SeNect

A

Project Report

Submitted in partial fulfillment 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 fulfillment 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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Acknowledgement

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

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Abstract

The **SeNect** app is a mobile 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 app was developed using a combination of advanced technologies, including **Flutter** for front-end development to ensure cross-platform compatibility, **Node.js with Express.js** for a robust back-end, and **PostgreSQL** 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 app'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 app 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 app 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

- ## Chapter 1: Introduction

- 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 app addresses this gap by creating a secure, user-friendly platform to strengthen these connections, fostering professional and personal growth.

- 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 app 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 Flutter 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.
- Enhances overall student engagement and builds a vibrant community.

- 1.7 Report Organization
- Chapter 1: Introduction to the problem, rationale, 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 app.

Chapter 2: Requirement Engineering

2.1 Feasibility Study

Technical Feasibility:
The project utilizes modern technologies such as Flutter, Node.js, and PostgreSQL, 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 app 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.

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 both Android and iOS platforms.
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.

2.4 Hardware & Software Requirements

2.4.1 Hardware Requirements

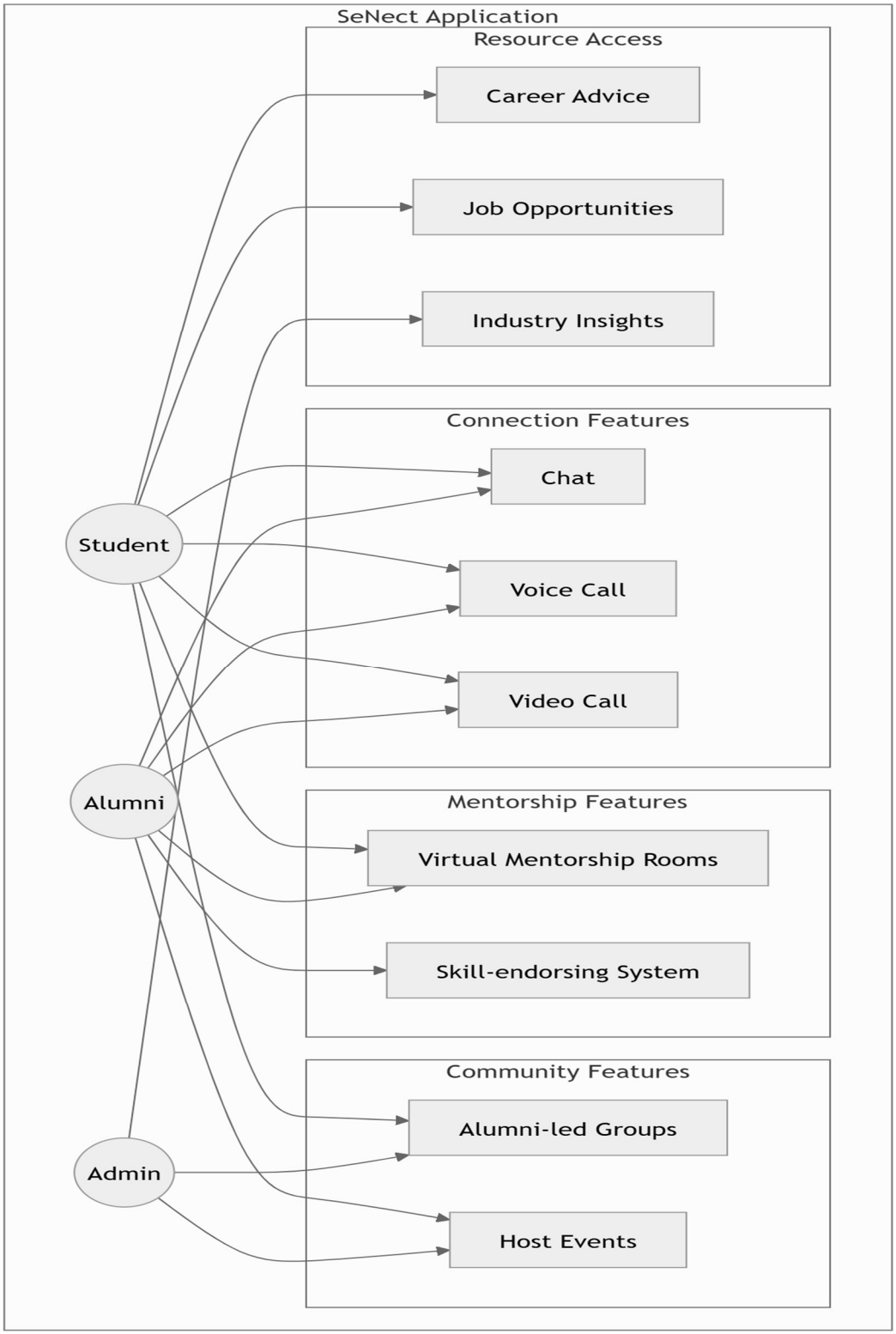
- Developer:
    - High-performance PC with at least 16GB RAM and an Intel i7 processor.
    - Stable internet connection.
- End User:
    - Smartphone with at least 2GB RAM and Android 8.0/iOS 12.0 or higher.
    - Stable internet connection.

- 2.4.2 Software Requirements

- Developer:

    - Operating System: Windows/Linux/macOS.
    - IDE: Visual Studio Code.
    - Tools: Flutter SDK, Node.js, PostgreSQL, Git.
- End User:
    - Operating System: Android/iOS.
    - App: SeNect mobile application (downloadable from app stores).

Use-case Diagram:



- **2.5.1 Use-case Descriptions**

- **1. User Registration and Login**
- **Actors**: Student, Alumni, Admin.
- **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)**
- **Actors**: Student.
- **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**
- **Actors**: Student, Alumni.
- **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**
- **Actors**: Student, Alumni.
- **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**
- **Actors**: Alumni.
- **Description**:
  Alumni can endorse specific skills on a student's profile, providing credibility and enhancing the student's professional profile.

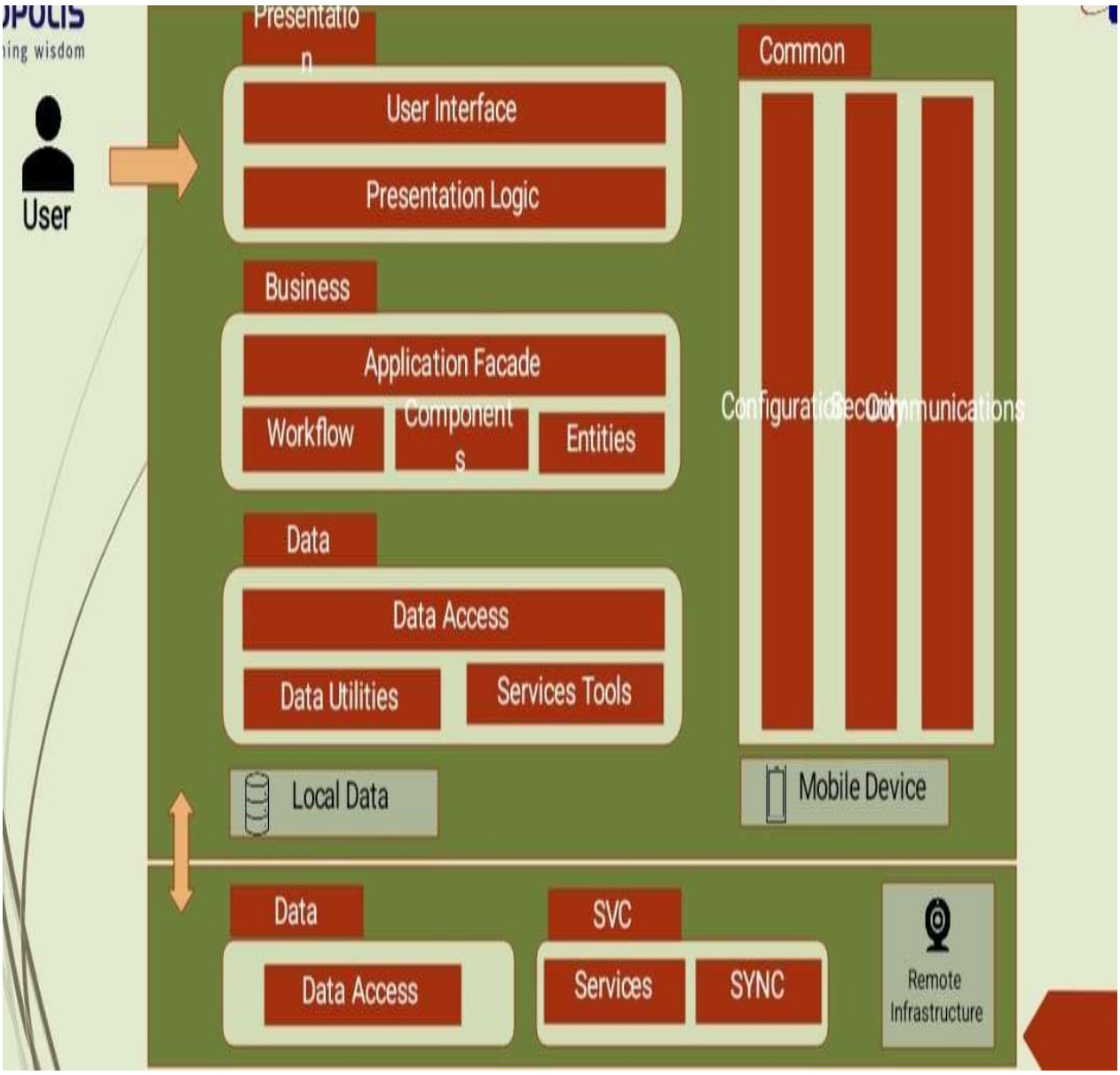
- **6. Alumni-led Groups**
- **Actors**: Alumni.
- **Description**:
  Alumni can create and manage groups based on shared interests, industries, or goals. These groups foster collaboration, networking, and knowledge-sharing between students and alumni.

- **7. Event Hosting**
- **Actors**: Alumni, Admin.
- **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.

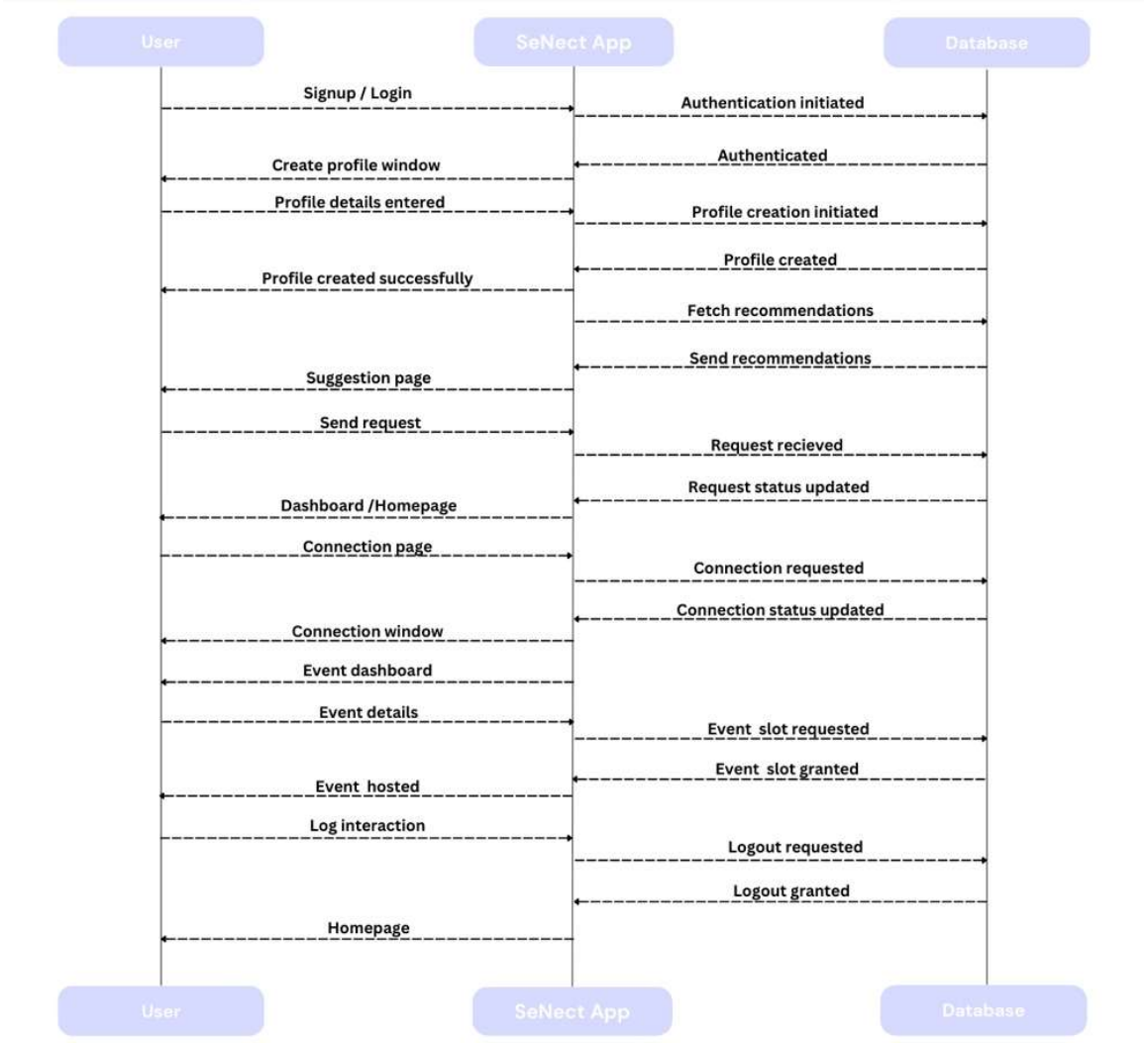
This description captures the key functionalities represented in the uploaded use-case diagram, focusing on the interactions between the actors and system features.

Chapter 3: Analysis & Conceptual Design & Technical Architecture

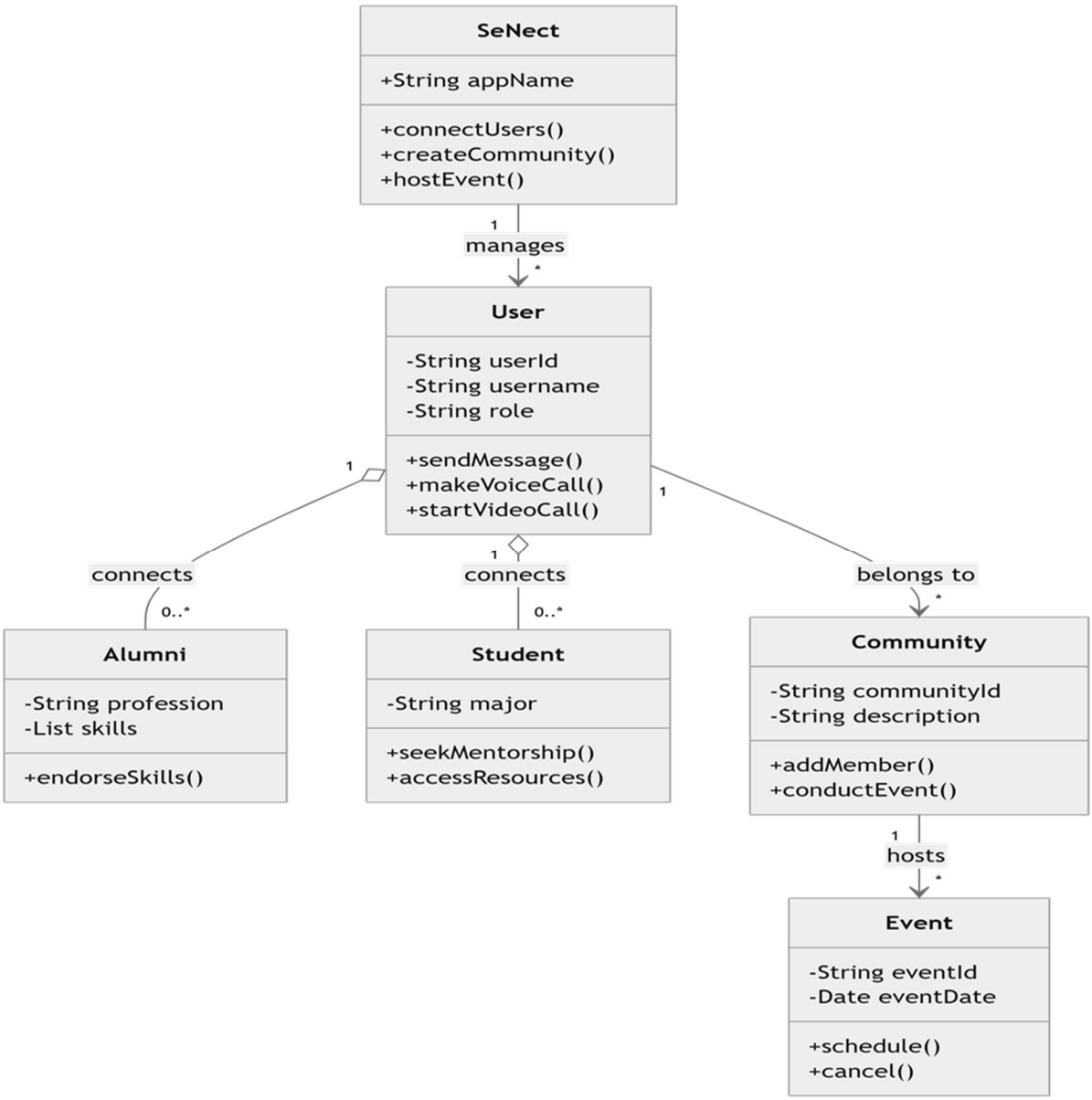
3.1 Technical Architecture



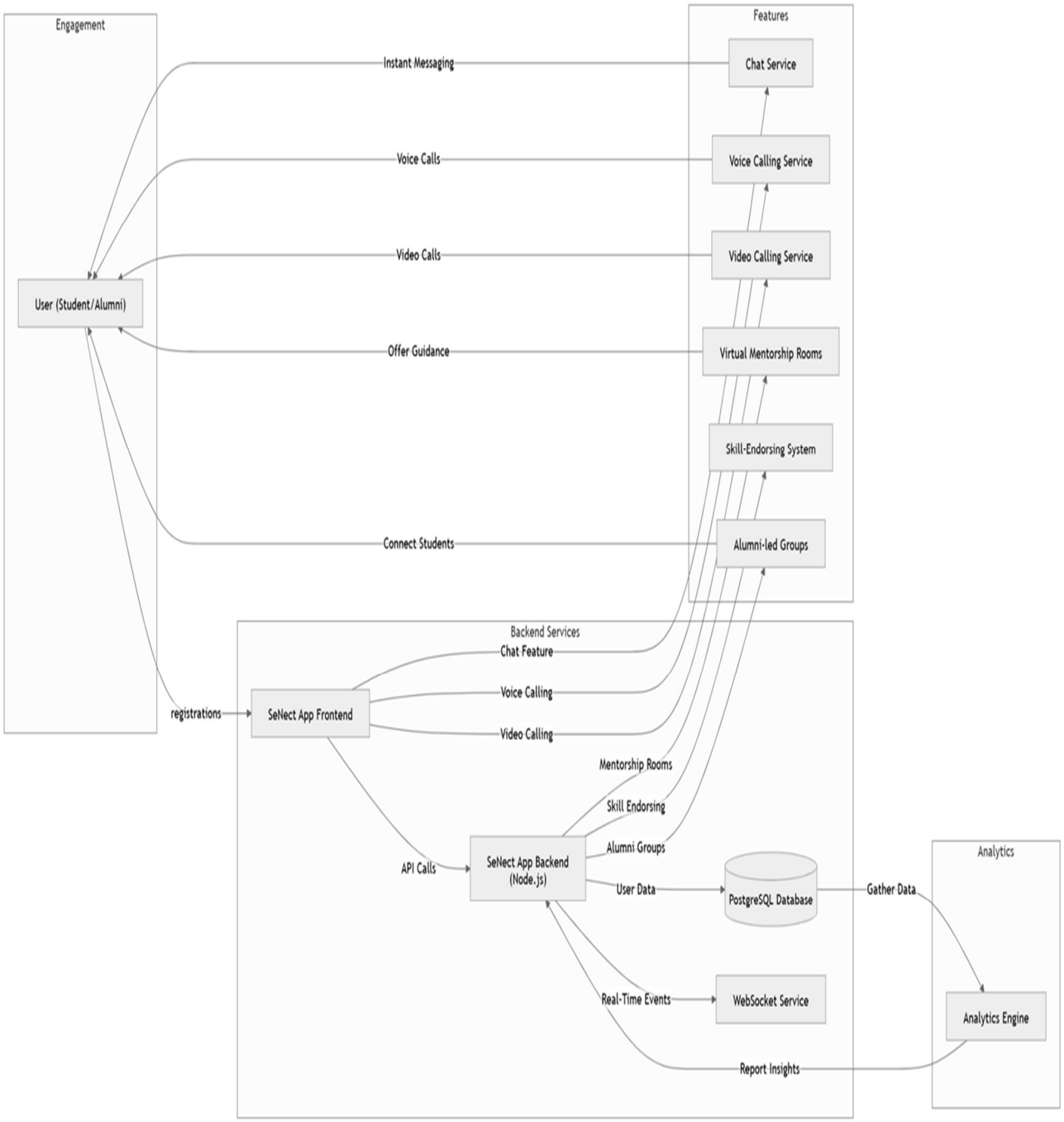
3.2 Sequence Diagram



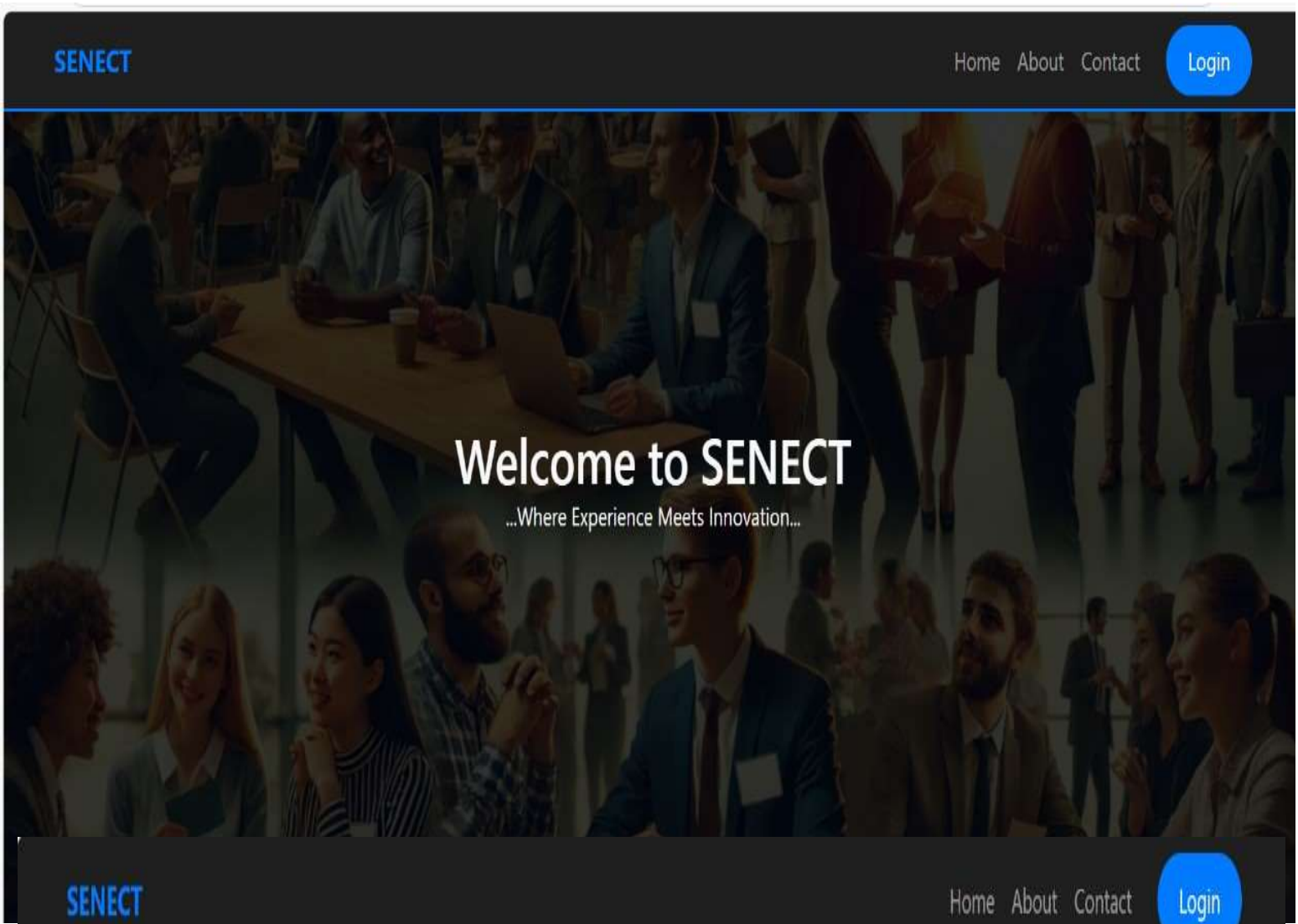
3.3 Class Diagram

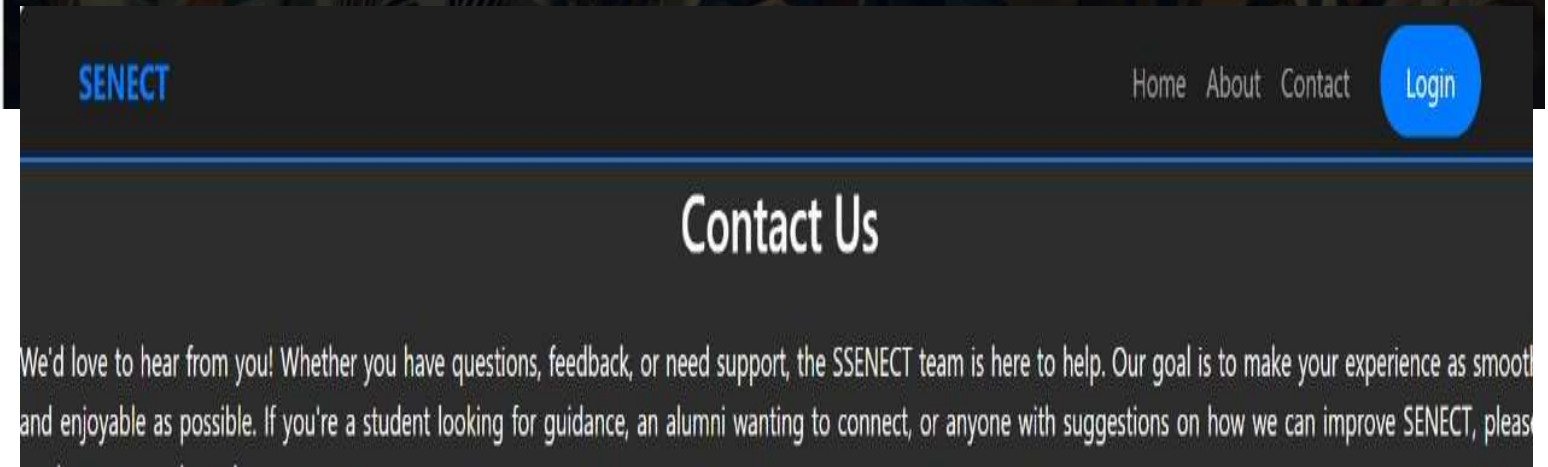


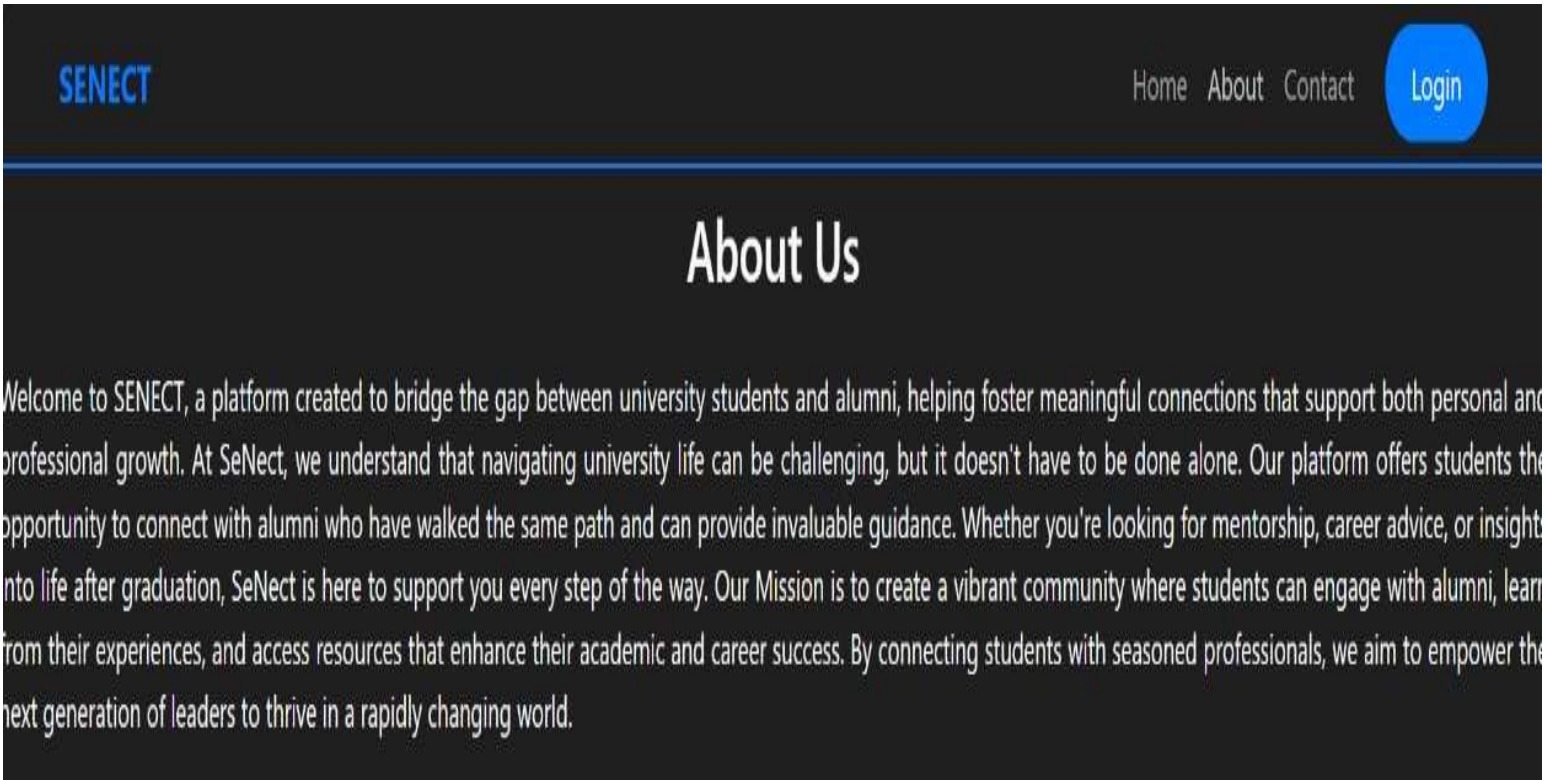
3.4 DFD

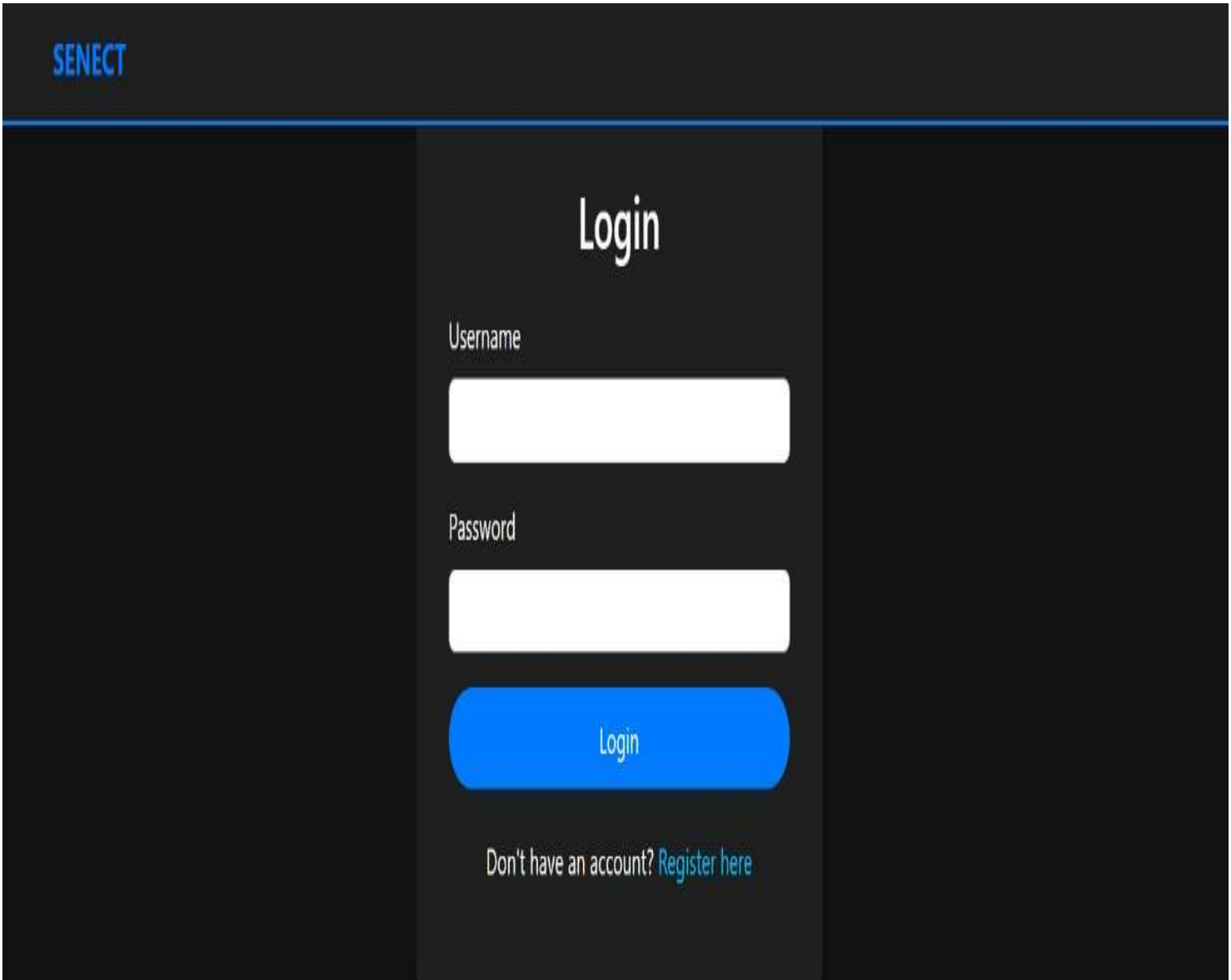

Engagement
Features
Instant Messaging
Chat Service
Voice Calls
Voice Calling Service
Video Calls
Video Calling Service
User (Student/Alumni)
Offer Guidance
Virtual Mentorship Rooms
Skill-Endorsing System
Connect Students
Alumni-led Groups
Backend Services
Chat Feature
Voice Calling
registrations
SeNect App Frontend
Video Calling
Mentorship Rooms
Skill Endorsing
Alumni Groups
API Calls
SeNect App Backend (Node.js)
User Data
PostgreSQL Database
Gather Data
Analytics
Real-Time Events
WebSocket Service
Analytics Engine
Report Insights

3.5 User Interface Design






SENECT
Home About Contact
Login
About Us
Welcome to SENECT, a platform created to bridge the gap between university students and alumni, helping foster meaningful connections that support both personal and
professional growth. At SeNect, we understand that navigating university life can be challenging, but it doesn't have to be done alone. Our platform offers students the
opportunity to connect with alumni who have walked the same path and can provide invaluable guidance. Whether you're looking for mentorship, career advice, or insights
into life after graduation, SeNect is here to support you every step of the way. Our Mission is to create a vibrant community where students can engage with alumni, learn
from their experiences, and access resources that enhance their academic and career success. By connecting students with seasoned professionals, we aim to empower the
next generation of leaders to thrive in a rapidly changing world.

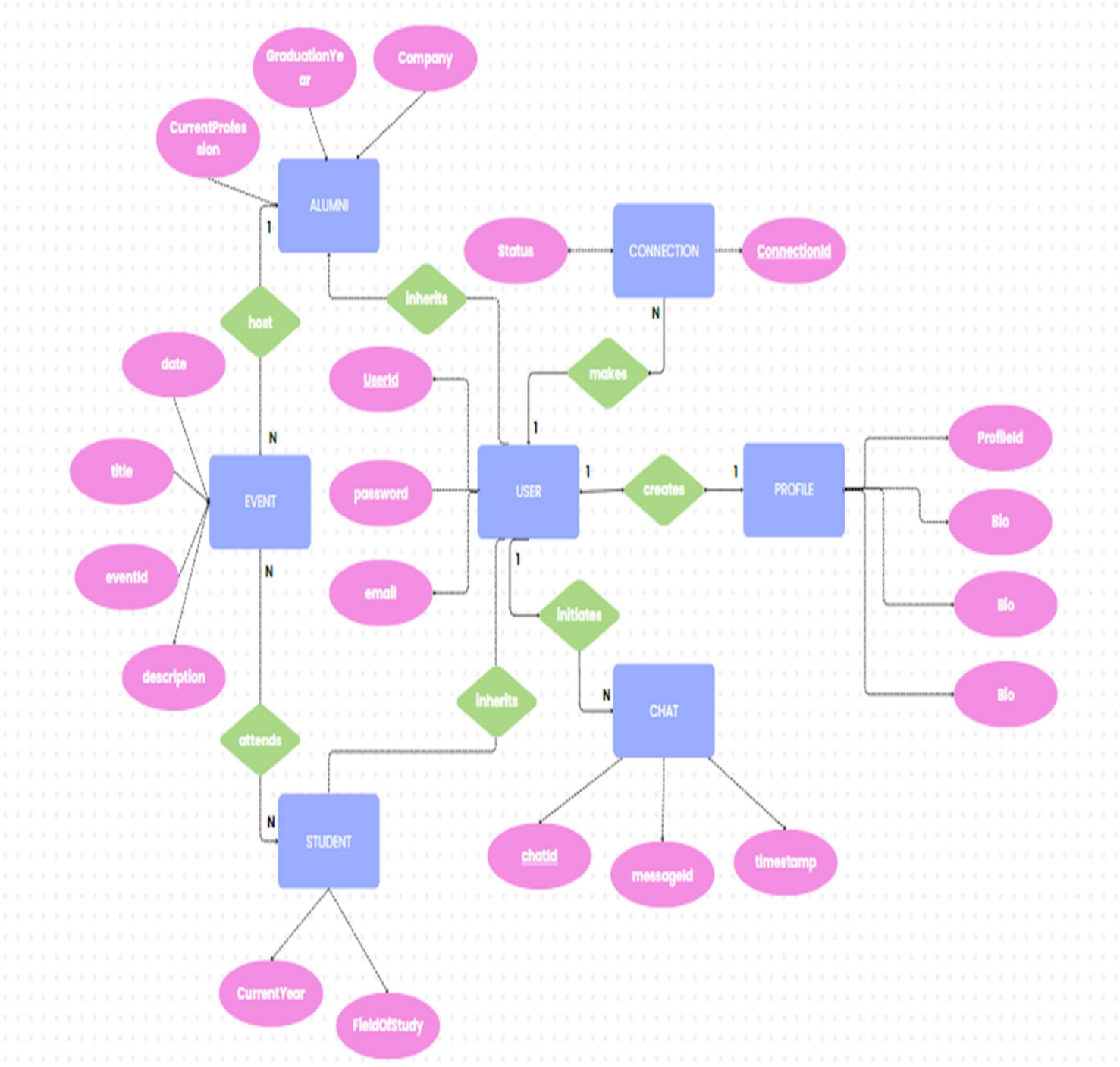

SENECT
Login
Username
Password
Login
Don't have an account? Register here

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.

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.

4.2 Implementation Approach

4.2.1 Introduction to Languages, IDEs, Tools, and Technologies

- Front-End Development :
  - Language: Dart
  - Framework: Flutter for cross-platform compatibility.
  - Features: Responsive UI, animations, and accessibility.

- Back-End Development :
  - Language: JavaScript
  - Framework: Node.js with Express.js for efficient server-side logic.
  - Features: RESTful APIs for seamless data exchange.

- Database :
  - System: PostgreSQL for relational database management.
  - Features: Data indexing, backup support, and optimized queries.

- IDEs and Tools :
  - IDE: Visual Studio Code for development.
  - Version Control: Git and GitHub for source code management.
  - Cloud Deployment: AWS or Heroku 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's skill.
   - Expected Output : Skill endorsement reflected in the student's profile.
   - Result : Pass.

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.

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.

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 note-taking 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.

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 app 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.