American International University- Bangladesh (AIUB)

**Department of Computer Science**
**Faculty of Science & Technology (FST)**

# Student Skill Bridge

A Software Engineering Project Submitted
By

| **Semester: Fall_24_25** | | **Section:** | **Group Number:** | |
|---|---|---|---|---|
| SN | Student Name | Student ID | Contribution (CO3+CO4) | Individual Marks |
| 1 | Golam Kibria | 22-49507-3 | 33.33% | |
| 2 | Sadman Sakib Shad | 22-49501-3 | 33.33% | |
| 3 | Showrav Ghosh | 23-50666-1 | 33.33% | |
| | | | | |
| | | | | |

The project will be evaluated for the following Course Outcomes

| **CO3: *Select* appropriate software engineering models, project management roles, and their associated skills for the complex software engineering project and evaluate the sustainability of developed software, taking into consideration the societal and environmental aspects** | Total Marks | |
|---|---|---|
| Appropriate Process Model Selection and Argumentation with Evidence | [5 Marks] | |
| Evidence of Argumentation Regarding Process Model Selection | [5Marks] | |
| Analysis of the impact of societal, health, safety, legal, and cultural issues | [5Marks] | |
| Submission, Defense, Completeness, Spelling, grammar, and Organization of the Project report | [5Marks] | |
| **CO4: *Develop* a project management plan to manage software engineering projects following the principles of engineering management and economic decision process** | Total Marks | |
| Develop the project plan, its components of the proposed software products | [5Marks] | |
| Identify all the activities/tasks related to project management and categorize them within the WBS structure. Perform detailed effort estimation correspond with the WBS and schedule the activities with resources | [5Marks] | |

| | | |
|---|---|---|
| Identify all the potential risks in your project and prioritize them to overcome these risk factors. | [5Marks] | |
| **CO5: Perform as an effective team member or leader in diverse team settings and solve multi-disciplinary problems in the computer science and engineering domain** | Total Marks | |
| Taking project responsibility: perform assigned tasks on time independently | [5 Marks] | |
| Contribution to project group meetings, sharing fruitful ideas | [5Marks] | |
| Positive attitude towards group work, collaboration, compromise, helping others to understand their project work responsibility | [5Marks] | |
| Showing respect and value towards other team member's opinion | [5Marks] | |

Description of Student's Contribution in the Project work

Student Name: Golam Kibria
Student ID: 22-49507-3
Contribution in Percentage (%): 33.33%
Contribution in the Project:

- Choosing project idea
- Choosing appropriate process model for the project
- Use Case Diagram

Kibria

_____
Signature of the Student

Student Name: Sadman Sakib Shad
Student ID: 22-49501-3
Contribution in Percentage (%): 33.33%
Contribution in the Project:

- Choosing project idea
- Requirement gathering and analysis
- Actity Diagram

Shad

_____
Signature of the Student

Student Name: Showrav Ghosh
Student ID: 23-50666-1
Contribution in Percentage (%): 33.33%
Contribution in the Project:

- Choosing project idea
- Class Diagram

| |
|---|
| ▪ State Diagram<br><br>Showrav<br>_____<br>Signature of the Student |
| Student Name:<br>Student ID:<br>Contribution in Percentage (%):<br><u>Contribution in the Project:</u><br>▪ Contribution Description 1<br>▪ Contribution Description 2<br><br>_____<br>Signature of the Student |
| Student Name:<br>Student ID:<br>Contribution in Percentage (%):<br><u>Contribution in the Project:</u><br>▪ Contribution Description 1<br>▪ Contribution Description 2<br><br>_____<br>Signature of the Student |

## 1. PROJECT PROPOSAL

### 1.1 Background to the Problem

In Bangladesh, many students look for part-time jobs and internships to gain experience and support their education. However, most job platforms are made for professionals and don't match opportunities based on a student's background, skills, or interests. As a result, students often struggle to find the right internships or part-time work. The process is unorganized and lacks helpful features like video resumes, easy online applications, and virtual interviews. This project aims to create a platform designed for Bangladeshi students, making it easier for them to find suitable jobs and internships that match their profile.

**Root Cause and Importance of the Problem:**

Most job platforms in Bangladesh are made for professionals, not students. They don't match jobs or internships based on a student's education, skills, or need for flexible hours. This makes

it hard for students to find suitable opportunities. The problem is important because many students rely on part-time work and internships to support their education and gain experience. Without the right platform, they miss out on chances to grow, earn, and prepare for their future careers.

## 1.2 Solution to the Problem

### Objective:

The main objective of our project **Student Skill Bridge** is to build an AI-based job portal that helps **students find part-time jobs and internships** that match their skills, interests, and academic background. We want to make the job search process easier, faster, and more personalized for students.

**To solve the current problems, the platform will provide:**

- Personalized job and internship recommendations
- Student-friendly profiles that highlight academic and extracurricular achievements
- Video resumes and online interviews for better communication with employers
- Direct application system for client-posted jobs

### Proposed Solution:

1. **AI-Powered Job Recommendation:** The system will analyze a student's portfolio (skills, experience, education) and suggest suitable job/internship circulars.
2. **Job Circular Posting (Client Feature):** Employers or clients can easily post part-time jobs or internship opportunities with detailed requirements.
3. **Video Interview Scheduling:** Students and employers can schedule and attend interviews directly through the platform (live or recorded).
4. **Physical Interview Management:** Employers can also set physical interview locations and time slots that students can select and confirm.
5. **Video Introduction for Students:** Students can upload a short video introduction to make their profile stand out to employers.
6. **Smart Dashboard for Users:** Students can track their applications and interview updates; employers can manage job postings and view applicants.
7. **Secure Messaging System:** An end-to-end encrypted communication platform enabling seamless interaction between job seekers and recruiters.
8. **Enhanced Data Security:** Implement robust encryption protocols to protect user data and adhere to GDPR and other data protection regulations.

### Appropriateness:

This solution is perfect because it is specially designed for students, helping them find part-time jobs and internships easily. The AI matches jobs based on their skills and interests, making the search faster and more accurate. With features like video resumes, online interviews, and in-app messaging, the platform makes applying simple, modern, and student-friendly—perfect for students in Bangladesh.

**Feasibilities:**

The platform uses available technology, making it easy to build and affordable to maintain. It's scalable, can grow with local partnerships and it is tailored to the needs of students and employers in Bangladesh.

**Functionalities:**

- **Personalized Dashboard:** Users can track applications, receive notifications and view job matches.
- **Real-Time Feedback:** Recruiters can provide feedback on application directly through the platform.
- **Analytics:** Job seekers can view insights into their profile visibility and application status, while recruiters can track candidate metrics.

**Targeted Group:**

- **College and University Students in Bangladesh:** Students looking for part-time jobs or internships to support their education and gain experience.
- **Employers:** Local businesses and organizations needs students for part-time work or internships. The platform connects students with job opportunities and helps employers find skilled student workers.

**Benefits:**

- **Students will benefit by:**
    - Finding jobs that match their skills.
    - Gaining work experience for their career.
    - Easily applying and communicating with employers.
- **Employers will benefit by:**
    - Accessing skilled students for part-time jobs.
    - Streamlining the hiring process with easy job postings and applications.

**Contribution to Scientific Development:**

- **Advancing AI:** Using AI for personalized job recommendations for students.
- **Improving Job Platforms:** Focusing on student needs, creating a new model for student job platforms.
- **Enhancing Educational Tech:** Integrating video resumes and online interviews to improve the job application process. These innovations help develop AI and tech-driven solutions for student employment.

**Literature Review:**

Other platforms like LinkedIn, Indeed and BDjobs help people find jobs but they are not focused on students. Some studies also use AI for job matching but not for part-time student jobs and internship.

**Contribution:**

Our project focused on students and adds:

- AI-based job matching
- Video resumes and interviews
- A simple, mobile friendly platform

It solves the gaps in existing systems by making job search easier for students.

**Existing Studies:**

- **AI in Job Matching:** Used to suggest jobs based on skills.
- **Student Job Problems:** Studies show students face trouble finding suitable part-time jobs.
- **Job Platforms:** Sites like Indeed and BDjobs exist but they are not student-friendly or student-focused. These studies show the need for a better platform for students such as the one we are building.

**Existing Software Solution:**

- **BDjobs:** Popular in Bangladesh but mainly for full-time jobs and not student-focused.
- **Internshala:** Focused on internships, mostly in India with limited support for Bangladeshi students.
- **LinkedIn:** Global platform for professionals, not ideal for students looking for part-time or internship.
- **Fiverr/Upwork:** Good for freelance work but not designed for student internship or part-time jobs.

These platforms do not fully meet the needs of Bangladeshi students seeking part-time jobs or internships.

**Proposed Enhancement:**

- Focused only on Bangladeshi students
- Uses AI to match jobs based on skills
- Supports video resumes and online interviews
- Allows easy chat between students and employers
- Connect with local businesses

## 2. SOFTWARE DEVELOPMENT LIFE CYCLE

### 2.1 Process Model

**Analysis of the Nature and Environment of the Software**

**Nature of the Software**

The proposed software **"Student Skill Bridge"** is a **web-based, AI-powered job portal** specifically targeted at **Bangladeshi students** seeking **part-time jobs and internships**. It integrates features like intelligent job recommendations, video resumes, online interviews, and a secure messaging system. The platform connects students with local businesses and employers in a streamlined and user-friendly way.

**Characteristics:**

- **Domain:** Educational Technology / Employment Portal
- **Target Users:** Students, Employers/Clients (Local Businesses), Admins
- **Platform:** Cross-platform (Web-first, Mobile-friendly interface)
- **AI Usage:** Personalized job recommendation system using Machine Learning
- **Security Needs:** High
- **Scalability:** High—expected to scale to support many students and employers

**Environment of the Software**

This software will operate in an **online, cloud-based environment**, supporting:

- **Remote access:** Students and employers can use it anytime, from anywhere.
- **Cloud database:** Centralized storage using Firebase for flexibility and scalability.
- **Secure communication protocols:** Encrypted API for chat and interview data.
- **Video integration environment:** Supports video uploads (resumes) and embedded live/recorded interviews via third-party APIs such as ZOOM.

**Selected Process Model:**

**SCRUM** is the suitable process model of our project which support **Agile Methodology**.

**Justification of using SCRUM process model:**

**Agile with Scrum – Best Fit**

- **Flexibility:** Agile supports changing requirements which is important for a student-focused platform where user feedback may lead to frequent updates.
- **Incremental Delivery:** Features like video resumes, AI job matching, and interview scheduling can be delivered in iterations.
- **Continuous Feedback Loop:** Scrum allows us to get input from students and employers after each sprint, improving feature quality.
- **User-Centric Design:** Agile encourages involving end-users during development—perfect for this platform that serves students and local employers.

- **Risk Reduction:** Early testing and continuous integration minimize failure risks and reveal issues quickly.
- **Team Collaboration:** Scrum ensures good coordination among team members with daily stand-ups and sprint planning.

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**Waterfall Model – Not Suitable**

- **Rigid Phases:** Waterfall requires all requirements upfront, which is not realistic for evolving student needs.
- **Late Testing:** Errors are detected only at the end, which may delay finding issues in AI models or video tools.
- **No Room for Feedback:** Does not allow incorporating user feedback during the development process.

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**V-Model – Not Suitable**

- It is testing-focused but lacks flexibility for ongoing changes.
- Not effective for modern web apps needing regular UI/UX improvement based on usage data.

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**Spiral Model – Too Complex for Scope**

- Though it handles risk well, it's more suited for large, complex, high-budget projects.
- Requires expert-level planning and risk analysis which may not align with a student project team.

**Evidence for supporting SCRUM:**

- **Case Studies:** Platforms like LinkedIn, Internshala, and Upwork successfully used Agile for continuous feature growth.
- **Applicability to the Portal:** Agile's iterative sprints align perfectly with the evolving needs of a student-focused job portal.
- **Proven Effectiveness:** Agile improves success rates, speeds up delivery, and reduces risks, as shown by industry research.

## 2.2 Project Role Identification and Responsibilities

**Identified Roles and Responsibilities:**

- **Product Owner**
  - **Assigned To:** Sadman Sakib Shad
  - **Responsibilities:**
    - Creates and maintain the Product Backlog.
    - Prioritizing backlog items based on business value and user needs.
    - Validates deliverables at the end of each sprint to ensure alignment with goals.
    - Acts as a bridge between stakeholders and the development team.
- **SCRUM Master**
  - **Assigned To:** Golam Kibria
  - **Responsibilities:**
    - Ensures the team follows SCRUM practices and principles.
    - Facilitates Scrum ceremonies: Scrum meeting, sprint planning, reviews.
    - Removes impediments or blockers affecting the development team.
    - Acts as a coach, promoting team collaboration and performance.
- **SCRUM Team**
  - **Assigned To:** Sadman Sakib Shad, Golam Kibria and Showrav Ghosh
  - **Responsibilities:**
    - Self-organize deliver working software by the end of each sprint.
    - Participates in planning and estimating user stories.
    - Design, develops, tests and integrates system components.
    - Works collaboratively to meet sprint goals.
    - Ensures code quality, performance and security standards are met.
- **Customers:**
  - **Assigned To:** Golam Kibria, Sadman Sakib Shad and Showrav Ghosh
  - **Responsibilities:**
    - Use the platform for job hunting or hiring.
    - Provide feedback on features, usability and performance.
    - Participate in beta testing and surveys.
    - Help shape development priorities through real-world use cases.
- **Management:**
  - **Assigned To:** Showrav Ghosh
  - **Responsibilities:**
    - Provides budget, infrastructure and team resources.
    - Monitors overall project progress and goals.
    - Ensures alignment with institutional or business strategy.
    - Supports and agile work environment and encourages collaboration.

- Approves major releases and oversees project governance.

**Stakeholders:**

- **Students:** Primary users of the platform who create profiles, search for jobs, apply and provide feedback on usability and features.
- **Employers:** Key users who post jobs, review applications and communicate with students and provide input on improving job listing features.

# 3. Requirements

## 3.1 Functional Requirements:

1. **Student Side:**
   1.1. The system shall allow students to register by providing their full name, email, username, gender, nid no, phone number, address, date of birth, user type (student), and password (must be 8 characters with a combination of letters, numbers, and special symbols).
   1.2. The system shall allow students to login using their registered email, username, or phone number along with their password.
   1.3. The system shall allow students to create and update profiles containing academic information, skills, and achievements.
   1.4. The system shall allow students to upload video resumes and written resumes in supported formats.
   1.5. The system shall allow students to browse and apply for part-time jobs or internships listed on the platform.
   1.6. The system shall display AI-based job recommendations to students based on their profile data and preferences.
   1.7. The system shall allow students to schedule or attend online/physical interviews with employers.
   1.8. The system shall enable students to view the status of their applications and feedback provided by employers.
   1.9. The system shall provide secure in-app messaging functionality for students to communicate with employers.
   1.10. The system shall allow user to recover their password by providing their username/email.
2. **Client Side:**
   2.1. The system shall allow employers to register by providing their company name, email, username, gender, nid no, phone number, address, date of birth, user type (employer/client), and password (must be 8 characters with a combination of letters, numbers, and special symbols).
   2.2. The system shall allow employers to login using their registered email, username, or phone number along with their password.
   2.3. The system shall allow employers to post job/internship circulars with details such as title, description, requirements, and deadlines.
   2.4. The system shall enable employers to review student applications, including resumes and profiles.

2.5. The system shall allow employers to schedule interviews (live video or physical) with applicants.
2.6. The system shall allow employers to send feedback and communicate with applicants via secure in-app messaging.
2.7. The system shall allow user to recover their password by providing their username/email.

3. **Admin Side:**
   3.1. The system shall allow administrators to manage user accounts (students/employers), including activation, suspension, or deletion.
   3.2. The system shall enable administrators to monitor and verify job/internship postings for compliance with platform policies.
   3.3. The system shall provide administrators with analytics and reports on system usage, user activity, and job application trends.
   3.4. The system shall allow administrators to address user complaints or issues through a dedicated support interface.

## 3.2 Non-Functional Requirements

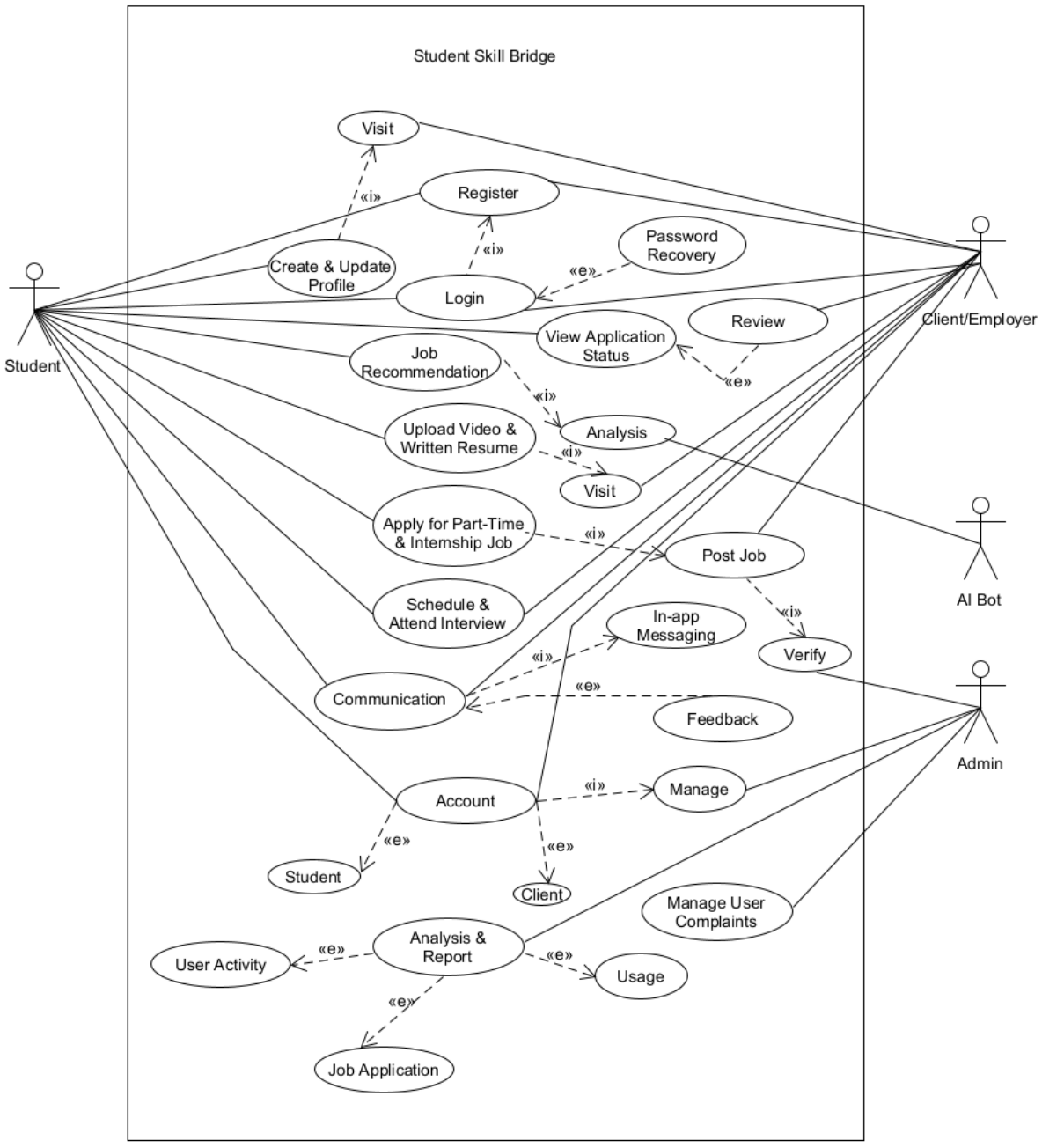
4. The system must be mobile-friendly and easy to use for students and employers.
5. Must support at least 500 concurrent users without performance degradation.
6. All user data specially resumes, credentials and messages must be encrypted.
7. The system should allow future expansion.
8. Compatible with all major browsers and mobile-friendly.
9. The system should be easy to use and navigate and support users with disabilities.
10. The system should respond quickly to user action.
11. It must be available 24/7.
12. Data must be backed up regular basis.

## 3.3 Constant:

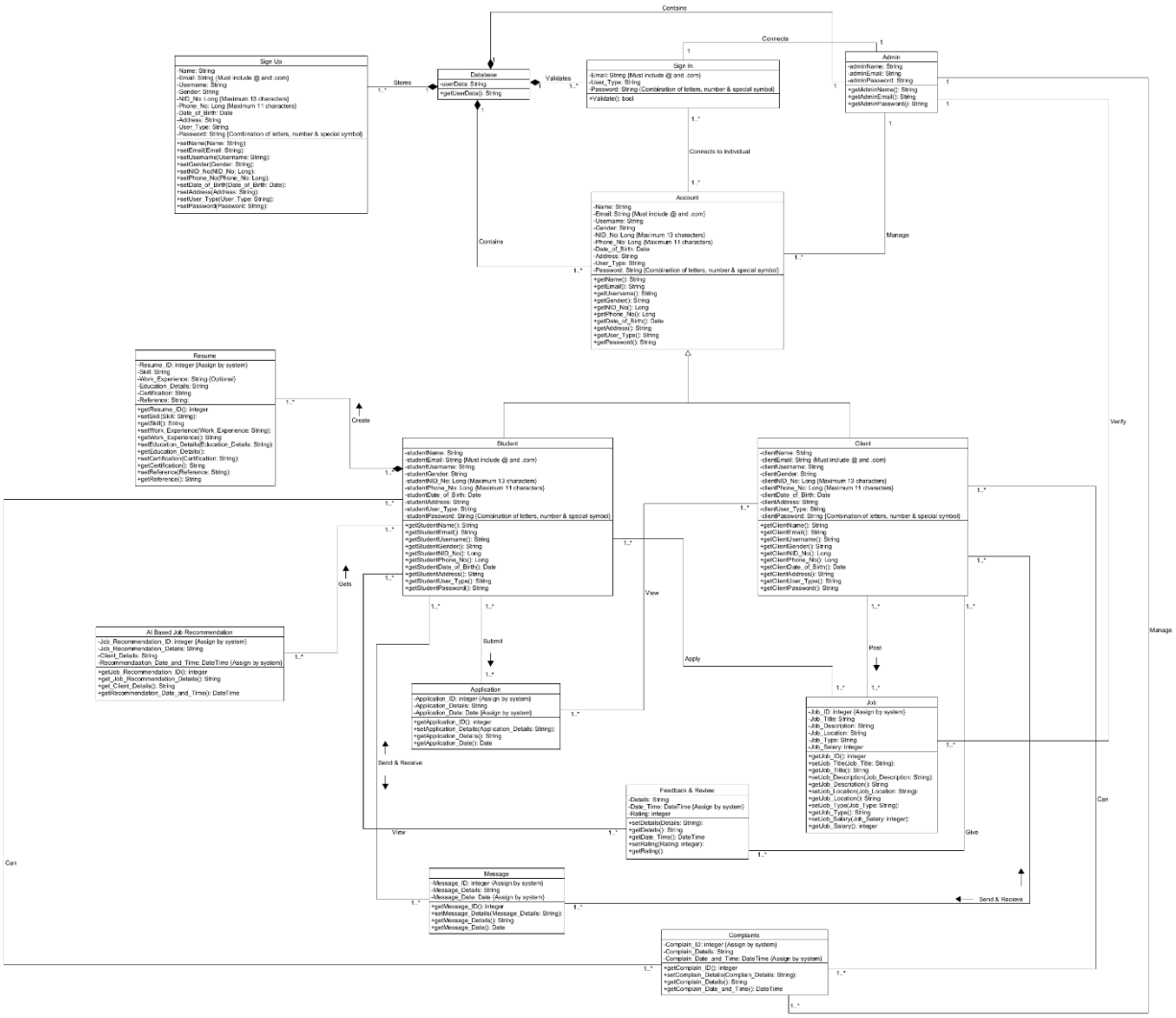
13. The system must be developed using MERN stack (MongoDB, Express.js, React.js, Node.js) and also Tensorflow.js.
14. Development timeline must not exceed 9 weeks.
15. Must be optimized for low-bandwidth environments.

# 4. Diagrams

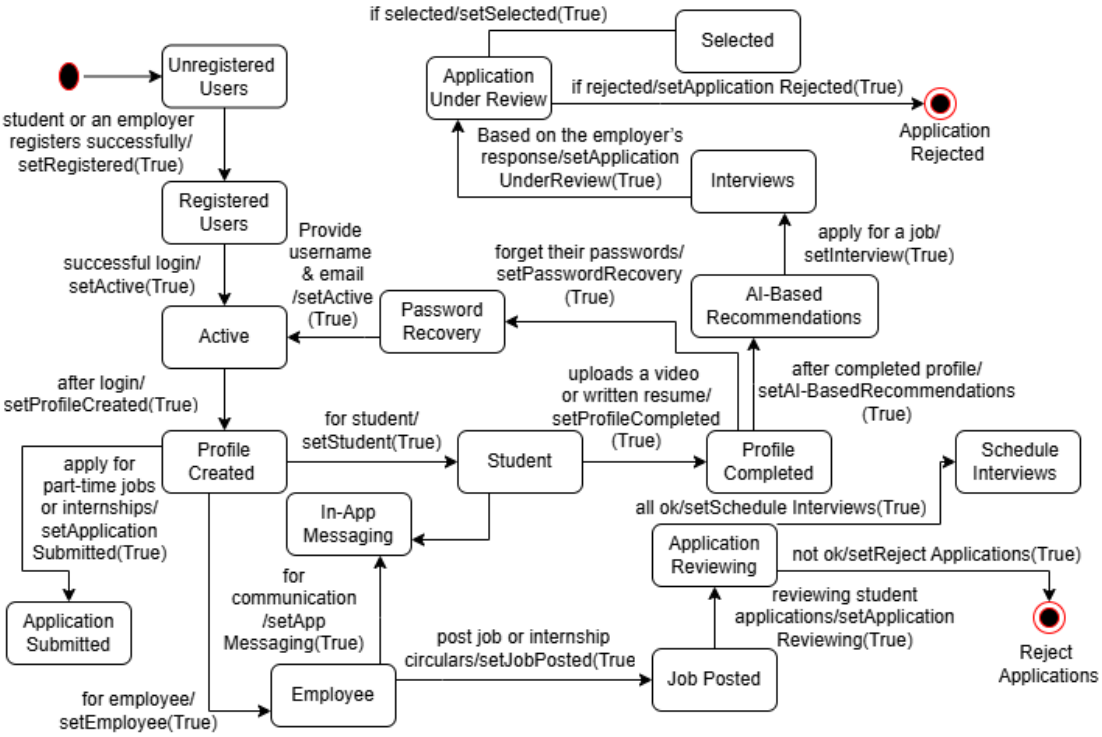
## 4.1 Use Case Diagram



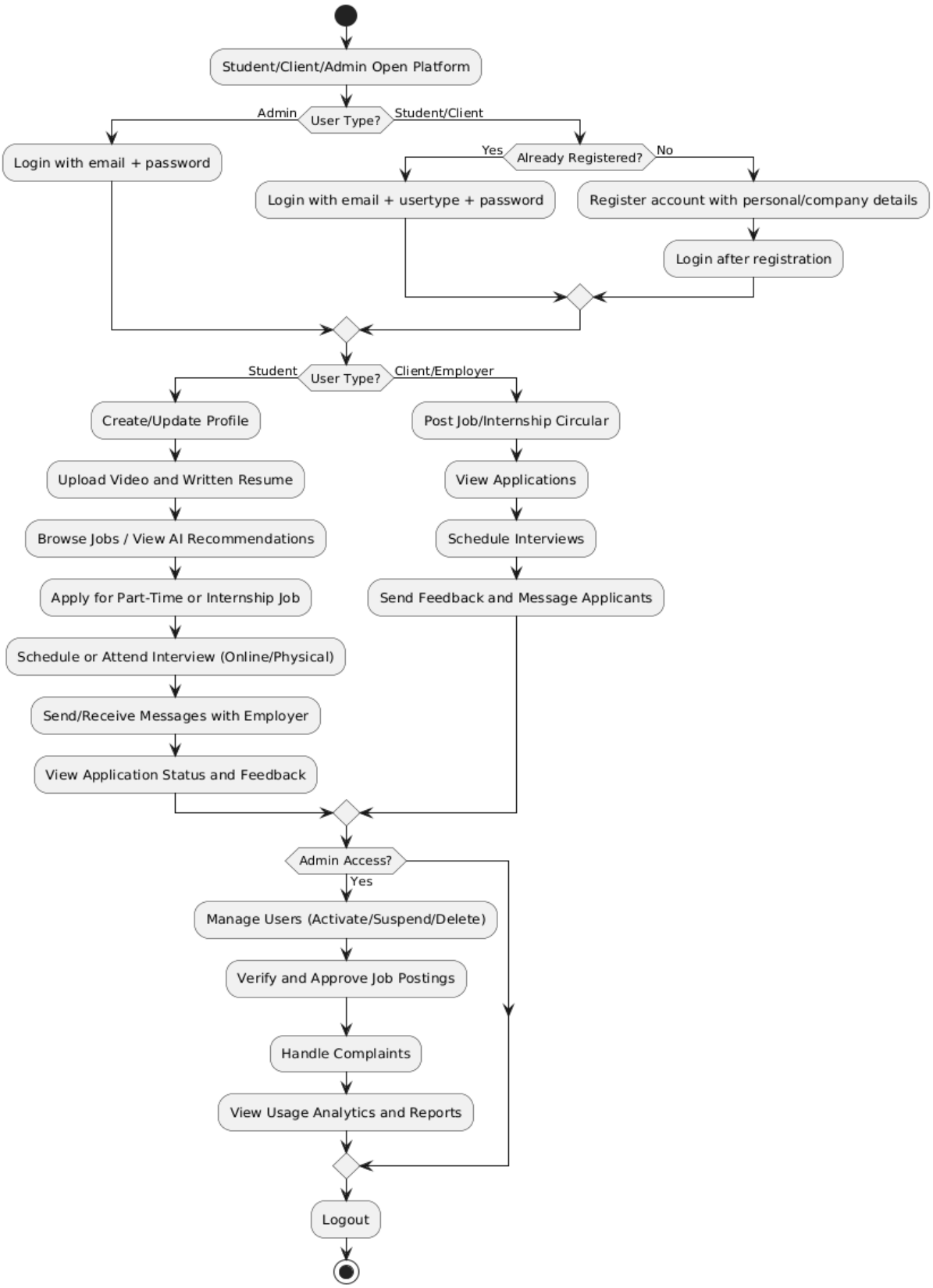
## 4.2 Class Diagram



## 4.3 State Diagram



## 4.4 Activity Diagram



## Rubric for Project Assessment (CO3)

| Criteria | Marks distribution (Max 3X5= 15) | | | | Acquired Marks |
|---|---|---|---|---|---|
| | Inadequate (1-2) | Satisfactory (3) | Good (4) | Excellent (5) | |
| **Selection of Software Engineering Models** | Does not articulate a position or argument of choosing appropriate model. Does not present any evidence to support the arguments for the choice of the model | Articulates a position or argument for choosing models that is unfocused or ambiguous. Presents incomplete/vague evidence to support argument for model choice | Articulates a position or argument of choosing models that is limited in scope. Does not present enough evidence to support the argument for the choice of the model | Clearly articulates a position or argument for the choosing software engineering models. Presents sufficient amount of evidence to support argument for the model selection | |
| **Role identification and Responsibility Allocation** | The project has poor project management plans for identifying roles and assigning the responsibilities | Identify few roles in the project management where some of the roles are left alone with any project responsibilities | Identify most of the roles in the project management and assign their responsibilities | Well planned project with proper role identification and responsibility allocation in the project management activities | |
| **Impact identification** | | | | | |

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|---|---|---|---|---|---|
| **Formatting and Submission** | Project report is not complete and Several errors in spelling and grammar. Present a Confusing organization of concepts, supporting arguments, and real-life example. Sentences rambling, and details are repeated. | Some errors in spelling and grammar. Some problems of organizing the answer in a logical order of defining, elaborating, and providing real-life examples. | Few errors in spelling and grammar. Presents most of the details in a logical flow of organization in definition, details, and example. | Project report is complete and No errors in spelling and grammar. Consistently presents a logical and effective organization of definition, details, and real-life example of the topic. | |
| | | | | **Acquired marks:** | |
| | | | | **CO Pass / Fail:** | |

## Rubric for Project Assessment (CO4)

| **Marking Criteria** | **Marks Distribution (Maximum 3X5=15)** | | | | **Acquired Marks** |
|---|---|---|---|---|---|
| | **Inadequate (1-2)** | **Satisfactory (3)** | **Good (4)** | **Excellent (5)** | |
| | | | | | |
| **Project Planning** | No background information regarding the project is given; project goals and benefits are missing. | Insufficient background information is given; project goals and benefits are poorly stated | Sufficient background information is given; the purpose and goals of the project are explained. | Thorough and relevant background information is given; project goals are clear and easy to identify. | |
| **Effort Estimation and Scheduling** | Student vaguely discuss the impact of societal, health, safety, legal and cultural issues in their project | Student provided with partial relevance to the impact of societal, health, safety, legal and cultural issues in their project | Student fairly provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project | Student comprehensively provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project | |

| | | | | | |
|---|---|---|---|---|---|
| **Risk Management** | Ambiguous representative example. | Partially identify / indicate towards real-life example. | Real-life example is fairly connected towards the definition. | Comprehensively defend with real life example. | |
| | | | | **Acquired Marks:** | |
| | | | | **CO Pass / Fail:** | |
| | | | | | |

| **CO5 [PO-i-2]: Perform as an effective team member or leader in diverse team settings and solve multi-disciplinary problems in computer science and engineering domain.** | | | | |
|---|---|---|---|---|
| **Assessment Attribute/Criteria** | **Missing/ Incorrect (0)** | **Inadequate (1)** | **Satisfactory (2)** | **Excellent (3)** |
| **Taking responsibility** | Does not perform assigned tasks; often misses meetings and, when present, does not have anything constructive to say; relies on others to do the work; | Partially performs all assigned tasks; attends meetings irregularly and occasionally participates and hence not reliable; | Performs all assigned tasks; attends meetings regularly and usually participates effectively.<br>generally reliable; | Performs all tasks very effectively; attends all meetings and participates enthusiastically; very reliable. |
| **Contributions** | Never provides useful ideas when participating in a group discussion | Rarely provides useful ideas when participating in a group discussion | Sometimes provides useful ideas when participating in a group discussion | Routinely provides useful ideas when participating in a group discussion |
| **Collaboration and Ability to Compromise** | Not cooperative, unable to compromise and disrupts the team process. | Sometimes cooperative, and rarely displays a positive attitude. | Usually cooperative, able to compromise and generally display positive attitude. | Always cooperative. Willingness to compromise. Always display positive attitude. |
| **Valuing other team members (Working with others)** | Often argues with teammates; doesn't let anyone else talk; occasional personal attacks | Seldom listens to others' points of view; occasionally behaves in an oppressive manner; tries to | Generally, listens to others' points of view; always uses appropriate and respectful language; tries to | Always listens to others and their ideas; helps them develop their ideas while giving them full |

| | | | | |
|---|---|---|---|---|
| | and "put-downs"; wants to have things done his way and does not listen to alternate approaches. | force their own ideologies on other. | make a definite effort to understand others' ideas. | credit; always helps the team reach a fair decision. |