

# SENECT : Where Experience Meets Innovation



A

Project Report

Submitted in partial fulfilment of the requirement for the award of degree of

**Bachelor of Technology**

In

**Information Technology**

Submitted to

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2024-2025**

## Declaration

I hereby declared that the work, which is being presented in the project entitled **SENECT** partial fulfilment of the requirement for the award of the degree of **Bachelor of Technology**, submitted in the Department of Information Technology at **Acropolis Institute of Technology & Research, Indore** is an authentic record of my own work carried under the supervision of “**Prof. Kapil Sahu**”. I have not submitted the matter embodied in this report for the award of any other degree.

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# Project Approval Form

I hereby recommend that the project **SENECT** prepared under my supervision be accepted in partial fulfilment of the requirement for the degree of Bachelor of Technology in Information Technology.

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## Acknowledgement

With boundless love and appreciation, we would like to extend our heartfelt gratitude and appreciation to the people who helped us to bring this work to reality. We would like to have some space of acknowledgement for them.

Foremost, we would like to express our sincere gratitude to our supervisor **Prof. Kapil Sahu** whose expertise, consistent guidance, ample time spent and consistent advice that helped us to bring this study into success.

To the project in-charge **Prof. Monika Chaudhary** and project coordinator **Prof. Deepak Singh Chouhan** for their constructive comments, suggestions, and critiquing even in hardship.

To the honourable **Prof. (Dr.) Prashant Lakkadwala**, Head, Department of Information Technology for his favourable responses regarding the study and providing necessary facilities.

To the honourable **Dr. S.C. Sharma**, Director, AITR, Indore for his unending support, advice and effort to make it possible.

Finally, we would like to pay our thanks to faculty members and staff of the Department of Information Technology for their timely help and support.

We also like to pay thanks to our **parents** for their eternal love, support and prayers without them it is not possible.

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## **Abstract**

The SENECT is a web application designed to bridge the gap between alumni and students of a university, fostering meaningful connections and promoting professional growth. The application was developed to address key challenges faced by students, such as limited access to mentorship, lack of centralized resources, and the absence of a dedicated platform for connecting with alumni. By creating an all-in-one solution, SENECT aims to enhance the student experience through personalized guidance, networking opportunities, and community building.

The web application was developed using a combination of advanced technologies, including HTML, CSS and Bootstrap for front-end development to ensure cross-platform compatibility, Node.js with Express.js for a robust back end, and Firebase for efficient data storage and retrieval. Features such as secure private chat, voice and video calling, mentorship rooms, and alumni-led groups were incorporated to facilitate real-time interactions and create a trusted platform for users. The design and development were guided by frameworks like the Technology Adoption Model (TAM) to ensure user-friendliness and effective engagement.

Initial testing and analysis demonstrated the web application's potential to address existing problems. Students reported easier access to mentorship and valuable career resources, while alumni expressed satisfaction in engaging with the university community and sharing expertise. The web application also showed a significant positive impact on community building and professional networking, creating a sense of belonging among users.

The findings underline the importance of leveraging technology to enhance student engagement, mentorship, and alumni relations in higher education settings. The SENECT web application provides a scalable and efficient solution for universities to improve their ecosystem by fostering connections, promoting knowledge sharing, and preparing students for future professional challenges. Its user-centric design and practical applications highlight its potential to become a transformative tool in education technology and alumni management.

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## Abbreviations

- ❖ **AI:** Artificial Intelligence
- ❖ **AWS:** Amazon Web Services
- ❖ **CSS:** Cascading Style Sheets
- ❖ **E-R:** Entity-Relationship
- ❖ **HTML:** Hyper Text Markup Language
- ❖ **IDE:** Integrated Development Environment
- ❖ **RESTful API:** Representational State Transfer Application Programming Interface

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- **1.1 Rationale**

The need for effective student-alumni networking platforms has grown significantly in recent years. Universities lack centralized systems to facilitate communication and mentorship opportunities between students and alumni, leading to missed opportunities for guidance, career development, and collaboration. The SENECT web application addresses this gap by creating a secure, user-friendly platform to strengthen these connections, fostering professional and personal growth.

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- **1.2 Existing System**

Existing solutions like LinkedIn focus on general professional networking but fail to provide a dedicated space tailored to university communities. Additionally, traditional methods, such as email or university events, are often limited in scope, time-consuming, and lack real-time interaction capabilities.

---

- **1.3 Problem Formulation**

- Students often struggle to find suitable mentors for academic and professional guidance.
  - Alumni lack a streamlined way to connect with students and give back to their alma mater.
  - The absence of a dedicated platform results in poor utilization of alumni resources.
- 

- **1.4 Proposed System**

The SENECT web application bridges the gap between students and alumni by providing:

1. *Real-time Communication*: Chat, voice, and video call features for seamless interaction.
2. *Mentorship Rooms*: Secure virtual spaces for personalized guidance.
3. *Skill Endorsements*: Alumni can validate students' skills, enhancing their professional profiles.
4. *Event Hosting*: Tools for alumni to organize webinars and collaborative activities.

- **1.5 Objectives**

1. Facilitate meaningful mentorship relationships between students and alumni.
  2. Enhance professional networking opportunities within the university ecosystem.
  3. Improve access to career resources and guidance.
  4. Strengthen university-alumni relations to benefit both parties.
- 

- **1.6 Contribution of the Project**

- 1.6.1 Market Potential

- The education technology market is expanding, and universities are increasingly adopting digital solutions to improve student experiences.
- SENECT stands out as a niche product tailored for university ecosystems, filling a critical gap in alumni-student engagement.

- 1.6.2 Innovativeness

- Combines real-time communication tools, mentorship rooms, and skill endorsements in a single platform.
- Offers a user-friendly mobile application powered by modern technologies like HTML, CSS, Bootstrap, Firebase and Node.js.

- 1.6.3 Usefulness

- Provides students with access to valuable career advice, job opportunities, and academic support.
  - Enables alumni to give back to their university by mentoring and endorsing skills proposed solution, and objectives.
- 

- Chapter 2:

- Requirement Engineering, including feasibility studies and requirements analysis.

- Chapter 3:

- Analysis & Conceptual Design & Technical Architecture

- Chapter 4:

- Implementation & Testing, detailing development tools, methodologies, and testing strategies.

- Chapter 5:
  - Results & Discussion, presenting the user interface, system snapshots, and database structure.
- Chapter 6:
  - Conclusion & Future Scope, summarizing the project's impact and potential enhancements.

---

This chapter establishes the foundation for understanding the purpose, scope, and contributions of the SENECT web application.

## Chapter 2: Requirement Engineering

---

- 2.1 Feasibility Study

- Technical Feasibility:

The project utilizes modern technologies such as HTML, CSS, Bootstrap, Firebase, and Node.js, ensuring compatibility and scalability. These technologies are widely supported and provide the necessary infrastructure for efficient development and deployment. The availability of cloud hosting platforms like AWS further enhances technical feasibility.

- Economic Feasibility:

The web application is cost-effective due to the use of open-source technologies and free development tools. Minimal investment is required for cloud hosting and database management, making it suitable for implementation within university budgets.

- Operational Feasibility:

SENECT is designed to address existing operational gaps in student-alumni communication. Its user-friendly interface and intuitive design ensure ease of use, while its features align with the needs of both students and alumni, enhancing acceptance and operational success.

Aspect	Description	Conclusion
Technical Feasibility	Availability of technology and tools	Feasible
Economic Feasibility	Budget allocation and ROI	Feasible
Operational Feasibility	User readiness and operational impacts	Feasible
Schedule Feasibility	Project timeline and milestones	Feasible

**Table 2.1:** Feasibility Study Analysis

---

- 2.2 Requirement Collection

- 2.2.1 Discussion

Requirements were gathered through brainstorming sessions with stakeholders, including students, alumni, and university representatives. User surveys and interviews were conducted to identify pain points and desired features.



➤ 2.2.2 Requirement Analysis

The analysis focused on categorizing requirements into functional and non-functional groups, prioritizing features based on their impact and feasibility. Core features such as chat, video calling, and skill endorsements were identified as essential, while additional features like event hosting were considered secondary.

---

• 2.3 Requirements

➤ 2.3.1 Functional Requirements

▪ 2.3.1.1 Statement of Functionality

1. Users should be able to register, log in, and manage their profiles.
2. The system should facilitate real-time communication via chat, voice, and video calls.
3. Alumni should be able to endorse students' skills and organize events.
4. The platform should provide mentorship rooms for secure video-based interactions.
5. The system should maintain user privacy and ensure secure data handling.

➤ 2.3.2 Non-Functional Requirements

▪ 2.3.2.1 Statement of Functionality

1. The app should be accessible on all web browsers.
2. It should have low latency for real-time communication.
3. The system should ensure 99.9% uptime with minimal disruptions.
4. Data should be securely stored and protected against unauthorized access.
5. The interface should be user-friendly and accessible to individuals with varying technical skills.

Requirement Type	Description
Functional Requirements	User login, profile creation, messaging, etc.
Non-Functional Requirements	System performance, security, scalability, etc.

**Table 2.2:** Functional and Non-Functional Requirements

- 2.4 Hardware & Software Requirements

- 2.4.1 Hardware Requirements

- Developer:
      - High-performance PC with at least 16GB RAM and an Intel i7 processor.
      - Stable internet connection.
    - End User:
      - High-performance PC with at least 8 GB RAM and an Intel i5 processor.
      - Stable internet connection.

Hardware Component	Specification	Purpose
Developer Machines	High-performance PC, 16 GB RAM, Intel i7 processor	Development environment
End-User Devices	PC or smartphone, 8 GB RAM, Intel i5 processor	Accessing the system

**Table 2.3:** Hardware Requirements

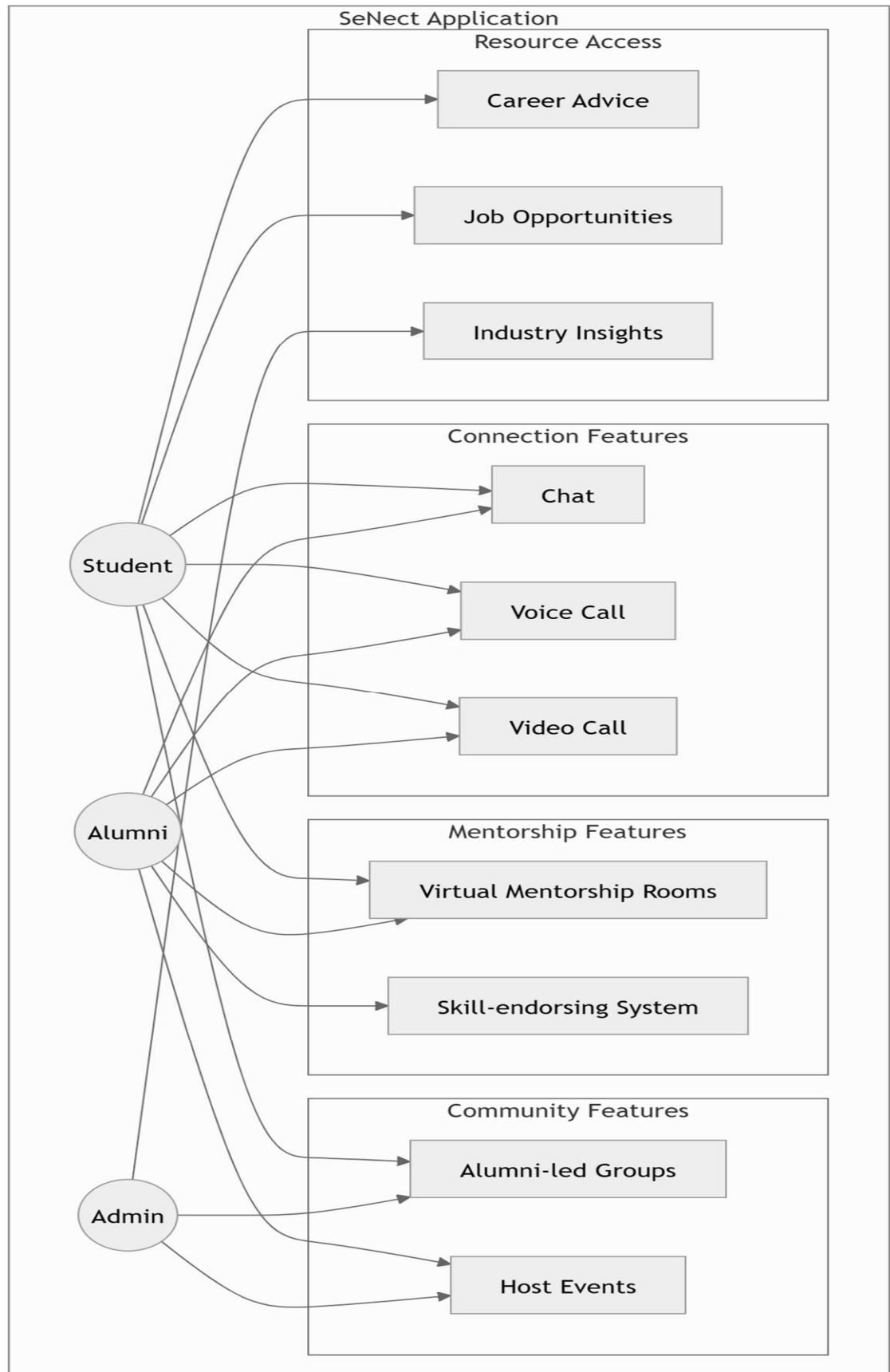
- 2.4.2 Software Requirements

- Developer:
      - Operating System: Windows/Linux/macOS.
      - IDE: Visual Studio Code.
      - Tools: HTML, CSS, Bootstrap, Node.js, Firebase, Git.
    - End User:
      - Operating System: Web Browser.
      - Website: SENECT web application.

Software	Version	Purpose
Operating System	Windows/Linux/macOS	Development and deployment platforms
Frontend Framework	HTML, CSS, Bootstrap	User interface development
Backend Framework	Node.js	Server-side logic and API development
Database	Firebase	Real-time database and user authentication
Development Tools	Visual Studio Code	Code development and editing

**Table 2.4:** Software Requirements

## 2.5 Use-case Diagram:



## ➤ 2.5.1 Use-case Descriptions

### 1. User Registration and Login

- o Actors: Student, Alumni, Admin.
  - o Description: All users must register and log in to the platform using a secure authentication system. Upon logging in, they gain access to features based on their role (Student, Alumni, or Admin).
- 

### 2. Accessing Resources (Career Advice, Job Opportunities, Industry Insights)

- o Actor: Student.
  - o Description: Students can access a library of resources provided by alumni or the university, such as career advice articles, job postings, and industry insights, to enhance their knowledge and career readiness.
- 

### 3. Real-time Communication

- o Actors: Student, Alumni.
  - o Description: Students and alumni can interact through chat, voice calls, or video calls. These features ensure seamless communication, allowing users to connect in real-time for mentorship, discussions, or networking.
- 

### 4. Mentorship Sessions

- o Actors: Student, Alumni.
  - o Description: Students can schedule and participate in secure virtual mentorship sessions with alumni in "Virtual Mentorship Rooms." These sessions enable personalized guidance for academic or career-related queries.
- 

### 5. Skill Endorsement

- o Actor: Alumni.
  - o Description: Alumni can endorse specific skills on a student's profile, providing credibility and enhancing the student's professional profile.
-

## 6. Alumni-led Groups

- o Actor: Alumni.
  - o Description: Alumni can create and manage groups based on shared interests, industries, or goals. These groups foster collaboration, networking, and knowledge-sharing between students and alumni.
- 

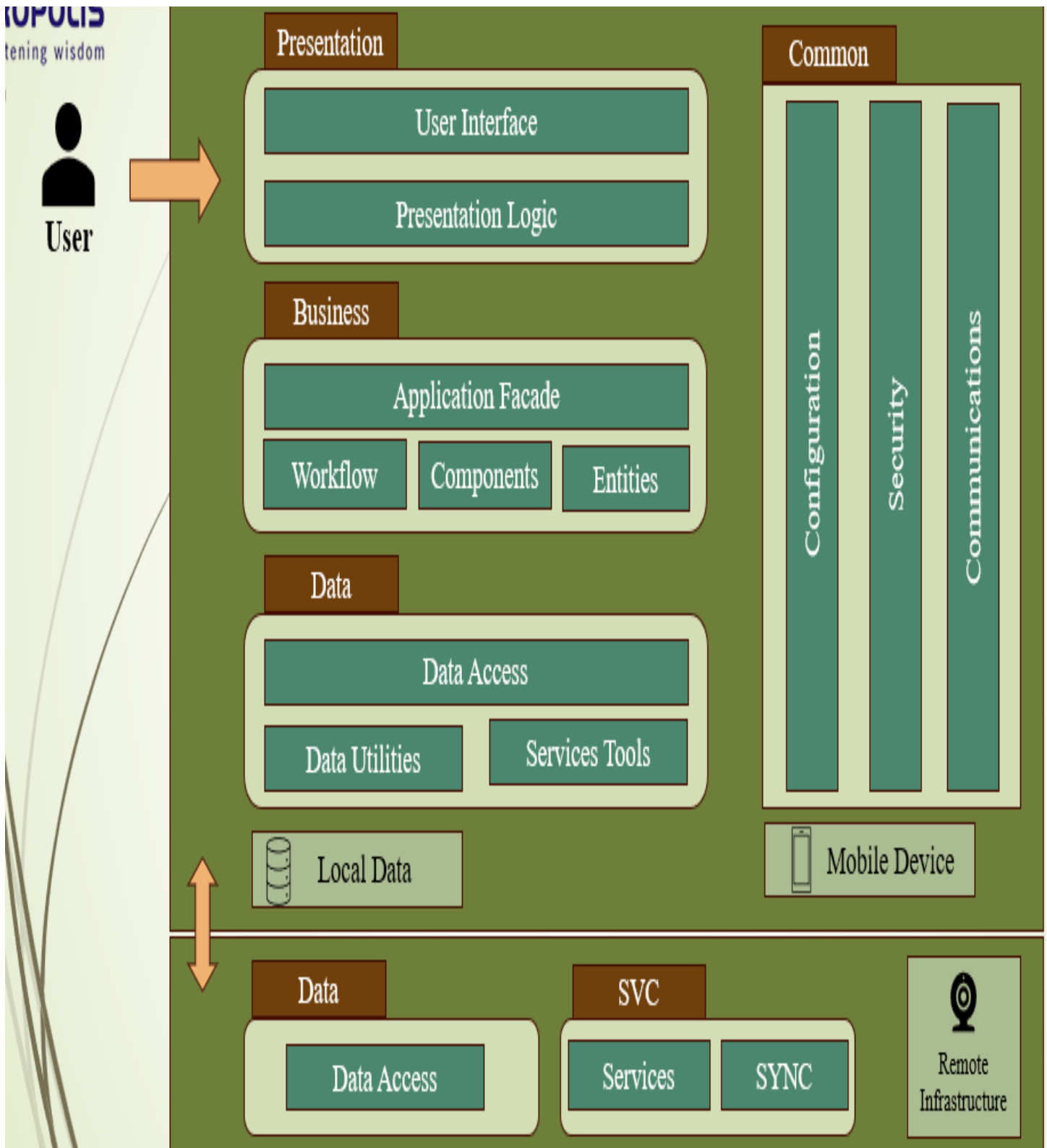
## 7. Event Hosting

- o Actors: Alumni, Admin.
  - o Description: Alumni can host events such as webinars, networking sessions, or collaborative research discussions. Admins oversee the event approval process and ensure adherence to platform guidelines.
- 

This description captures the key functionalities represented in the uploaded use-case diagram, focusing on the interactions between the actors and system features.

## Chapter 3: Analysis & Conceptual Design & Technical Architecture

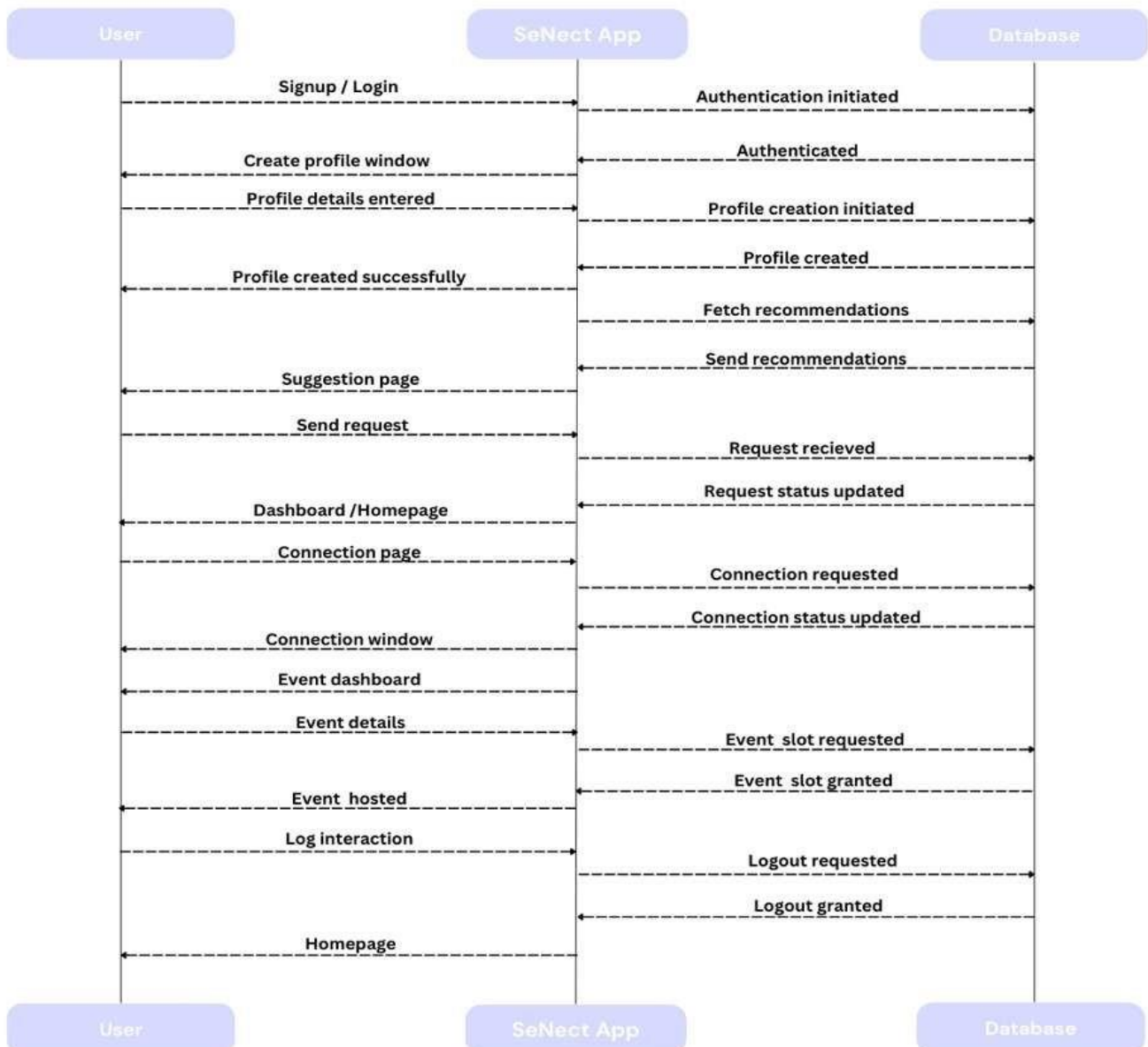
### 3.1 Technical Architecture



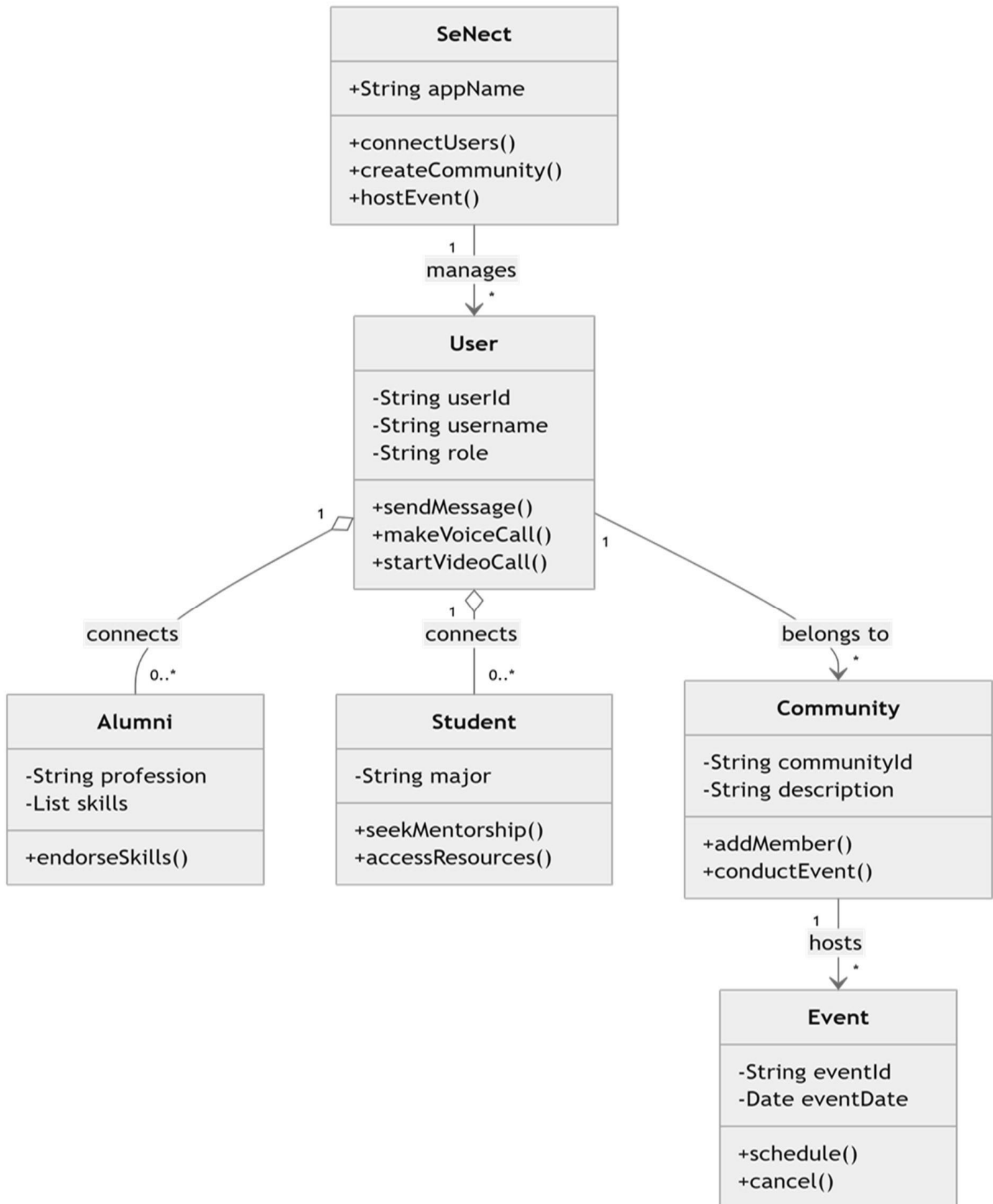
Component	Description
Frontend	HTML, CSS, and Bootstrap for responsive UI design
Backend	Node.js with Express.js for server-side APIs
Database	Firebase for real-time data synchronization
Cloud Infrastructure	Firebase Hosting for scalable web app deployment

**Table 3.1:** Technical Architecture Component

## 3.2 Sequence Diagram

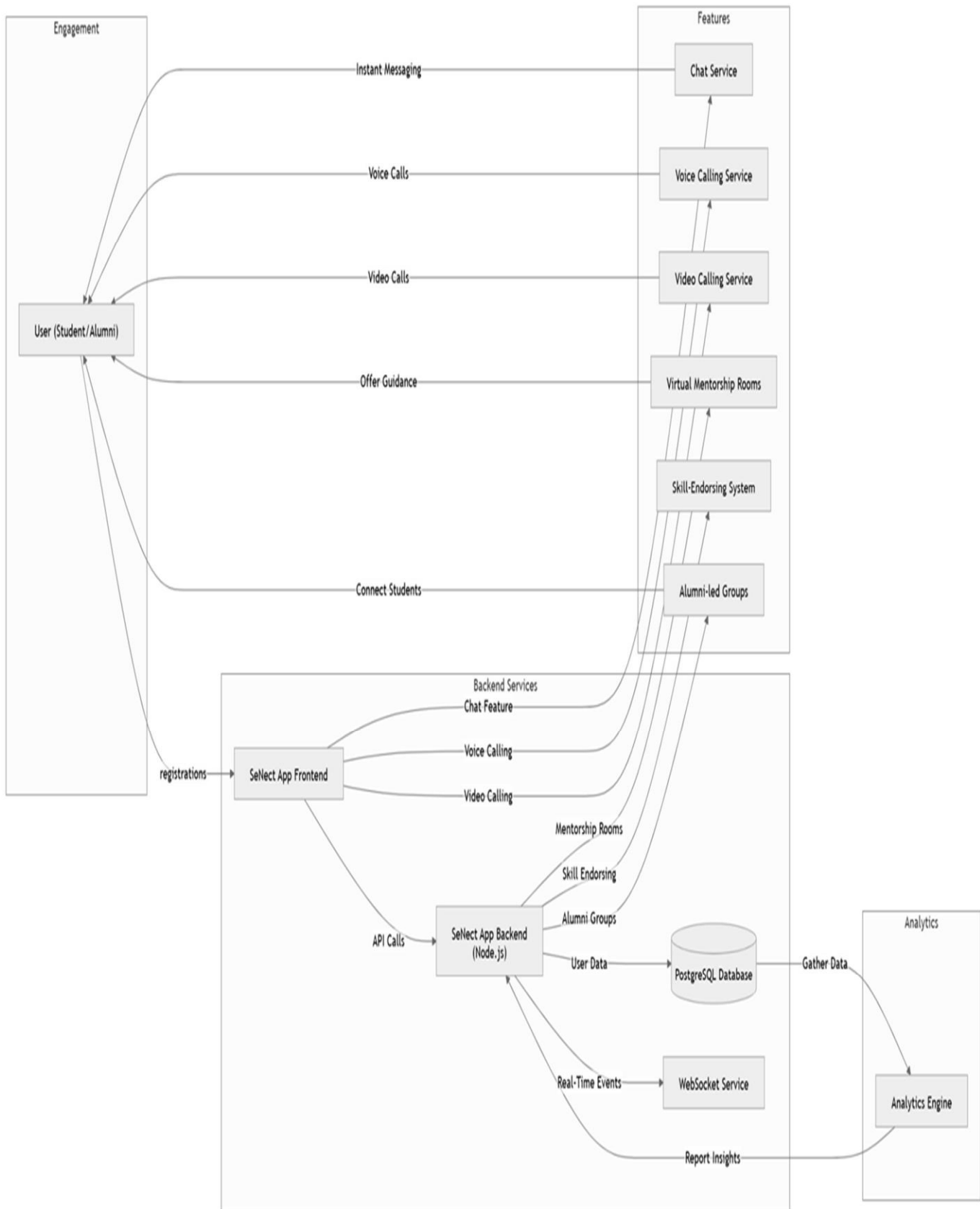


### 3.3 Class Diagram

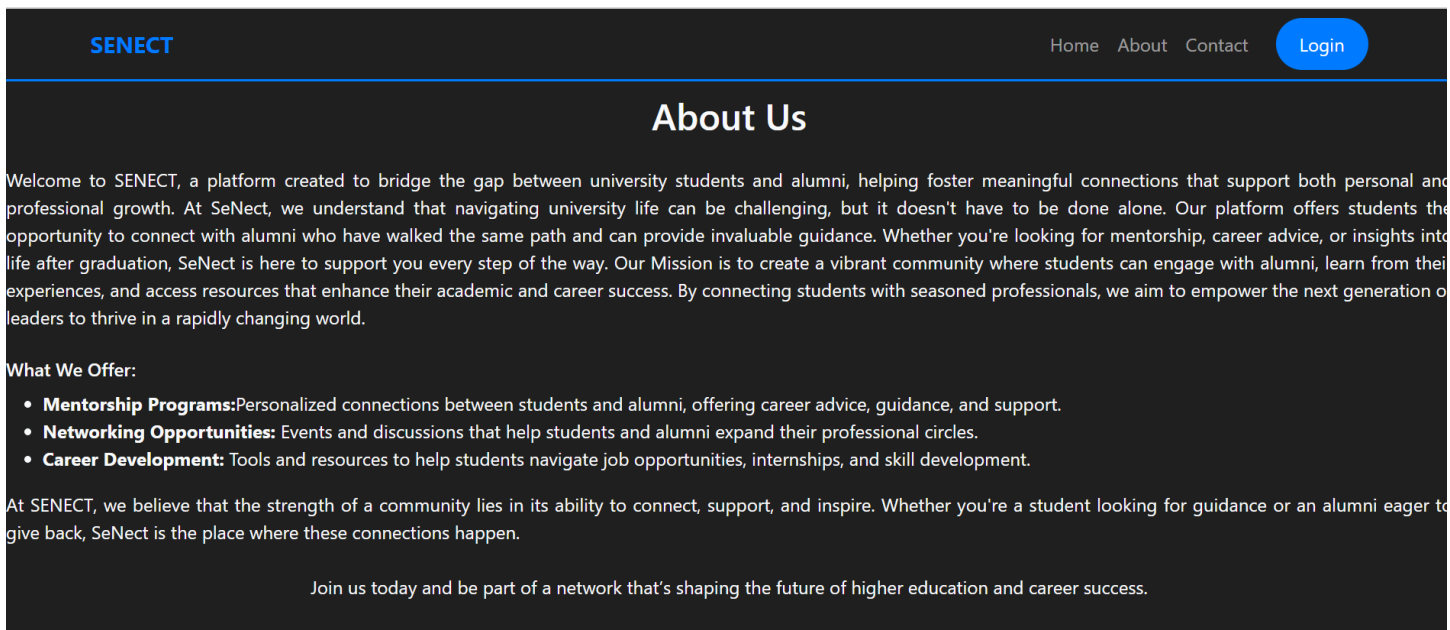
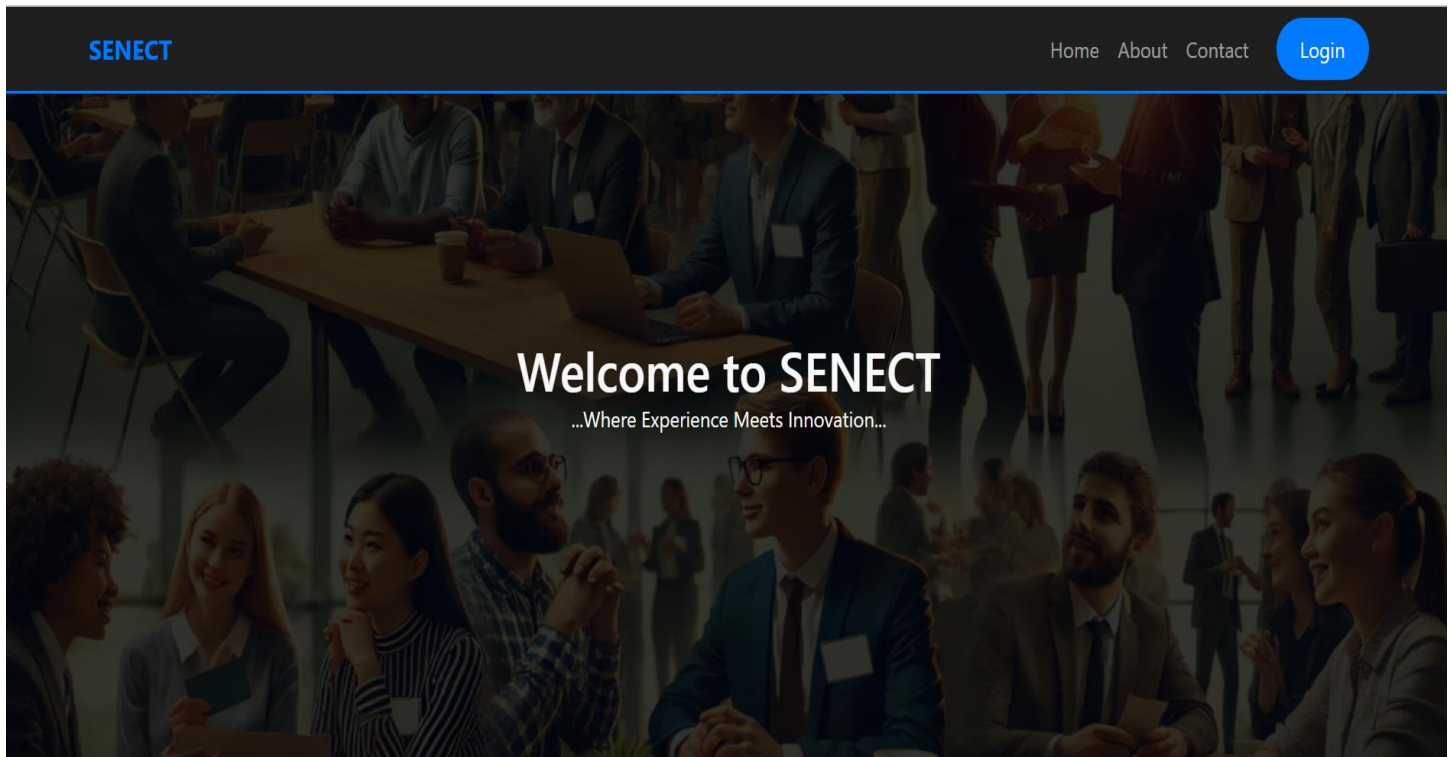




### 3.4 Data Flow Diagram



## 3.5 User Interface Design



## Contact Us

We'd love to hear from you! Whether you have questions, feedback, or need support, the SSENECT team is here to help. Our goal is to make your experience as smooth and enjoyable as possible. If you're a student looking for guidance, an alumni wanting to connect, or anyone with suggestions on how we can improve SENECT, please reach out. We're always happy to assist.

### How to Reach Us:

- **Email Us:** If you have questions or need help, feel free to email us at: [support@senect.com](mailto:support@senect.com)
- **Phone:** For immediate assistance, you can call us at: [+91 1234567890](tel:+911234567890)
- **Social Media:** Connect with us on our social media platforms:
  - [Facebook: @SeNect](#)
  - [Twitter: @SeNectOfficial](#)
  - [LinkedIn: SeNect Network](#)

If you're a student, alumni, or simply interested in learning more about SeNect, don't hesitate to contact us. We're here to ensure that your connection with our platform is seamless, informative, and impactful.

We look forward to hearing from you!

## Create an Account

Username

Email address

Password

Register

## Login

Username

Password

Login

Don't have an account? [Register here](#)

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### Dashboard

[Home](#)

[My Posts](#)

[Notifications](#)

[Settings](#)

### Recent Posts



**User 1**

Check out my latest project on web development!



**User 2**

Excited to share my new data analysis certification.



**John Doe**

Email: johndoe@example.com

Phone: +1 234 567 890

Location: San Francisco, CA

#### Quick Links

[Edit Profile](#)

[Add Certificates](#)

[Update Skills](#)

150 x 150

## John Doe

A passionate developer eager to explore and share knowledge.

[Edit Profile](#)[Logout](#)

### Skills

- JavaScript
- Python
- HTML & CSS
- ReactJS

## Edit Profile

Full Name

Email Address

Password

Bio

Skills

## 3.6 Data Design

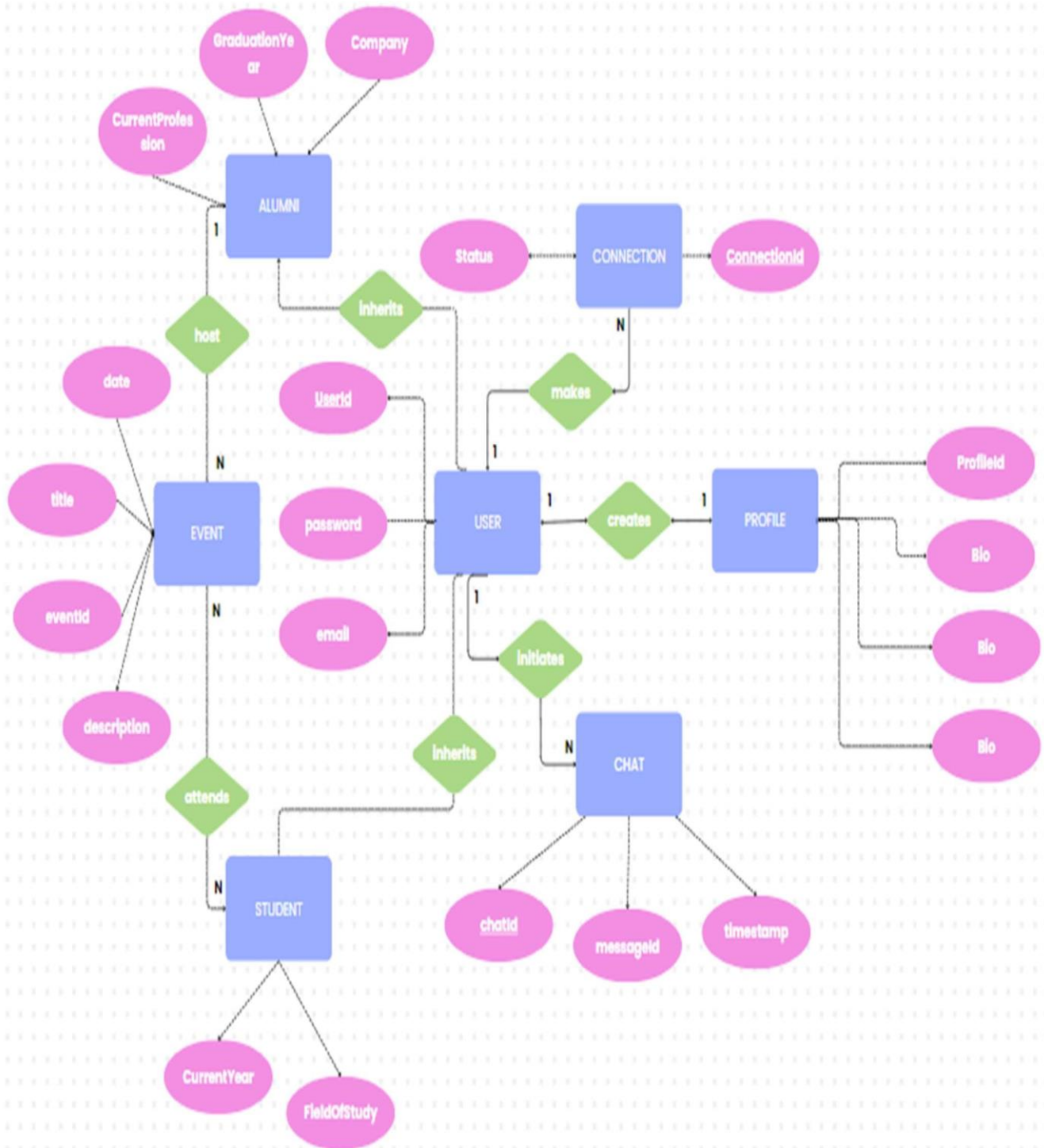
### 3.6.1 Schema Definitions

- This schema represents a system where users (students and alumni) can interact through events, chats, profiles, and connections.
- The USER table is central, with STUDENT and ALUMNI inheriting its attributes to represent specific roles.
- ALUMNI can host events, while STUDENT can attend them, managed via the EVENT and EVENT\_ATTENDEES tables for many-to-many relationships.
- Users can create PROFILE entries for additional personal details, initiate CHAT interactions, and form CONNECTIONS with other users.
- The schema efficiently supports networking, communication, and event participation features.

Table Name	Description
Users	Stores user details (ID, Name, Email, etc.)
MentorshipSessions	Tracks mentorship sessions between users
Messages	Logs chat messages between users
Events	Details of events organized by alumni

**Table 3.2:** Data Schema Description

### 3.6.2 E-R Diagram



## Chapter 4: Implementation & Testing

### 4.1 Methodology

The development methodology for the SENECT website based on an Agile Development Framework, emphasizing iterative and incremental progress with a focus on user-centric design. Regular feedback loops were employed to refine the features and ensure alignment with user needs.

#### 4.1.1 Proposed Algorithm

The website incorporates multiple algorithms for efficient data handling and communication, including:

- User Matching Algorithm: Matches students with alumni based on shared interests, academic background, or career aspirations.

Steps:

1. Input user profiles, including skills, interests, and academic details.
2. Calculate similarity scores using a weighted matrix.
3. Suggest top matches with high similarity scores.

- Real-Time Communication Protocol: Ensures seamless interaction via chat, voice, and video.

Steps:

1. Establish secure WebSocket connections.
2. Encode and transmit data packets in real time.
3. Synchronize client-server communication to maintain low latency.

Step Number	Description
1	Accept input data
2	Process input using defined rules/logic
3	Validate results and handle errors
4	Return processed output or feedback to the user

**Table 4.1:** Proposed Algorithm Steps



## 4.2 Implementation Approach

### 4.2.1 Introduction to Languages, IDEs, Tools, and Technologies

- Front-End Development:
  - o Language: HTML, CSS
  - o Framework: Bootstrap
  - o Features: Responsive UI, animations, and accessibility.
- Back-End Development:
  - o Language: JavaScript
  - o Framework: Node.js with Express.js for efficient server-side logic.
  - o Features: RESTful APIs for seamless data exchange.
- Database:
  - o System: Firebase for relational database management.
  - o Features: Data indexing, backup support, and optimized queries.
- IDEs and Tools:
  - o IDE: Visual Studio Code for development.
  - o Version Control: Git and GitHub for source code management.
  - o Cloud Deployment: AWS for hosting

## 4.3 Testing Approaches

### 4.3.1 Unit Testing

Unit testing focused on validating individual components of the app to ensure their correctness.

Test Cases:

1. Login Feature:
  - Input: Correct username and password.
  - Expected Output: Successful login.
  - Result: Pass.
2. Chat Functionality:

- Input: Message input from user A.
- Expected Output: Message delivered to user B in real-time.
- Result: Pass.

### 3. Skill Endorsement:

- Input: Alumni endorses a student' skill.
- Expected Output: Skill endorsement reflected in the student's profile.
- Result: Pass.

Test Case	Input	Expected Output	Result
Login Validation	Valid credentials	Success message	Pass
Invalid Login Attempt	Invalid password	Error message	Pass
Data Retrieval	Valid request	Correct data returned	Pass

**Table 4.2:** Unit Testing Test Cases and Results

#### 4.3.2 Integration Testing

Integration testing ensured seamless communication between the front-end, back-end, and database.

Test Cases:

##### 1. User Registration:

- Test: Front-end submits registration form to the server.
- Expected Output: User details saved in the database and acknowledgment returned.
- Result: Pass.

##### 2. Voice Calling:

- Test: User A initiates a call to user B.
- Expected Output: Call notification received by user B, and audio communication established.
- Result: Pass.

3. Database Query Performance:

- Test: Retrieve user profile with endorsements.
- Expected Output: Profile data loaded within 2 seconds.
- Result: Pass.

Test Case	Modules Involved	Expected Outcome	Result
Login and Profile Access	Authentication, Profile	Seamless integration	Pass
Messaging Feature	Messaging, Notifications	Messages sent and logged	Pass

**Table 4.3:** Integration Testing Test Cases and Results

## Chapter 5: Results & Discussion

### 5.1 User Interface Representation

#### 5.1.1 Brief Description of Various Modules

1. Login and Registration Module: Provides secure access to users with options for registration, login, and password recovery.
2. Dashboard Module: Displays an overview of activities, notifications, and quick access to key features like mentorship rooms and groups.
3. Mentorship Rooms: Facilitates secure video-based mentorship sessions between students and alumni.
4. Chat and Calling Module: Includes real-time chat, voice, and video call features for seamless communication.
5. Skill Endorsement Module: Allows alumni to endorse student skills, enhancing their professional profiles.
6. Event Management Module: Enables alumni to create and manage events or webinars.

Module	Description
Authentication Module	Handles user login, logout, and registration
Mentorship Module	Facilitates mentor-mentee interactions
Messaging Module	Enables real-time communication
Events Module	Manages event creation and participation

**Table 5.1:** Module Descriptions in the System

### 5.2 Snapshot of System with Brief Description

1. Login Screen: User-friendly interface for logging into the system with email and password authentication.
2. Dashboard: A centralized view showing user statistics, recent messages, and suggested alumni connections.

3. Chat Window: Real-time messaging interface with options for sending text, images, and files.
4. Mentorship Room: Interactive video call screen with integrated notetaking and resource sharing.
5. User Profile: Displays user details, skills, endorsements, and connection history.

## 5.3 Database Description

### 5.3.1 Snapshot of Database Tables with Brief Description

1. Users Table:
  - Fields: UserID, Name, Email, Password, Role (Student/Alumni), Profile Picture.
  - Purpose: Stores user details and access credentials.
2. MentorshipSessions Table:
  - Fields: SessionID, MentorID, MenteeID, Date, Duration, Notes.
  - Purpose: Tracks details of mentorship sessions.
3. Messages Table:
  - Fields: MessageID, SenderID, ReceiverID, Content, Timestamp.
  - Purpose: Stores chat messages for real-time communication.
4. Events Table:
  - Fields: EventID, OrganizerID, Title, Description, Date, Time, Location.
  - Purpose: Manages alumni-hosted events.
5. Endorsements Table:
  - Fields: EndorsementID, EndorserID, EndorseeID, Skill, Timestamp.
  - Purpose: Tracks skill endorsements given by alumni.

Table Name	Field Name	Description
Users	UserID, Name, Email	Stores user basic information
MentorshipSessions	SessionID, MentorID	Details of mentorship interactions
Messages	MessageID, SenderID	Chat messages and their metadata
Events	EventID, OrganizerID	Details about events

**Table 5.2:** Database Tables with Fields and Descriptions

## 5.4 Final Findings

1. The SENECT successfully bridges the gap between students and alumni by providing real-time communication and professional networking tools.
2. Features like mentorship rooms and skill endorsements enhance the overall user experience and add value to both students and alumni.
3. System testing results indicate robust functionality, with all major modules performing as expected.
4. User feedback highlights the ease of use, especially the chat and mentorship features.

## Chapter 6: Conclusion & Future Scope

### 6.1 Conclusion

The SENECT has proven to be an effective solution for fostering connections between university alumni and students. It addresses challenges like limited access to mentorship and professional resources while creating a vibrant and supportive community. By leveraging modern technologies and user-centric design, the website enhances student engagement and strengthens alumni relations, making it a valuable tool for universities.

### 6.2 Future Scope

1. AI-Powered Recommendations: Implementing AI to suggest mentors, events, and resources based on user preferences and activities.
2. Gamification: Adding badges and rewards for active participation to encourage engagement.
3. Multi-Language Support: Expanding the app's usability by offering interfaces in multiple languages.
4. Integration with Job Portals: Linking with career platforms for job postings and application tracking.
5. Enhancements: Introducing offline modes and push notifications for improved accessibility.