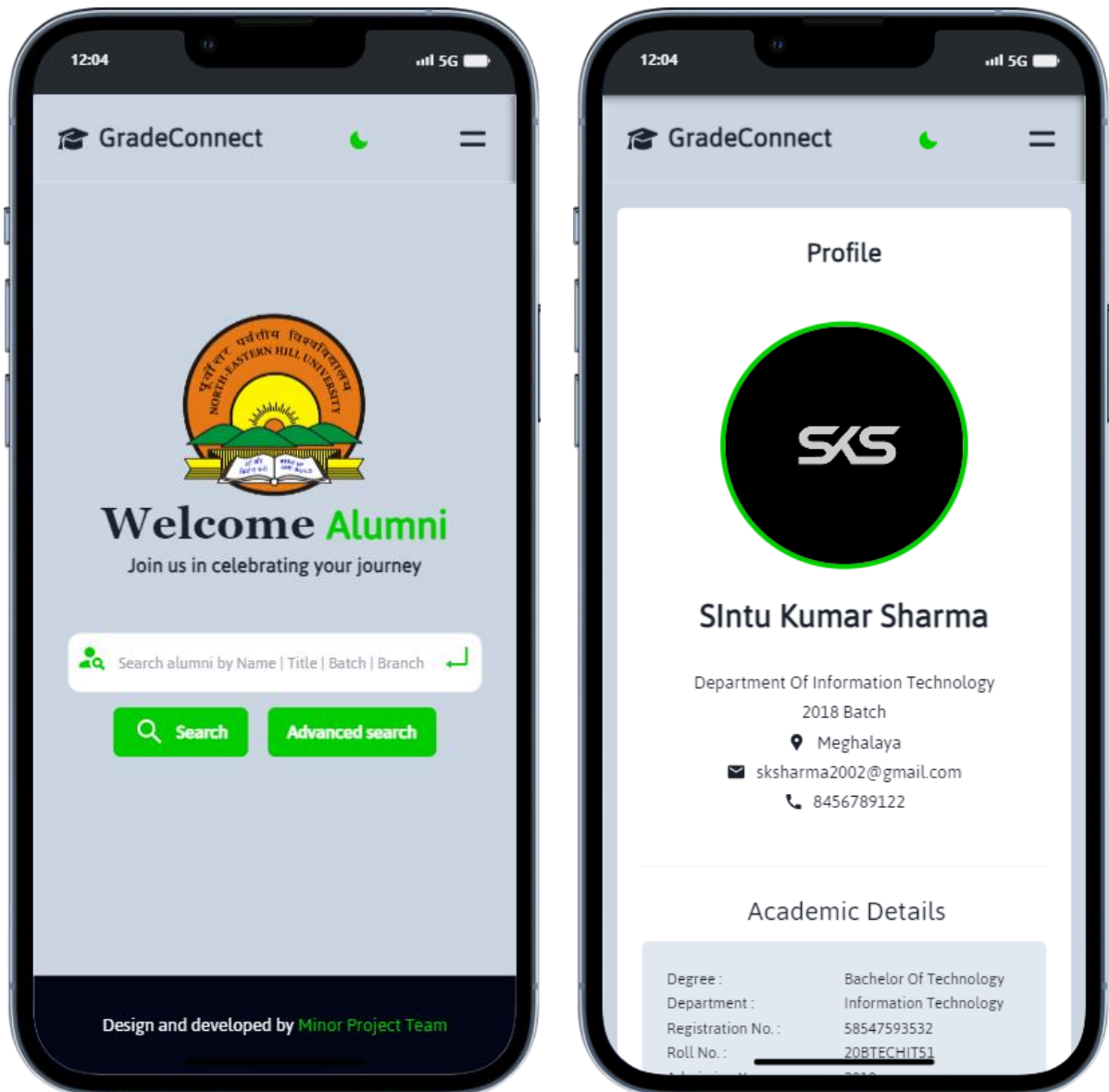


Figure 5.4: Mobile View

## 5.5 Admin Dashboard

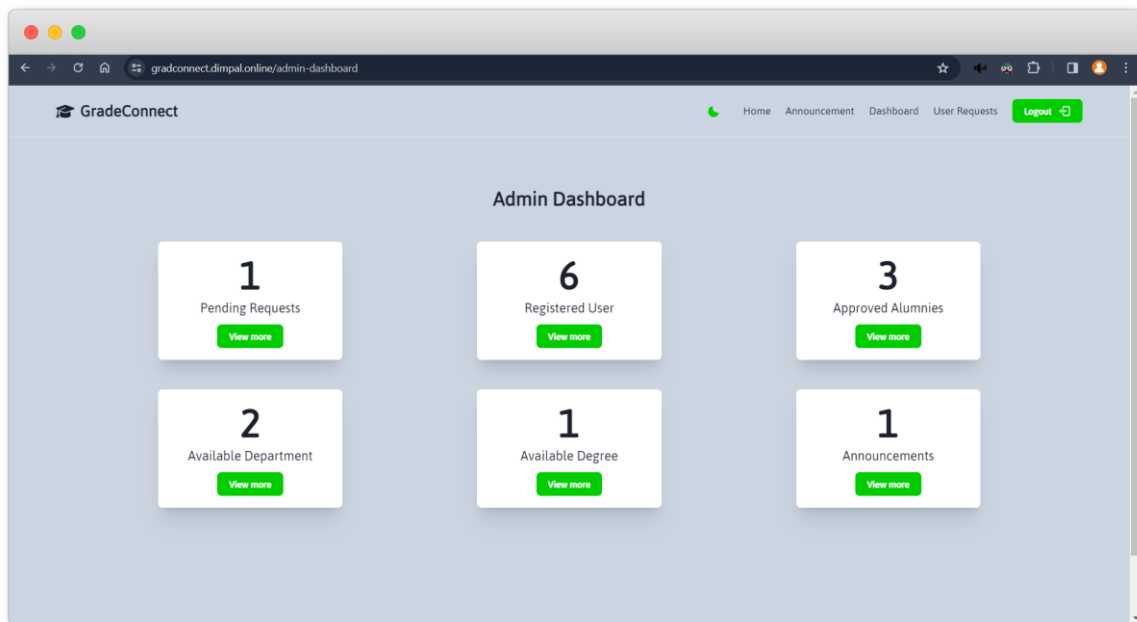


Figure 5.5: Admin Dashboard

## 5.6 Alumni Requests

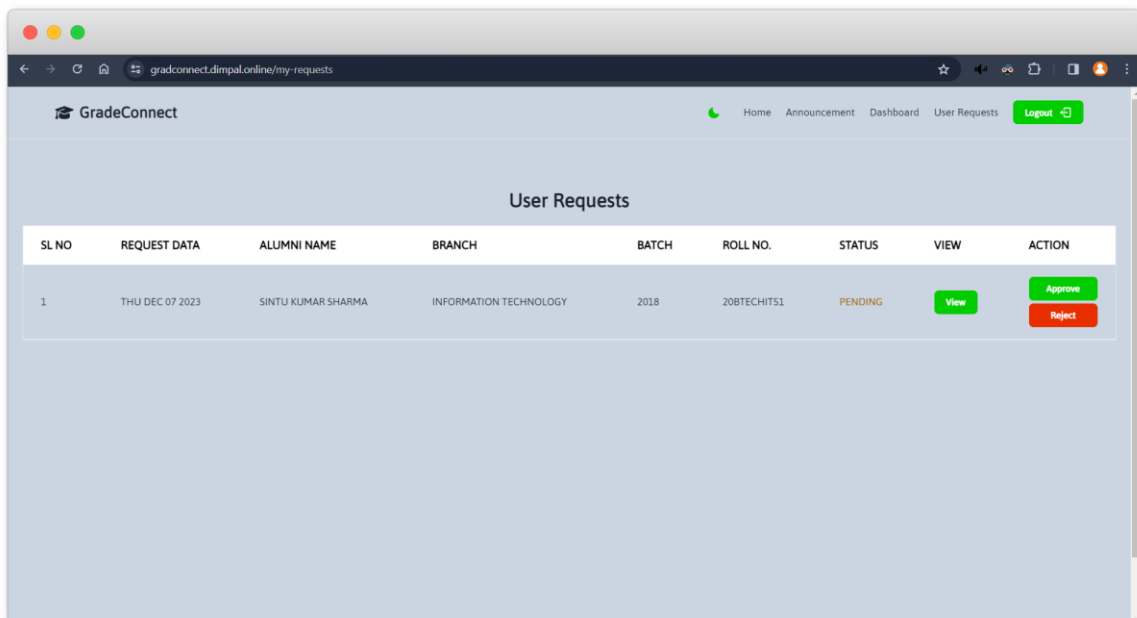
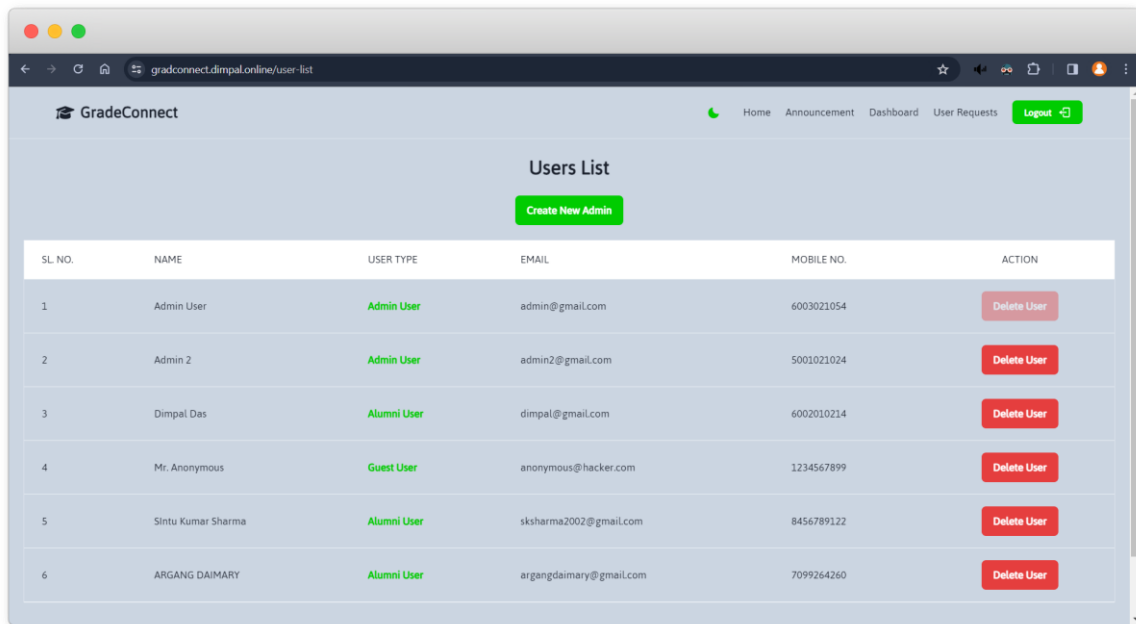


Figure 5.6: Alumni Requests

## 5.7 Users List



GradeConnect

Home Announcement Dashboard User Requests Logout

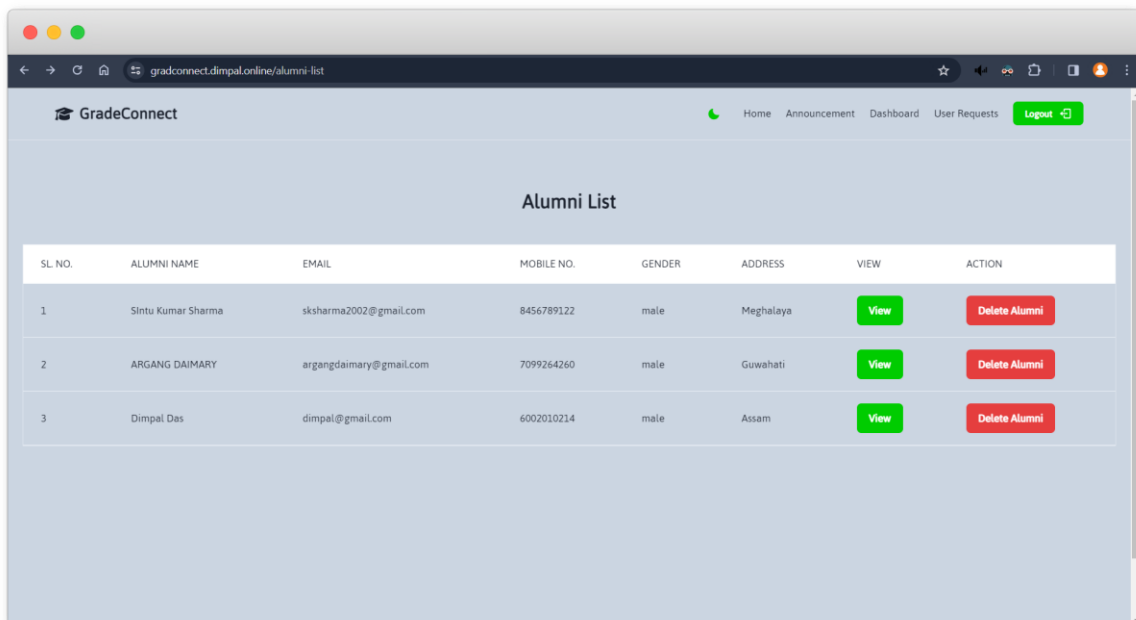
Users List

Create New Admin

SL NO.	NAME	USER TYPE	EMAIL	MOBILE NO.	ACTION
1	Admin User	Admin User	admin@gmail.com	6003021054	Delete User
2	Admin 2	Admin User	admin2@gmail.com	5001021024	Delete User
3	Dimpal Das	Alumni User	dimpal@gmail.com	6002010214	Delete User
4	Mr. Anonymous	Guest User	anonymous@hacker.com	1234567899	Delete User
5	Sintu Kumar Sharma	Alumni User	sksharma2002@gmail.com	8456789122	Delete User
6	ARGANG DAIMARY	Alumni User	argangdaimary@gmail.com	7099264260	Delete User

Figure 5.7: Users List

## 5.8 Approved Alumni



GradeConnect

Home Announcement Dashboard User Requests Logout

Alumni List

SL NO.	ALUMNI NAME	EMAIL	MOBILE NO.	GENDER	ADDRESS	VIEW	ACTION
1	Sintu Kumar Sharma	sksharma2002@gmail.com	8456789122	male	Meghalaya	View	Delete Alumni
2	ARGANG DAIMARY	argangdaimary@gmail.com	7099264260	male	Guwahati	View	Delete Alumni
3	Dimpal Das	dimpal@gmail.com	6002010214	male	Assam	View	Delete Alumni

Figure 5.8: Approved Alumni

## 5.9 Search

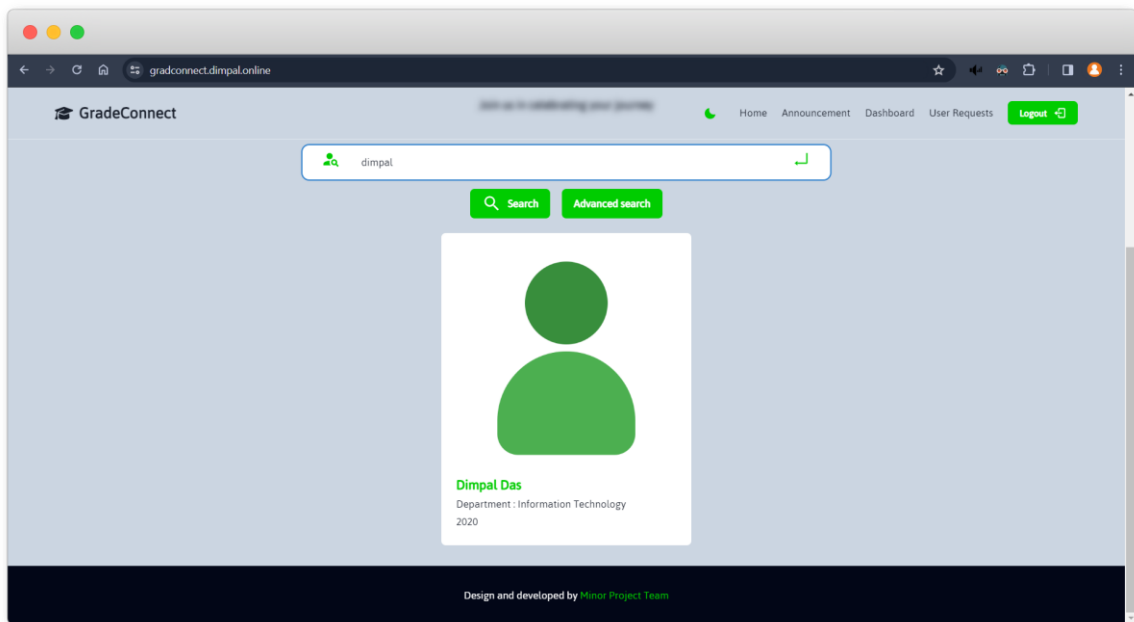


Figure 5.9: Search

## 5.10 Advanced Search

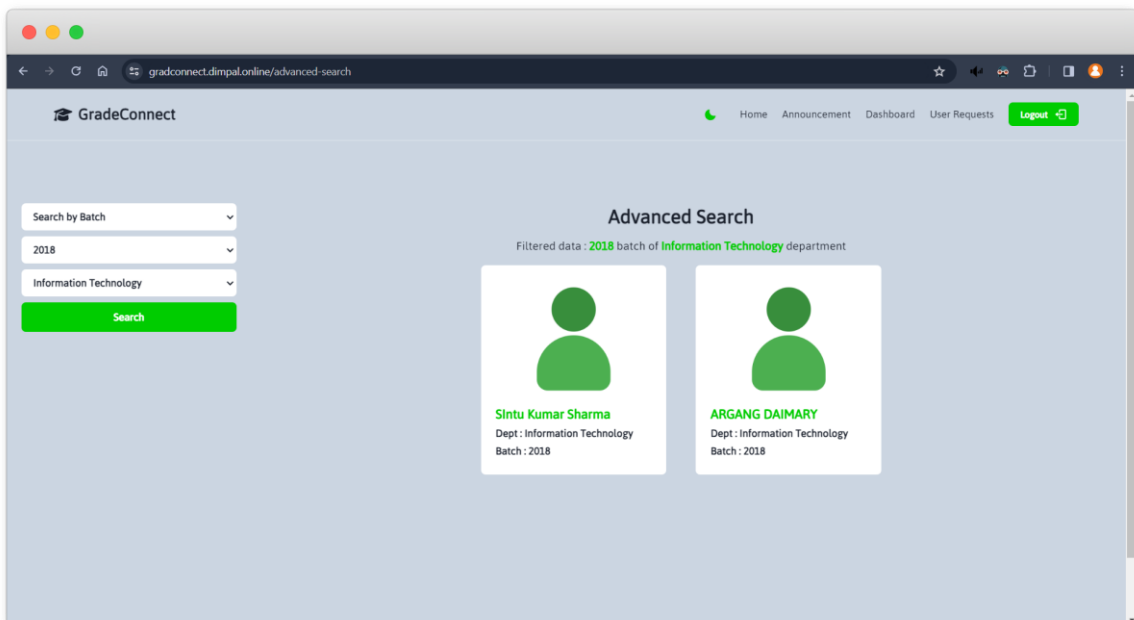


Figure 5.10: Advanced Search



## 5.11 Profile

The screenshot shows the 'Profile' page of a user named Dimpal Das on the GradeConnect platform. The page is divided into several sections:

- Header:** GradeConnect logo, navigation links (Home, Profile, Announcement, My Requests), and a Logout button.
- Profile Section:** Features a circular profile picture of Dimpal Das, a 'Change Profile Picture' button, and a 'Remove Profile Picture' button. Below the picture are social media icons and contact information: Department Of Information Technology, 2020 Batch, Assam, dimpal@gmail.com, and a phone number.
- Academic Details:** A table with the following information:

Degree:	Bachelor Of Technology	Department:	Information Technology
Registration No.:	20070486	Roll No.:	20BTECHT16
Admission Year:	2020	Completion Year:	2022
CGPA Year:	8.2		
- Profession Details:** A table with the following information:

Profession:	Full Stack Developer	Organisation:	NIC	X
Working From:	2018	Working To:	Present	
- Footer:** A green button labeled 'Add Profession Details'.

Figure 5.11: Profile

## 5.12 Send Request

The screenshot shows the 'Send a request' page of the GradeConnect platform. The page contains a form with the following fields:

- Full Name:** A text input field.
- Branch:** A dropdown menu with 'Select A Department' as the placeholder.
- Degree:** A dropdown menu with 'Select A Degree' as the placeholder.
- Gender:** A dropdown menu with 'Select Gender' as the placeholder.
- Mobile Number:** A text input field.
- Email Address:** A text input field.
- Registration Number:** A text input field.
- Admission Year:** A text input field.
- Completion Year:** A text input field.
- Roll Number:** A text input field.
- CGPA:** A text input field.
- Current Profession:** A text input field.
- Organisation:** A text input field.
- Working From:** A text input field.

Figure 5.12: Send Request

## 5.13 Degree

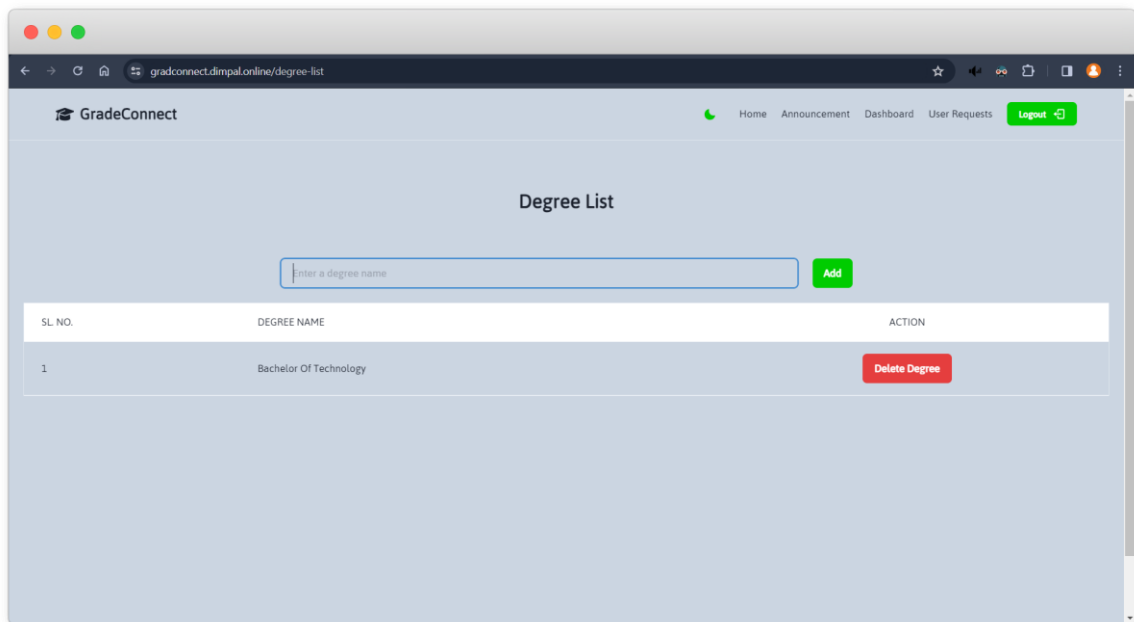


Figure 5.13: Degree

## 5.14 Department

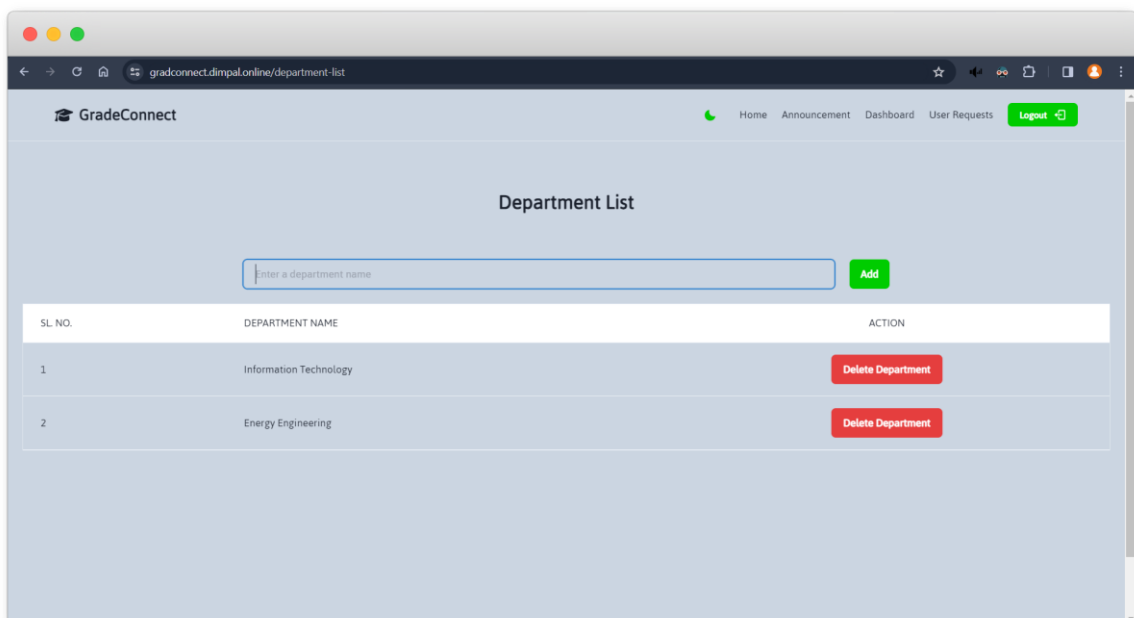


Figure 5.14: Department

## 5.15 Make an Announcement

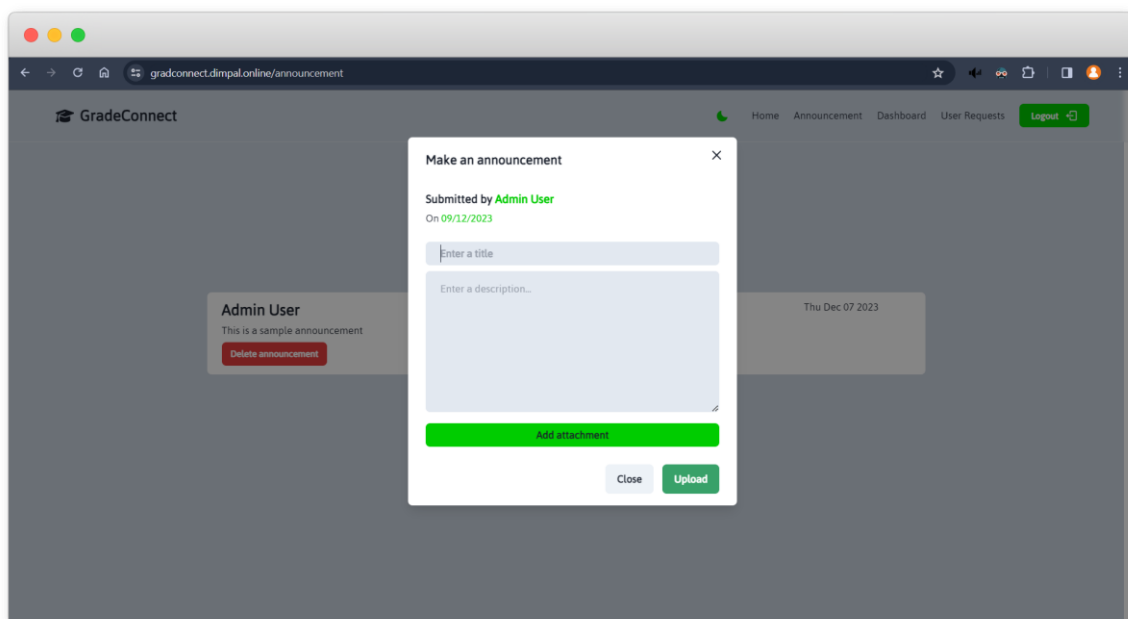


Figure 5.15: Make an Announcement

## 5.16 Announcement

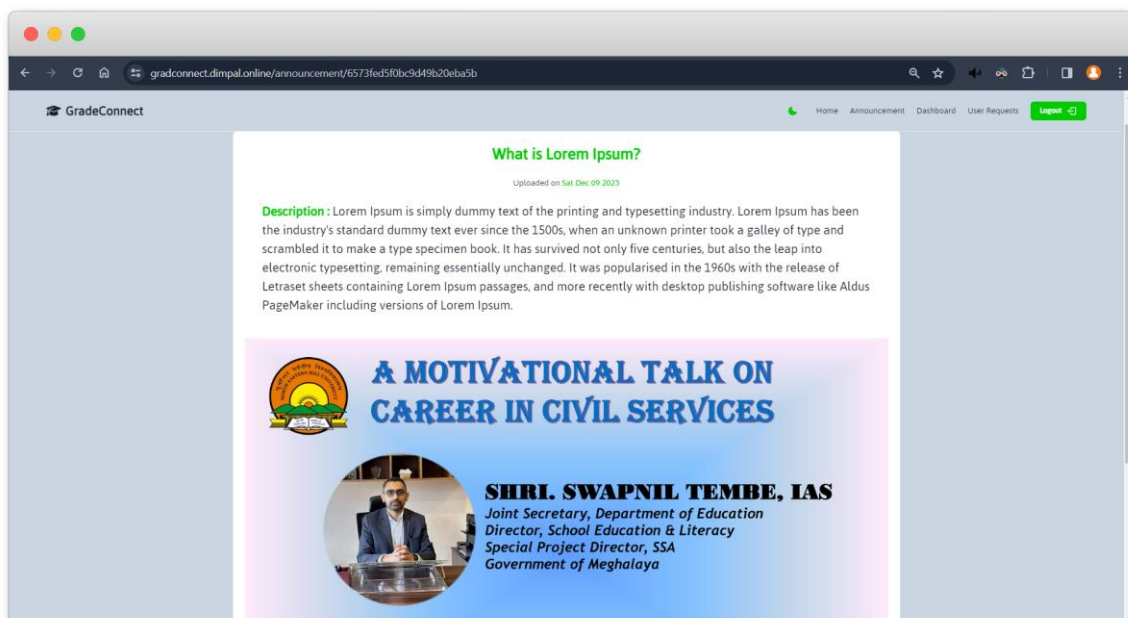


Figure 5.16: Announcement

# Chapter 6

## Deployment

### 6.1 Server Setup

#### 6.1.1 Frontend Deployment:

The frontend deployment process ensures that the user interface is compiled, packaged, and made accessible to users. Here's an overview of the steps involved:

##### **Build Process:**

- Utilizing the React Vite build tool to compile and bundle the frontend code efficiently.
- Generating optimized static assets and a production-ready build.

##### **Hosting Service:**

- Choosing a hosting service to deploy the compiled frontend code.
- Uploading static assets and deploying the frontend to make the website publicly accessible.

#### 6.1.2 Backend Deployment:

Backend deployment focuses on setting up the server environment to handle backend operations, API requests, and database interactions. Key steps include:

**Node.js Runtime:**

- Ensuring that the server environment supports the Node.js runtime for executing server-side code.
- Installing and configuring Node.js to create a stable runtime environment.

**Express.js Deployment:**

- Deploying the Express.js application to handle backend logic.
- Configuring the server to efficiently process incoming requests and respond with the required data.

## **6.2 Cloud Database Setup**

Setting up the cloud database is pivotal for storing and managing data effectively. In our case, we utilize MongoDB Atlas, a cloud-based database service.

### **6.2.1 MongoDB Atlas**

**Account Creation:**

- Creating an account on the MongoDB Atlas platform to access their cloud database services.
- Providing necessary information and configuring account settings.

**Cluster Configuration:**

- Setting up a MongoDB cluster tailored to the project's requirements.
- Configuring cluster settings, including storage capacity, geographical location, and security options.

**Database Integration:**

- Integrating MongoDB Atlas credentials into the backend code.
- Establishing a secure connection between the application and the cloud database.

By meticulously following these deployment steps, we ensure that our Alumni Website is not only functionally robust but also accessible to users with optimal performance. The coordinated deployment of frontend, backend, and cloud database components contributes to a seamless and reliable user experience.

# Chapter 7

## Conclusion

Looking forward, the Alumni Website has exciting potential for growth and improvement. Here are some key areas we plan to enhance:

**Expanded Profile Options:** Provide more customization options for alumni profiles, allowing them to showcase achievements and projects. Include multimedia elements like videos and portfolios for richer profiles.

**Alumni Success Stories:** Showcase alumni success stories, offering inspiration to current students. Encourage alumni to share their experiences for community building.

**In-Platform Messaging System:** Develop an integrated messaging system within the Alumni Website to foster private communication among alumni. This feature aims to facilitate direct interaction, collaboration, and mentorship opportunities directly within the platform.

These enhancements aim to make the Alumni Website a dynamic hub for alumni engagement, fostering a thriving community for years to come.

## Future Enhancement

In summary, our Alumni Website project endeavors to create a seamless and secure platform for graduates to connect and manage their academic and professional profiles. Utilizing MERN stack technologies, we've crafted a user-centric platform with features like alumni requests and admin controls. Despite challenges, our commitment to delivering a functional and timely solution remains unwavering. We envision the Alumni Website becoming an integral part of our university community, fostering meaningful connections among alumni and enhancing their graduation experiences.

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