Software Requirements Specification

for

AI Based Skill Assessment

Version 1.0 approved

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1. Introduction

1.1 Purpose

The purpose of this system is to streamline the placement process for IT engineering students and the Training and Placement Office (TPO) by providing an integrated platform for skill assessment and career guidance. It allows students to register, upload their resumes, and receive personalized recommendations based on extracted skills and ATS (Applicant Tracking System) scores. Additionally, the system offers domain-specific quizzes to enhance student preparedness and features a dashboard for the TPO to efficiently manage and sort students by their skills, department, and resume scores. The leaderboard feature further motivates students by displaying their ranks relative to their peers.

Scope:

This SRS outlines the functional and non-functional requirements essential for the core functionalities of AI Based Skill Assessment. It encompasses functionalities crucial for users such as students, Training and Placement Officers (TPOs), and administrators, including:

- User authentication and registration with PRN number
- Resume upload and ATS-based skill extraction
- Personalized recommendations for career resources and job opportunities
- Domain-specific quizzes for skill assessment
- TPO dashboard for sorting and managing students based on skills and ATS scores
- Leaderboard for student rankings

1.2 Document Conventions

1. **Font:** Times New Roman 12pt is consistently used throughout the document to maintain readability and consistency.
2. **Bold Text:** Bold text is utilized for the following purposes:
    - **Headings:** Section titles, subsections, and requirement identifiers (e.g., 2.1.1).
    - **Keywords:** Key terms within requirement statements (e.g., "The system shall allow users to customize documentation formats.").
3. **Italics:** Italics are employed for emphasis or to denote placeholder text within requirement statements (e.g., "The response time for documentation generation may vary based on project size and complexity.").
4. **Priorities:** Each requirement is explicitly assigned a priority using a numbering system (e.g., Requirement 1.2.3 (High)). Priority levels are indicated numerically, with higher numbers denoting higher priority.
5. **Inheritance:** Priorities are not inherited by detailed requirements from higher-level requirements. Each requirement statement is independently assigned its priority to ensure clarity and specificity.

1.3 Intended Audience and Reading Suggestions

This Software Requirements Specification (SRS) for the AI-based Skill Assessment system is intended for the following audience:

- **Students:** Students will use this document to understand the features and functionalities available to them, such as registration, resume upload, skill extraction, personalized recommendations, quizzes, and viewing the leaderboard.
- **Training and Placement Officers (TPOs):** TPOs will leverage this document to understand how to manage and sort student profiles, access the TPO dashboard, and utilize the system for efficiently handling the placement process based on student skills and ATS scores.

- **Software Developers:** Developers will utilize this document to gain a comprehensive understanding of the system's functional and non-functional requirements, guiding them in the design, development, and testing phases of the AI-based Skill Assessment system.
- **Project Managers:** Project managers will use this document to comprehend the scope and functionalities of the AI-based Skill Assessment system, assisting them in planning project timelines, resource allocation, and overall project management.
- **System Administrators:** System administrators will find insights into managing user roles, system performance, and ensuring the smooth operation of the AI-based Skill Assessment system.

Reading Suggestions

The document is structured as follows:

- **Section 1: Introduction:** Provides an overview of the AI Based Skill Assessment System, including its purpose, scope, and document conventions.
- **Section 2: System Overview:** Describes the overall functionalities of the AI Based Skill Assessment System and its interaction with users.
- **Section 3: Specific Requirements:** Details the functional and non-functional requirements for different user roles (e.g., Students, TPO cell).
- **Section 4: System Interfaces:** Describes how the AI Based Skill Assessment System interacts with external systems, if any.
- **Section 5: Quality Attributes:** Defines non-functional requirements such as performance, security, and usability.
- **Section 6: Appendices:** Includes supplementary information such as diagrams, data models, or glossaries.

Recommended Reading Sequence

1. **Section 1:** Gain a general understanding of the AI Based Skill Assessment System and its purpose.
2. **Section 2:** Familiarize yourself with the overall flow and functionalities of the AI Based Skill Assessment System.

3. **Section 3:** Depending on your role, focus on the specific requirements relevant to the user type (e.g., student, TPO co-ordinator).
4. **Sections 4 & 5:** For developers and system architects, review these sections for interfacing with external systems and non-functional requirements.
5. **Section 6:** Refer to appendices for additional details as needed.

1.4 Product Scope

Product Description

The AI-based Skill Assessment system is a software platform designed to assist IT engineering students and the Training and Placement Office (TPO) in the skill assessment and placement preparation process. It aims to provide an automated, personalized, and efficient approach to evaluating student skills, offering targeted career guidance, and simplifying the management of placement-related activities.

Benefits and Objectives:

- **Students:**
    - Access to personalized skill assessment through resume analysis and ATS scoring.
    - Customized recommendations for resources and job opportunities based on individual skill sets.
    - Opportunities to enhance skills through domain-specific quizzes in areas such as DSA, Web Dev, and Android dev and various other fields.
- **Training and Placement Officers (TPOs):**
    - Streamlined management of student profiles, enabling sorting and filtering based on skills, department, and ATS scores.
    - Improved ability to identify and support students in alignment with industry requirements.
    - A centralized dashboard for overseeing the placement process by easy sorting, filtering & exporting of student data.

- **Overall Goals:**
    - Enhance the efficiency and accuracy of skill assessment for students.
    - Facilitate better preparation for placements by providing relevant and personalized recommendations.
    - Improve the overall placement process by providing TPOs with advanced tools to manage student data effectively.

Alignment with Academic and Career Goals:

The AI-based Skill Assessment system aligns with the academic and career objectives of fostering well-prepared, industry-ready graduates. By automating the skill assessment process and providing targeted career advice, the system contributes to:

- Improved student placement outcomes.
- Better alignment of student skills with industry needs.

This document focuses on the core functionalities of the AI-based Skill Assessment system in Version 1.0. Future versions may expand upon the scope to include features such as:

- Integration with external job portals and professional networking sites (e.g., Eduplus).
- Advanced analytics for tracking student progress over time.
- Sorting and Filtering options od student data.

1.5 References

Template for SRS

https://web.cs.dal.ca/~hawkey/3130/srs_template-ieee.doc

UML Diagram

https://www.edrawsoft.com

Designing software

https://www.figma.com

2. Overall Description

2.1 Product Perspective

Context and Origin:

The AI-based Skill Assessment system is a newly developed platform designed to assist IT engineering students and Training and Placement Officers (TPOs) in the skill assessment and placement preparation process. The system automates the extraction of skills from student resumes, provides personalized recommendations, and facilitates placement management, all within a unified platform.

Relationship to Existing Systems:

The AI-based Skill Assessment system operates as an independent and self-contained product, designed to complement existing educational and placement management tools. While it does not replace existing systems directly, it can be integrated with academic management platforms, resume databases, and potentially external job portals to enhance its functionality and reach.

System Overview:

The AI-based Skill Assessment system can be delineated into three primary components:

- **User Interface:** This component includes the web-based interface through which students and TPOs interact with the system. It provides functionalities for student registration, resume upload, skill assessment, quiz participation, and dashboard access for TPOs.
- **Core Functionality:** The core functionality involves the AI-driven business logic that processes student resumes, extracts relevant skills, generates ATS scores, and provides personalized career recommendations. It also manages the quiz system and the leaderboard for student rankings.
- **Data Storage:** This component is responsible for storing student information, resumes, skill assessments, quiz results, and other related data. It uses databases to ensure secure and efficient storage and retrieval of data.

External Interfaces:

- **User Interfaces:** The system provides a web-based Leaderboard for students and Dashboard for TPOs. The Leaderboard is designed for ease of use, allowing for quick access to essential features like checking the Leaderboard rank, Home screen for recommendations, quizzes, and admin dashboard for student management (filtering & sorting).
- **Potential Future Integrations:** The system may potentially integrate with external job portals, academic management systems, or professional networking platforms (e.g., Eduplus) via APIs or other integration mechanisms. These integrations could expand the system's functionality and provide users with more comprehensive support.

Benefits:

- **Enhanced Placement Preparation:** The system provides students with targeted skill assessments and personalized recommendations, improving their readiness for placements.
- **Efficient Skill Management:** TPOs can easily manage and sort student profiles based on skills and ATS scores, optimizing the placement process.
- **Improved Student Engagement:** With access to domain-specific quizzes and leaderboards, students are motivated to improve their skills and track their progress.
- **Facilitated Placement Management:** The system streamlines the management of placement activities, making it easier for TPOs to identify and support students who are ready for placement opportunities.

This product perspective provides a high-level overview of the AI-based Skill Assessment system, outlining its purpose, architectural components, potential integrations, and anticipated benefits within the context of student skill assessment and placement preparation.

2.2 Product Functions

The AI-based Skill Assessment system offers functionalities tailored for various user roles, categorized as follows:

User Functions:

- **Student Registration:** Allow students to register with their Email, PRN number, name, college, and department.
- **Resume Upload:** Enable students to upload their resumes for skill assessment.
- **Skill Extraction and ATS Scoring:** Automatically extract relevant skills from the uploaded resume and generate an ATS (Applicant Tracking System) score.
- **Personalized Recommendations:** Provide students with personalized resources and job/career opportunities based on their extracted skill sets.
- **Quizzes:** Allow students to attempt quizzes in various domains such as DSA, Aptitude, and programming to enhance their skills.
- **TPO Dashboard:** Provide TPOs with a dashboard to sort and manage students based on their skills, department, and ATS scores.
- **Leaderboard:** Display a leaderboard where students can see their ranks based on quiz performance and other metrics.

User Roles:

1. **Student Functions:**
    - Register with PRN, name, college, and department.
    - Upload resume.
    - View extracted skills and ATS score.
    - Receive personalized resources and job recommendations.
    - Attempt domain-specific quizzes.
    - View leaderboard to track ranking.
2. **Training and Placement Officer (TPO) Functions:**
    - Access TPO dashboard.
    - Sort and manage student profiles based on skills, department, and ATS scores.

- Review leaderboard rankings for student performance tracking.

Additional Considerations:

- **User Authentication and Authorization:** Users authenticate and are authorized based on their role (student or TPO), ensuring secure access to functionalities using firebase.
- **Secure Data Handling:** Ensure secure storage and transmission of sensitive data such as student profiles, resumes, and quiz results to maintain data integrity and confidentiality.
- **Optional Features:** Consider incorporating optional features such as integration with external job portals, advanced analytics for tracking student progress, or additional quizzes based on evolving industry trends.
- **Relationships between Functions:** A high-level object class diagram can illustrate the relationships between these functionalities, showing how students and TPOs interact with various components of the system.

2.3 User Classes and Characteristics

1. **Students:**
   - **Characteristics:**
     - Individuals pursuing IT engineering or related fields.
     - Varied levels of technical skills and experience, ranging from beginners to advanced.
     - Interested in assessing and improving their skills through resources, quizzes, and personalized recommendations.
   - **Frequency of Use:** Regular, as they engage with the system to upload resumes, take quizzes, and access personalized resources throughout their academic journey.
   - **Product Functions Used:**
     - Registration and profile management.
     - Resume upload and ATS scoring.
     - Viewing extracted skills and receiving personalized recommendations.
     - Attempting domain-specific quizzes.
     - Viewing leaderboard rankings.
   - **Importance:** High. Students are the primary users who rely on the system to assess their skills, improve their employability, and track their progress.
2. **Training and Placement Officers (TPOs):**
   - **Characteristics:**
     - Individuals responsible for managing the placement process within the institution.
     - Strong organizational skills and experience in handling student data and coordinating with companies.
   - **Frequency of Use:** Regular, as they utilize the system to manage and sort student data, monitor progress, and prepare for placement activities.
   - **Product Functions Used:**
     - Accessing and managing the TPO dashboard.
     - Sorting and filtering student profiles based on skills, department, and ATS scores.

    - Reviewing quiz performance and leaderboard rankings.
- **Importance:** High. TPOs rely on the system to streamline the placement process, ensure students are well-prepared, and match them with suitable job opportunities.

2.4 Operating Environment

The AI-based Skill Assessment System should be designed to operate flexibly, taking into consideration the following key aspects:

Hardware Platform:

- The system should be accessible through web-based interfaces, ensuring compatibility with a range of devices:
    - Desktop computers (Windows, macOS, Linux)
    - Laptops (various operating systems)
    - Mobile devices (smartphones and tablets)
- Specific hardware requirements will depend on the chosen development framework and application complexity, but ensuring compatibility with widely used devices is a priority.

Operating System:

- The system should function seamlessly on commonly used operating systems for the chosen hardware platforms, including but not limited to:
    - Windows 10+
    - macOS 12+
    - Linux distributions
    - Android 10+
    - iOS 14+

Software Dependencies:

- Backend operations will likely depend on a web server (Firebase) and a database management system (Firestore).
- Additional libraries or tools may be required based on the chosen development framework or functionalities, such as AI and machine learning libraries (e.g., TensorFlow, scikit-learn), email server integration for notifications, or integration with other educational tools and platforms.

Security Considerations:

- The system should operate within a secure environment, employing robust data encryption and access controls to protect sensitive user data and assessments.
- Implementation of firewalls and secure communication protocols (e.g., HTTPS) is crucial to prevent unauthorized access and data breaches.

2.5 Design and Implementation Constraints

Several factors may influence the development process of the AI-based Skill Assessment System, including:

Security and Data Privacy:

- User data, including personal information, resumes, and assessment results, is sensitive and requires robust security measures.
- Encryption of data at rest and in transit is essential to ensure confidentiality and integrity.

Scalability and Performance:

- The system should be designed to handle a growing number of users, assessments, and data efficiently.
- Performance optimization is crucial to ensure responsive interactions, especially during peak usage times or with large datasets.

Technology Stack:

- The choice of programming languages, frameworks, and database systems will impact development costs, timelines, and maintainability.
- Balancing innovative AI features with established technologies that offer long-term support is essential for stability and scalability.

Development Budget and Timeline:

- Available resources will determine the pace of development and the scope of features implemented initially.
- Prioritizing core functionalities within budget constraints may be necessary to ensure timely delivery and project success.

User Interface (UI) and User Experience (UX) Design:

- The system should cater to users with varying levels of technical expertise, providing a user-friendly interface with intuitive navigation and clear instructions.
- Accessibility considerations for users with disabilities should be incorporated into the UI design to ensure inclusivity and compliance with accessibility standards.

Deployment and Maintenance:

- The chosen deployment model (e.g., cloud-based, on-premise) will influence maintenance requirements and ongoing costs.
- Ease of updates and bug fixes should be considered during development to facilitate long-term maintenance and ensure system reliability.

Regulatory Compliance:

- Depending on the intended use and jurisdiction, the system may need to comply with specific regulations regarding data security, accessibility, or intellectual property rights.
- Adhering to regulatory requirements is essential to mitigate legal risks and ensure ethical conduct throughout the development process.

By carefully considering these constraints, developers can make informed decisions throughout the design and implementation process, ensuring the AI-based Skill Assessment System delivers a secure, user-friendly, and efficient solution for students and placement cells.

2.6 User Documentation

Step-by-Step User Guide for the AI-Based Skill Assessment System:

1. Sign Up/Login:

- **New Users:** Sign up with your email, password, and additional details such as PRN number, name, college name, and department. Choose your user type: Student or Placement Officer.
- **Returning Users:** Log in with your email and password to access the system.

2. User Roles:

- **Student:** Students can register, upload resumes, take quizzes, view recommendations, and check their leaderboard ranks.
- **Placement Officer:** Placement Officers have similar functionalities as Students but also have additional permissions for reviewing student data, sorting students based on skills and scores, and accessing the training and placement cell dashboard.

3. Student Registration:

- Click on the "Register" button.
- Fill in your PRN number, name, college name, and department.
- Upload your resume for skill extraction.
- Complete the registration process to gain access to the system.

4. Resume Upload:

- Navigate to the "Upload Resume" section.
- Upload your resume file in the supported format (e.g., PDF, DOCX).
- The system will scan and extract relevant skills from your resume and provide an ATS score.

5. Skill Assessment and Recommendations:

- After resume upload, view your extracted skills and ATS score on your dashboard.
- Receive personalized recommendations for skill improvement and career opportunities based on your extracted skillset.

6. Quizzes:

- Go to the "Quizzes" section to access various quizzes in domains like DSA, Aptitude, programming, etc.
- Select a quiz, attempt the questions, and submit your answers.
- Review your quiz results and track your performance.

7. Leaderboard:

- Access the "Leaderboard" section to view your ranking among peers.
- Track your progress and compare your performance with other students.

8. Placement Officer Dashboard:

- Log in to access the "Training and Placement Cell Dashboard."
- Use the dashboard to view, sort, and filter students based on skills, department, and resume ATS scores.
- Generate reports and manage student data effectively.

9. Review and Update:

- Periodically review your resume and skill assessments to ensure they reflect your current abilities and achievements.
- Update your resume and re-upload if needed to maintain an accurate skill profile.

10. User Interface Navigation:

- Familiarize yourself with the user interface layout.
- Use the navigation menu to access functionalities such as registration, resume upload, skill assessment, quizzes, leaderboard, and dashboard.

11. Logout:

- After completing your tasks, remember to log out of the system to ensure security.
- Click on the "Logout" button to end your session.

3. External Interface Requirements

3.1 User Interfaces

The system provides intuitive user interfaces for Students and Placement Officers, facilitating easy navigation and interaction with the system's functionalities.

3.2 Hardware Interfaces

While the AI-based Skill Assessment System primarily operates on user devices, there are some hardware interfaces to consider:

1. User Devices:

- **Supported Device Types:** The system should be accessible through various user devices with internet connectivity:
    - Desktop computers (Windows, macOS, Linux)
    - Laptops (various operating systems)
    - Smartphones and tablets (Android, iOS)
- **Nature of Data and Control Interactions:**
    - Users interact with the system through a user interface (web browser) on their devices.
    - Data exchange occurs between the user device and the system’s server via the internet.
    - Users provide control inputs by interacting with the UI elements (buttons, menus, forms) to access functionalities such as registration, resume upload, quizzes, and leaderboard.
- **Communication Protocols:**
    - Secure communication protocols like HTTPS (Hypertext Transfer Protocol Secure) are essential to ensure encrypted data transmission between user devices and the server.

3.3 Software Interfaces

The AI-based Skill Assessment System will interact with various software components to facilitate its functionalities. Here's an overview of potential software interfaces:

1. Database Management System (DBMS):

- **Component:** A non-relational database management system (Firebase) will be utilized to store user profiles, resumes, skill assessments, quiz results, recommendations, and leaderboard data.
- **Data Flow:**
    - **Incoming:** User registrations, resume uploads, quiz submissions, and updates will be stored in the database upon submission or modification.
    - **Outgoing:** The system will retrieve user profiles, assessment results, quiz data, and recommendations from the database to display on user interfaces or during skill assessment processes.
- **Communication:** The AI-based Skill Assessment System will interact with the DBMS using secure APIs or libraries provided by the chosen database system.
- **Shared Data:** User profiles, resume data, skill assessments, quiz results, and recommendations will be stored and shared across various system modules.

2. Web Server and Application Framework:

- **Component:** A web server (firebase) will host the system's web application files, while an application framework (firebase functions) will handle the business logic, AI functionalities, and user interactions.
- **Data Flow:**
    - **Incoming:** User requests from web browsers or mobile apps will be received by the web server and routed to the application framework for processing.
    - **Outgoing:** The application framework will generate dynamic web pages, API responses, or AI-based recommendations based on user requests and data retrieved from the database.
- **Communication:** The web server will utilize protocols like HTTP and HTTPS to communicate with user devices, while the application framework will provide APIs for seamless interaction with the database, AI models, and other system components.

- **Shared Data:** User data, assessment results, quiz information, and AI-generated recommendations will be shared between the application framework and the database for processing and presentation.

3.4 Communications Interfaces

The AI-based Skill Assessment System relies on various communication interfaces to ensure effective operation. Here's an overview of key communication aspects:

1. User Interaction:

- **Protocols:** Secure communication protocols are essential for all user interactions.
    - **Web Interface:** HTTPS (Hypertext Transfer Protocol Secure) will secure communication between web browsers and the web server.
- **Data Formats:** JSON (JavaScript Object Notation) will be employed as a common format for exchanging data between user interfaces and the backend system due to its flexibility and ease of use.
- **Electronic Forms:** Online forms will facilitate actions such as student registration, resume uploads, quiz participation, and profile updates. These forms should prioritize user-friendliness and incorporate robust data validation mechanisms to maintain data integrity.

2. System Notifications (Optional):

- **Email Notifications:** System-generated emails may be utilized for:
    - Confirmation of registration and resume uploads.
    - Notifications of assessment results and recommendations.
    - Alerts regarding quiz completion and leaderboard updates.
- **Push Notifications (Mobile App Optional):** If a mobile app is developed, push notifications can be used to deliver real-time updates to users about assessment results, quiz availability, and personalized recommendations.
- **Message Formatting:** Both email and push notifications should be formatted to convey essential information clearly and effectively.

3. Communication Standards:

- **RESTful API Design:** The backend system will employ a RESTful API design for communication with the web interface or potential mobile app. This standardized approach streamlines data exchange and simplifies integration efforts.

- **Database Communication:** The chosen DBMS will provide APIs or libraries for secure and efficient communication between the application framework and the database.

4. Security Considerations:

- **Data Encryption:** Encryption protocols should be implemented for data in transit (between user devices and the server) and at rest (stored in the database) using industry-standard algorithms.
- **Authentication and Authorization:** Secure authentication mechanisms should be in place, potentially incorporating multi-factor authentication for enhanced security. User roles (e.g., student, placement officer) will determine access privileges within the system.

5. Data Transfer Rates and Synchronization:

- **Internet Connectivity:** Reliable internet connectivity is essential for users to access the system and for seamless data exchange. The system should be designed to operate efficiently even under moderate internet speeds.
- **Data Synchronization (Optional):** If offline functionality is a requirement, mechanisms for data synchronization between the user interface and the backend server need to be implemented to ensure data consistency upon reconnection.

4. System Features

1) Feature: Student Registration

4.1.1 **Description and Priority:**

- **Description:** This feature allows students to create new accounts within the AI-based Skill Assessment System. During registration, students provide essential details, including their PRN number, name, college name, and department. They can also upload their resumes for further processing.
- **Priority:** High. Student registration is essential for accessing personalized assessment and recommendations.

4.1.2 **Stimulus/Response Sequences**

- **User:**
  - Navigates to the "Registration" section.
  - Enters required information in the registration form and uploads the resume.
  - Submits the completed form.
- **System:**
  - Displays a registration form with fields for PRN number, name, college name, department, and resume upload.
  - Validates user input for completeness and correctness.
  - Processes the registration information and stores it securely in the system.
  - Confirms successful registration and provides feedback.

4.1.3 **Functional Requirements**

- **REQ-1:** The system shall provide a user-friendly registration form capturing essential student details and resume uploads.
- **REQ-2:** User input during registration shall be validated for correctness (e.g., PRN number format, resume file type).
- **REQ-3:** The system shall securely store student registration data and uploaded resumes.
- **REQ-4:** Upon successful registration, the system shall create a unique student profile and provide a confirmation message.
- **REQ-5:** The system shall handle invalid or incomplete registration attempts with clear error messages.

2) Feature: Skill Assessment

4.1.1 **Description and Priority:**

- **Description:** This feature allows students to participate in various quizzes and assessments, including DSA, Aptitude, and programming. The system uses AI to analyze quiz performance and provide an ATS score.
- **Priority:** High. Skill assessment is a core functionality for evaluating and recommending career opportunities.

4.1.2 **Stimulus/Response Sequences**

- **User:**
  - Logs into the system.
  - Navigates to the "Skill Assessment" section.
  - Selects a quiz or assessment to start.
  - Completes the assessment and submits answers.
- **System:**
  - Displays available quizzes and assessments.
  - Provides an interface for students to answer questions.
  - Analyzes quiz performance using AI and generates an ATS score.
  - Displays the assessment results and personalized recommendations.

4.1.3 **Functional Requirements**

- **REQ-1:** The system shall offer a variety of quizzes and assessments in different domains.
- **REQ-2:** Assessments shall be scored using AI algorithms to provide accurate results.
- **REQ-3:** The system shall generate and display an ATS score based on quiz performance.
- **REQ-4:** Students shall receive personalized recommendations and resources based on their performance.
- **REQ-5:** The system shall allow students to retake assessments if needed.

3) Feature: Resume Analysis and ATS Scoring

4.1.1 **Description and Priority:**

- **Description:** This feature enables the system to analyze student resumes, extract relevant skills, and provide an ATS score. This helps students understand how their resumes align with industry standards and job requirements.

- **Priority:** High. Resume analysis is crucial for providing actionable feedback and enhancing students' job applications.

4.1.2 **Stimulus/Response Sequences**

- **User:**
  - Uploads their resume through the system.
  - Requests analysis of the resume.
- **System:**
  - Analyzes the uploaded resume using AI to extract skills and qualifications.
  - Calculates an ATS score based on industry standards.
  - Provides feedback and suggestions for improving the resume.

4.1.3 **Functional Requirements**

- **REQ-1:** The system shall support resume uploads in various file formats (e.g., PDF, DOCX).
- **REQ-2:** AI algorithms shall analyze resumes to extract relevant skills and qualifications.
- **REQ-3:** The system shall calculate and display an ATS score based on extracted skills and job requirements.
- **REQ-4:** Students shall receive actionable feedback and suggestions for resume improvement.
- **REQ-5:** The system shall ensure the confidentiality and security of uploaded resumes.

4) Feature: Placement Cell Dashboard

4.1.1 **Description and Priority:**

- **Description:** This feature provides the placement cell with a dashboard to sort and manage student profiles based on skills, department, and ATS scores. This helps in efficient placement and recruitment processes.
- **Priority:** High. The placement cell dashboard is essential for managing and optimizing the placement process.

4.1.2 **Stimulus/Response Sequences**

- **User (Placement Officer):**
  - Logs into the placement cell dashboard.

  - Views and sorts student profiles based on various criteria (skills, department, ATS score).
  - Generates reports and manages student profiles.
- **System:**
  - Displays the placement cell dashboard with sorting and filtering options.
  - Retrieves and presents student profiles based on selected criteria.
  - Allows for report generation and profile management.

4.1.3 **Functional Requirements**

- **REQ-1:** The system shall provide a comprehensive dashboard for the placement cell.
- **REQ-2:** Users shall be able to sort and filter student profiles based on skills, department, and ATS score.
- **REQ-3:** The dashboard shall support report generation and profile management functionalities.
- **REQ-4:** The system shall ensure secure access to the placement cell dashboard based on user roles.
- **REQ-5:** Data presented on the dashboard shall be updated in real-time for accuracy.

5) Feature: Leaderboard

4.1.1 **Description and Priority:**

- **Description:** This feature displays a leaderboard showing the ranks of students based on their performance in assessments and overall skills. It fosters competition and motivation among students.
- **Priority:** Medium. While not essential for core functionalities, the leaderboard enhances engagement and motivation.

4.1.2 **Stimulus/Response Sequences**

- **User:**
  - Logs into the system.
  - Navigates to the "Leaderboard" section.
  - Views the ranking of students based on their performance.
- **System:**
  - Displays the leaderboard with student rankings and scores.
  - Updates the leaderboard in real-time based on recent assessments and scores.

4.1.3 **Functional Requirements**

- **REQ-1:** The system shall provide a leaderboard displaying student rankings based on assessment performance.
- **REQ-2:** Rankings shall be updated in real-time based on recent assessment results.
- **REQ-3:** The leaderboard shall be accessible to all users, with rankings based on overall skills and performance.
- **REQ-4:** The system shall ensure the leaderboard is presented in a clear and visually engaging format.

6) Feature: Personalized Recommendations

4.1.1 **Description and Priority:**

- **Description:** This feature provides personalized recommendations to students based on their assessment results, skills, and career interests. Recommendations include job opportunities, courses, and resources.
- **Priority:** Medium. Personalization enhances the value of the system by providing tailored career guidance.

4.1.2 **Stimulus/Response Sequences**

- **User:**
  - Completes assessments and provides career interests.
  - Requests personalized recommendations.
- **System:**
  - Analyzes assessment results, skills, and career interests using AI.
  - Generates and displays personalized recommendations, including job opportunities and resources.

4.1.3 **Functional Requirements**

- **REQ-1:** The system shall analyze assessment results and skills to provide personalized recommendations.
- **REQ-2:** Recommendations shall include relevant job opportunities, courses, and resources.
- **REQ-3:** The system shall update recommendations based on new assessment results and user inputs.
- **REQ-4:** Recommendations shall be presented in a user-friendly format.

7) Feature: Data Export

4.1.1 **Description and Priority:**

- **Description:** This feature allows users to export their assessment results, resume analysis reports, and other relevant data for offline use or further analysis.
- **Priority:** Low. While useful for offline access, it is not critical compared to core functionalities.

4.1.2 **Stimulus/Response Sequences**

- **User:**
  - Logs into the system.
  - Navigates to the "Export" section.
  - Selects the data to export and chooses the format (e.g., PDF, Excel or CSV).
  - Initiates the export process.
- **System:**
  - Provides options for selecting data and export formats.
  - Generates and downloads the requested data in the chosen format.

4.1.3 **Functional Requirements**

- **REQ-1:** The system shall support exporting assessment results, resume analysis reports, and other relevant data.
- **REQ-2:** Users shall be able to select data and choose export formats (e.g., PDF, Excel or CSV).
- **REQ-3:** The export process shall be completed efficiently, and users shall receive a downloadable file.
- **REQ-4:** The system shall ensure the exported data maintains its integrity and formatting.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

General System Performance

- **Page Load Times:** Web pages within the AI-based Skill Assessment System should load within 3 seconds for users with a stable internet connection (speeds of 10 Mbps or higher). This includes activities such as logging in, navigating to different sections, and loading skill assessment data.
- **System Responsiveness:** User interactions and actions within the system should be reflected within 1 second. This includes submitting assessment results, navigating dashboards, and updating user profiles. Delays exceeding 1 second may indicate system lags and should be investigated promptly.

Specific Feature Performance

- **Assessment Processing:**
    - Submitting an assessment should be completed within 5 seconds, including uploading responses and processing results.
    - Generating and displaying personalized skill recommendations should be completed within 3 seconds after submitting the assessment.
- **Accessing Skills Data:**
    - Loading a list of student assessments and results should take no more than 2 seconds, even with a large number of records (over 1000).
    - Viewing detailed skill reports or resumes should take no more than 1 second.
- **Integration with External Systems:**
    - Integrating skill assessment data with external systems or platforms should be completed within 5 seconds, including selecting the target system and initiating the integration process.

Additional Considerations

- The system should be designed to handle concurrent user access, ensuring smooth performance even with multiple users accessing or submitting assessments simultaneously.
- Performance benchmarks should be established during system development and tested regularly to ensure adherence to performance requirements.

- Implement mechanisms to monitor system performance in real-time and identify potential bottlenecks for optimization, ensuring consistent performance under varying user loads.

Rationale These performance requirements are crucial for ensuring a seamless user experience within the AI-based Skill Assessment System. Fast loading times and responsive interactions enhance user productivity and satisfaction, encouraging consistent utilization of the system. Setting clear performance goals also provides developers with tangible benchmarks to optimize system performance during development and maintenance phases.

5.2 Safety Requirements

Safety Requirements for AI-Based Skill Assessment System

Data Security

- **REQ-1:** The system shall implement robust user authentication mechanisms to prevent unauthorized access. This may include password complexity requirements, two-factor authentication, and session timeout settings.
- **REQ-2:** All data transmission between users and the system shall be encrypted using secure protocols (e.g., HTTPS) to safeguard against data breaches and unauthorized access.
- **REQ-3:** Skill assessment data, including user profiles and assessment results, shall be stored securely with access restricted to authorized users only.
- **REQ-4:** The system shall comply with relevant data privacy regulations (e.g., GDPR, CCPA) regarding data collection, storage, and usage. This includes providing functionalities for data access requests and deletion upon user instruction.
- **REQ-5:** A documented data security policy outlining data handling procedures, access controls, and incident response protocols shall be established and made available to users.

System Access and Use

- **REQ-6:** Clear differentiation between user roles (e.g., Student, Placement Officer, Admin) shall be implemented, granting access to features and data based on designated permissions.
- **REQ-7:** Provide comprehensive training for authorized users on secure handling of skill assessment data within the system, including guidelines for data protection and confidentiality.

- **REQ-8:** The system may incorporate logging mechanisms to track user activity, recording access attempts and actions performed within the system to detect and mitigate potential security threats.

System Reliability

- **REQ-9:** Redundancy measures shall be integrated into the system design to minimize downtime in the event of hardware or software failures. This may include regular data backups and disaster recovery plans.
- **REQ-10:** Routine system maintenance procedures shall be implemented to address bugs, update software components, and patch security vulnerabilities promptly to ensure system reliability and resilience.

External Regulations

- Adherence to any applicable industry regulations or government standards regarding data security and privacy within the software development domain shall be ensured, considering local regulations in the target deployment region.

5.3 Security Requirements

Security Requirements for AI-Based Skill Assessment System

Data Security

- **REQ-1:** Implement robust user authentication mechanisms to prevent unauthorized access. This may include:
    - Password complexity requirements: Enforce minimum password lengths, character variations (uppercase, lowercase, numbers, symbols), and regular password changes.
    - Session timeout settings: Automatically log out inactive users after a predetermined period to minimize the risk of unauthorized access due to unattended sessions.
- **REQ-2:** All data transmission between users and the system shall be encrypted using secure protocols (e.g., HTTPS) to protect against data breaches. This ensures that user profiles, assessment results, and other sensitive information are encrypted during transmission.
- **REQ-3:** Implement robust data access controls:

- Grant access to skill assessment data only to authorized users with legitimate roles (e.g., Students, Placement Officers).
- Define user roles and permissions within the system to restrict access to features and data based on user types.
- Practice data minimization by collecting and storing only necessary information for system functionalities.

System Access and Use

- **REQ-4:** Secure user sessions:
  - Implement secure session management practices to prevent session hijacking or unauthorized access.
  - Consider using secure cookies or tokens for user authentication to enhance session security.
- **REQ-5:** Administer proper training for authorized users on:
  - Secure handling of assessment data within the system, emphasizing data privacy and confidentiality.
  - Recognizing and reporting suspicious activity to mitigate security threats.
- **REQ-6:** Implement user activity logging:
  - Log user actions within the system, including login attempts, assessment submissions, and modifications made, to detect and address security breaches or unauthorized activities.

5.4 Software Quality Attributes

Usability

- **Ease of Use:** The system interface should be intuitive for users, with clear navigation and straightforward assessment processes. Aim for a learning curve of less than 1 hour for basic functionalities.
- **Satisfaction:** Conduct usability testing to ensure user satisfaction with the system's interface and functionalities.

Availability

- Ensure high availability of the system for users to access assessments and skill data, aiming for a system uptime of at least 99.5% during monthly operational hours.

Maintainability

- Maintain well-documented code, following coding best practices to facilitate future maintenance and updates. Aim for a maintainability index (e.g., Maintainability Index Suite - MIS) in the "easily maintainable" range.

Reliability

- Ensure reliable system functionality with minimal errors or disruptions. Aim for a mean time between failures (MTBF) of at least one month for critical functionalities.

Performance

- Prioritize responsive user experience, aiming for fast loading times and quick response to user actions. Web pages should load within 3 seconds, and user actions should be reflected within 1 second.

Security

- Implement robust security measures, including strong user authentication, data encryption, and regular security audits to identify and address vulnerabilities.

Flexibility

- Design the system to be adaptable to future changes and growth. Consider a modular architecture that allows for adding new features or integrations without significant rework.

Interoperability

- Ensure compatibility with other systems or services, defining clear data formats and APIs for seamless integration if needed.

Portability

- Consider the target deployment environment and ensure compatibility across different platforms or configurations.

Testability

- Design the system with testability in mind, implementing unit testing, integration testing, and system testing to ensure all functionalities work as intended.

Reusability

- Identify and promote reusable code components within the system for potential future applications.

Robustness

- Ensure the system can handle unexpected inputs, errors, or high traffic volumes without crashing or becoming unresponsive.

Prioritization

- Prioritize ease of use and reliability over advanced functionalities, ensuring a positive user experience for all users. Balance the need for high availability with cost-effectiveness in system operations.

5.5 Business Rules

User Roles:

- **Student:**
  - Can sign up using their PRN number, name, college name, and department name.
  - Upon logging in and can access skill assessments and quizzes.
  - Can upload resumes and view personalized skill recommendations and ATS scores.
  - Can take quizzes and view their scores and leaderboard ranking.
- **Placement Officer:**
  - Can sign up using institutional credentials.
  - Can access and manage student data, including skill assessments and resumes.
  - Can generate reports based on student performance and skill assessments.
  - Can view and sort student data based on skills, department, and ATS scores.
- **Admin:**
  - Can manage user accounts and permissions.
  - Can oversee system-wide functionalities, including documentation and integration.
  - Can access and review all student and placement officer data.
  - Can configure system settings and perform system maintenance tasks.

Access Control:

- The system shall enforce role-based access control (RBAC) to restrict functionalities based on user roles.
- Students cannot access Placement Officer or Admin functionalities and vice versa.
- Assessment data and user profiles are accessible only to authorized users based on their roles.

Communication:

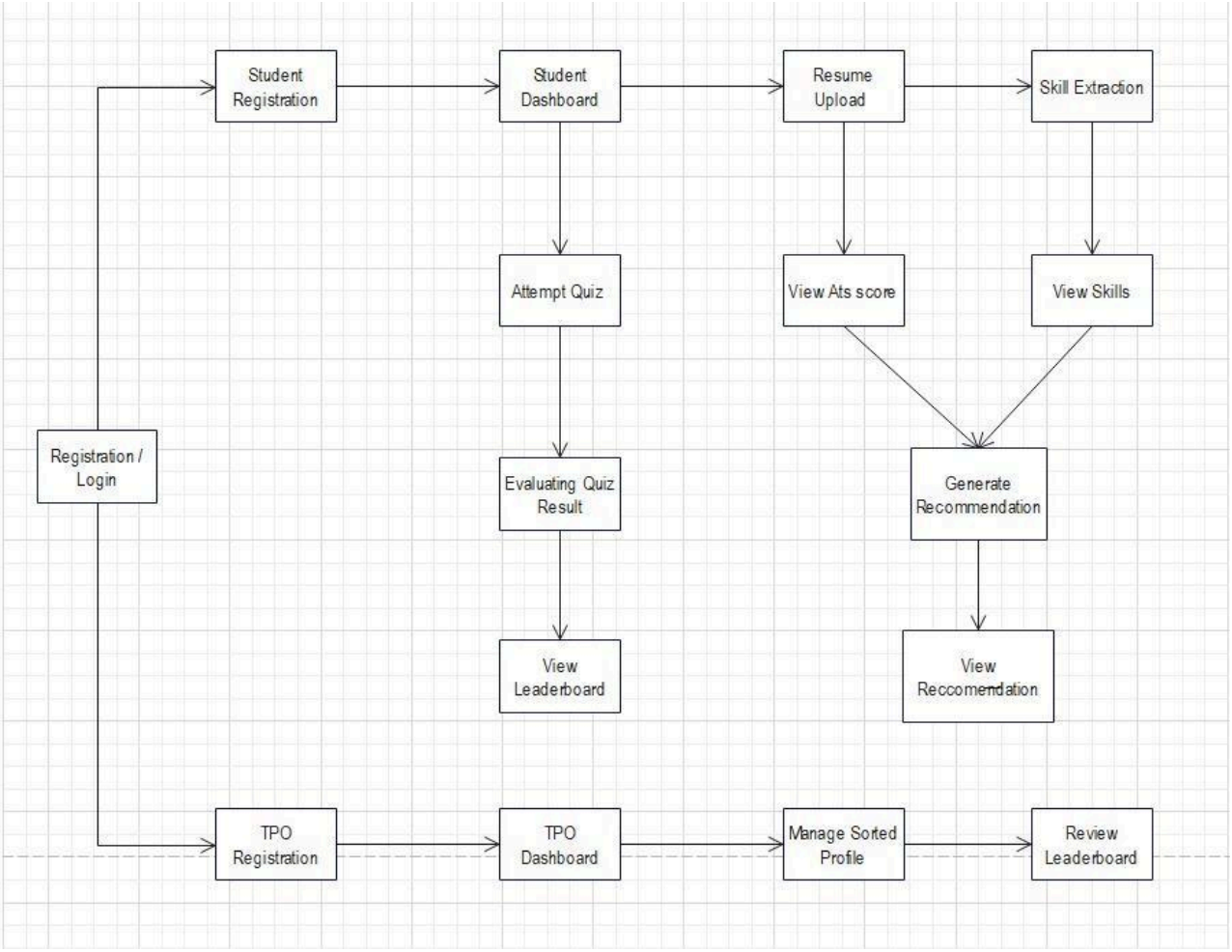
- The system may facilitate communication channels between students and placement officers regarding skill assessments and career opportunities.
- Students can receive notifications about new assessments, results, and personalized recommendations.
- Placement Officers can send messages to students regarding assessment feedback and placement opportunities

6. Other Requirements

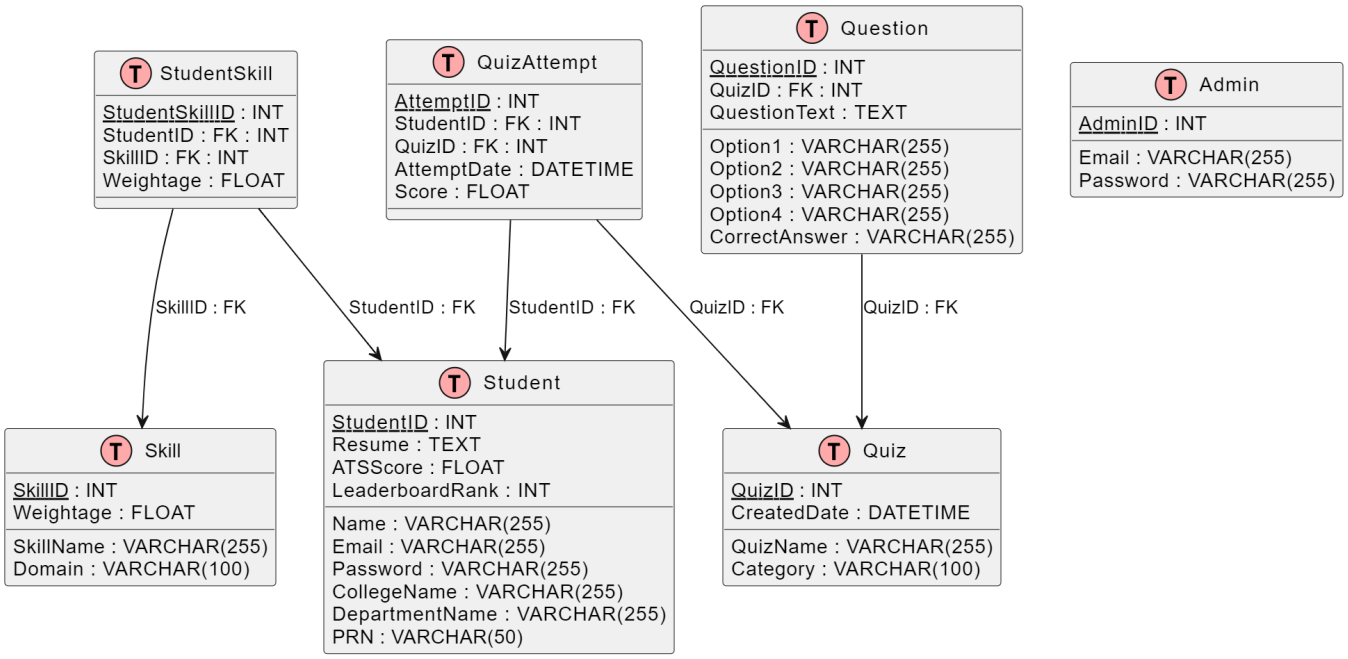
Appendix A: Analysis Models

Use case diagram

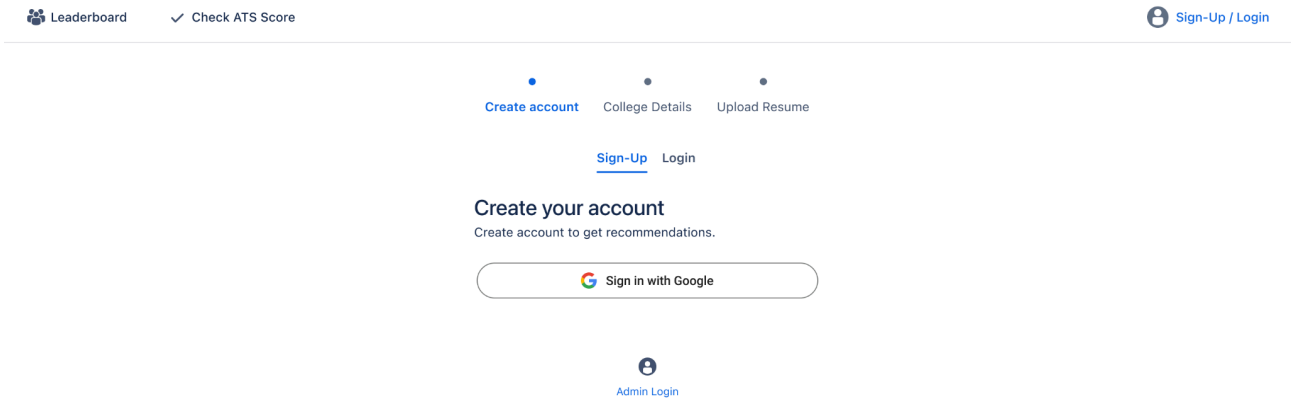
Block diagram

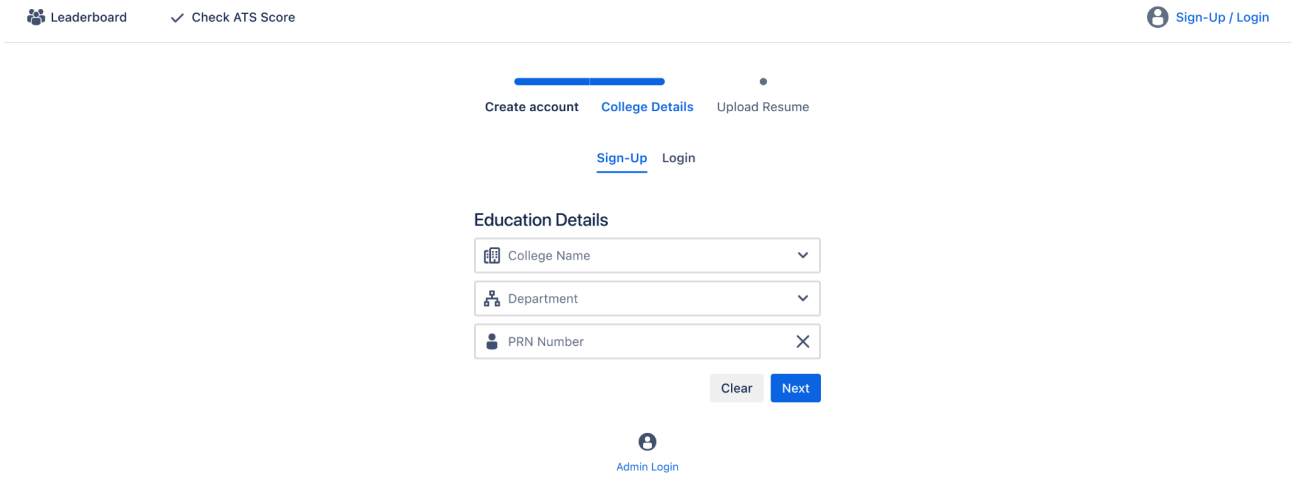


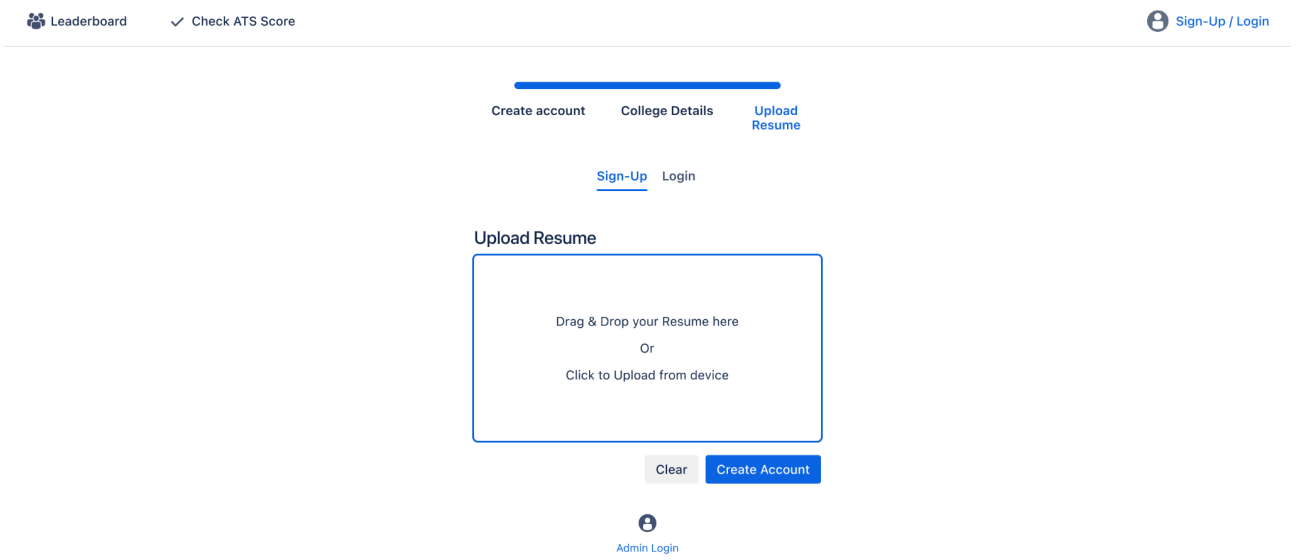
Class Diagram



Appendix B: Graphical User Interface(GUI)



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Or
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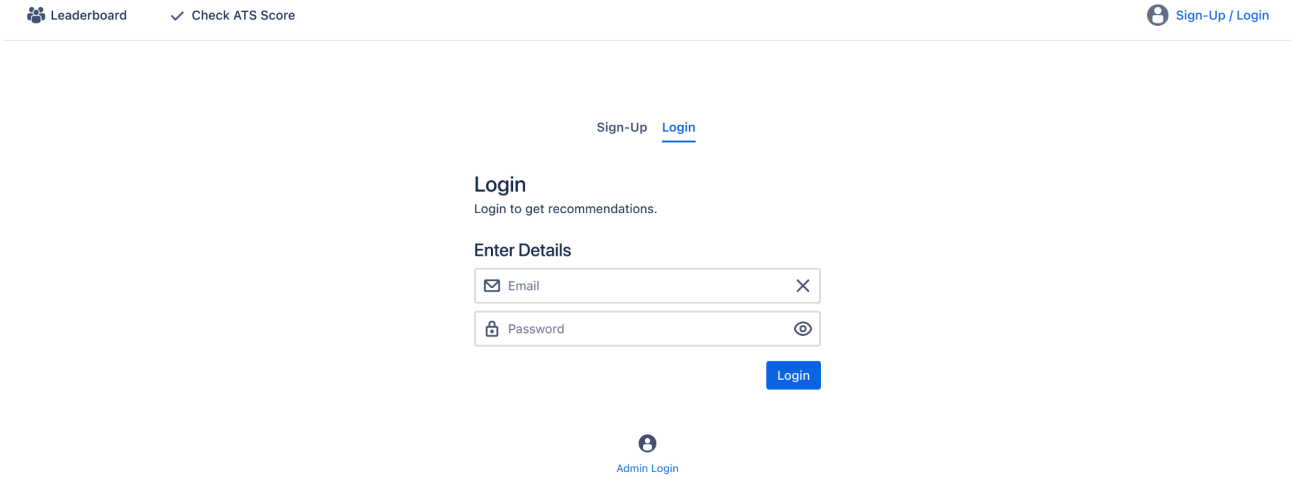
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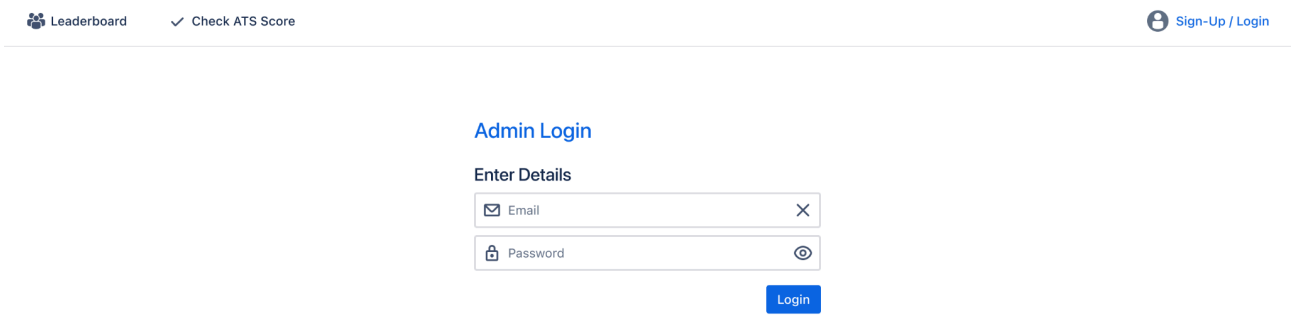
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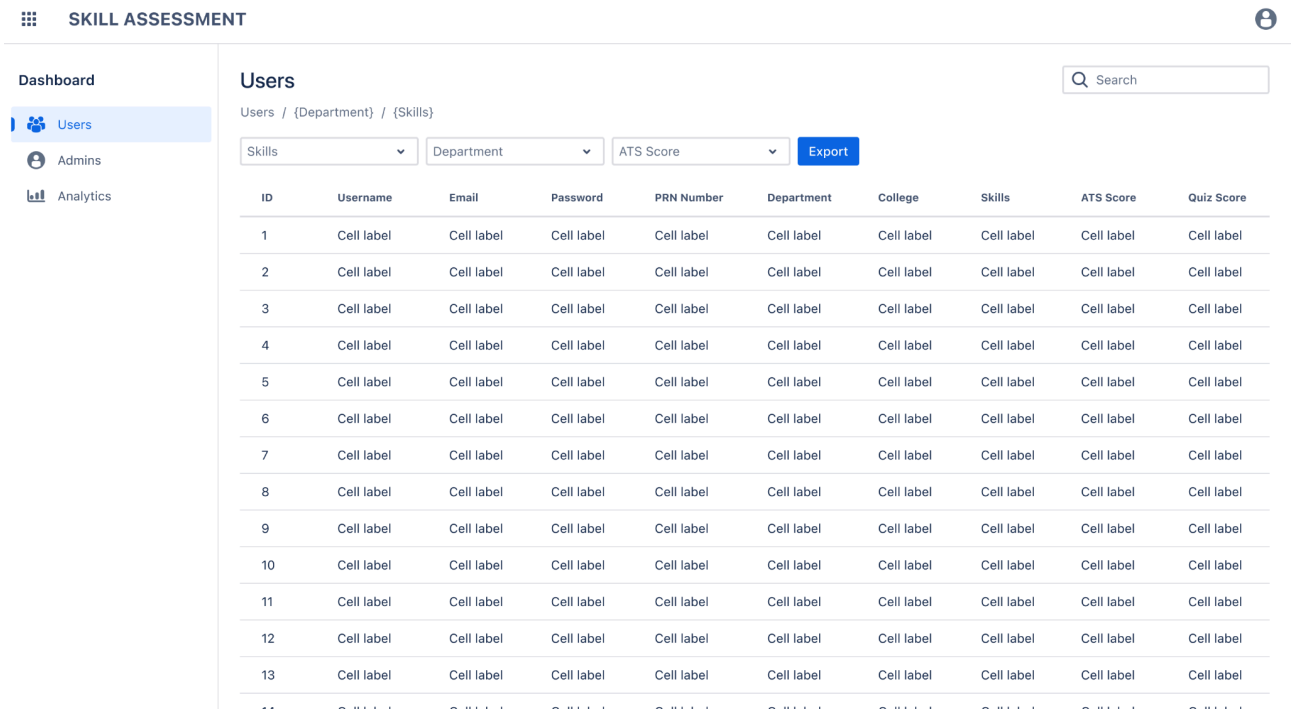
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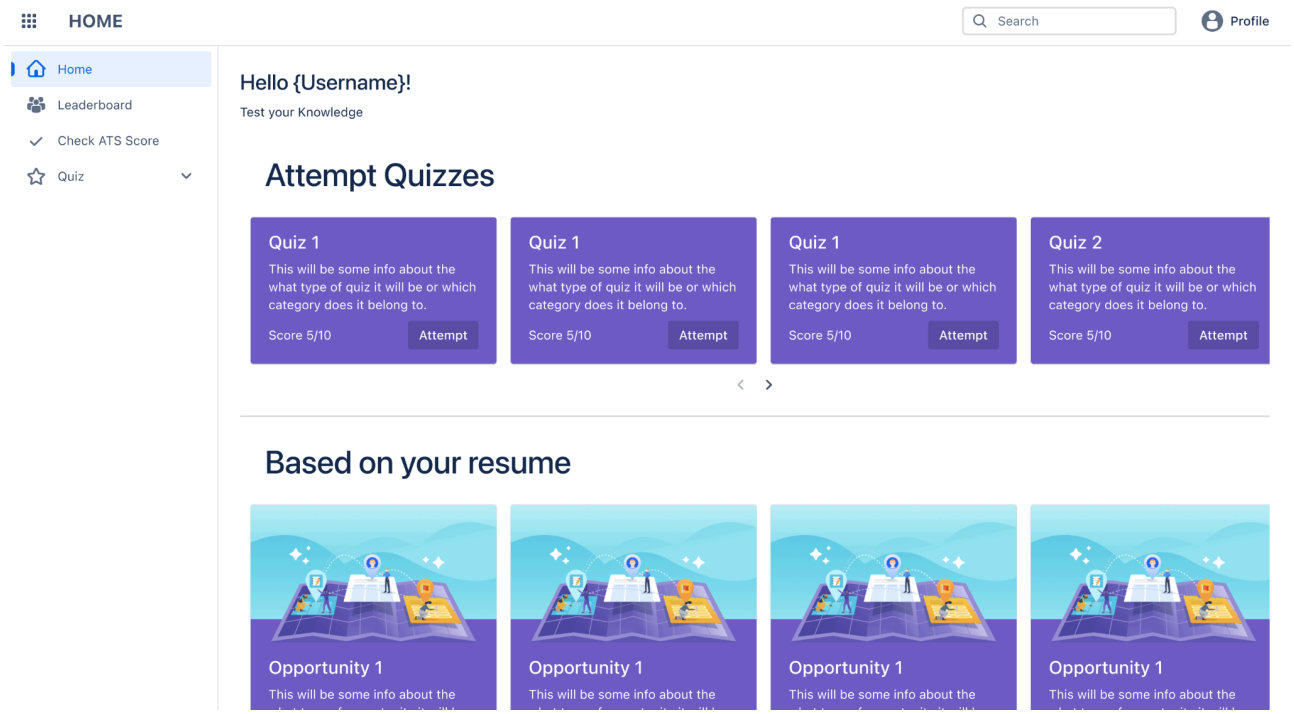

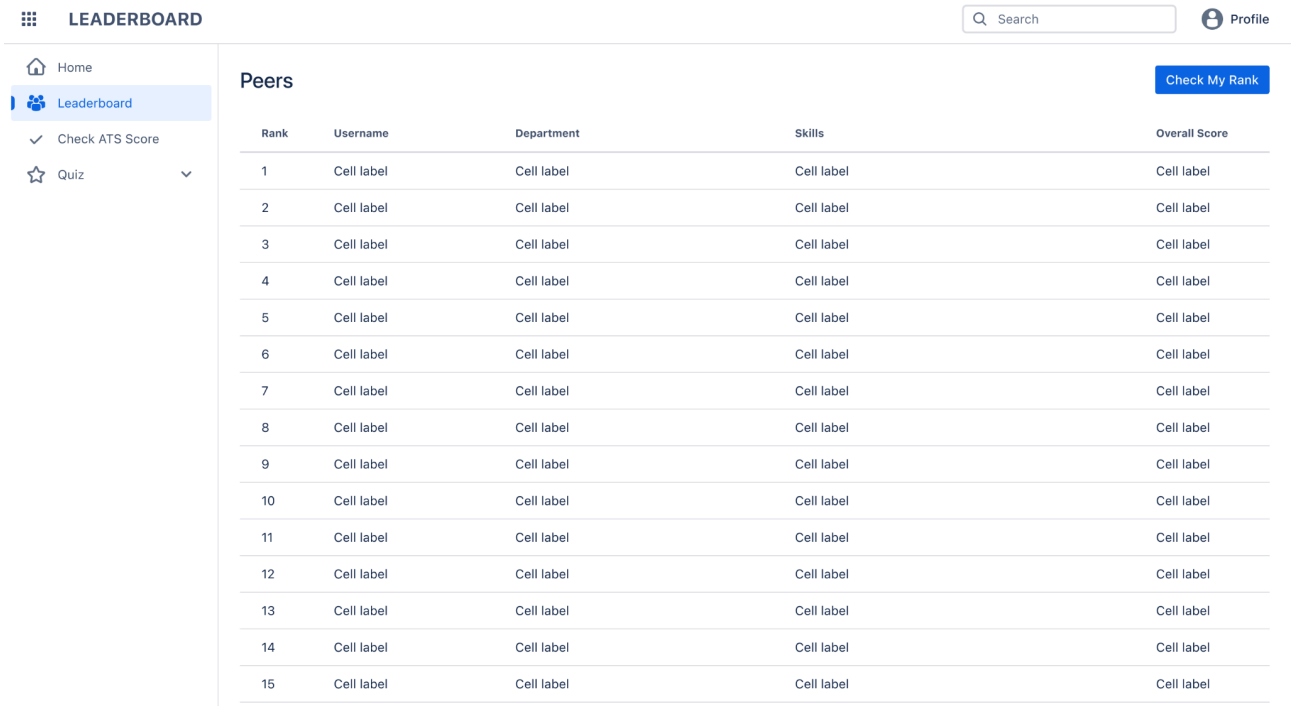

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5	Cell label	Cell label	Cell label	Cell label
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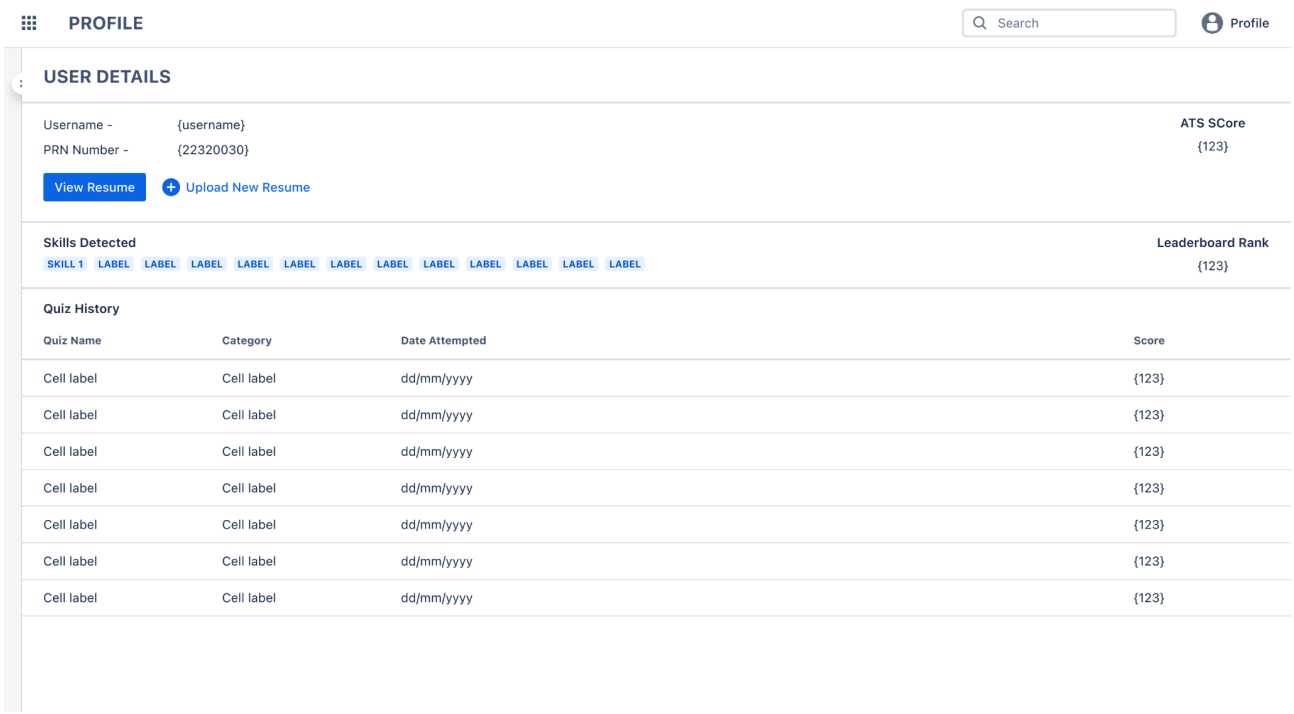
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Upload New Resume
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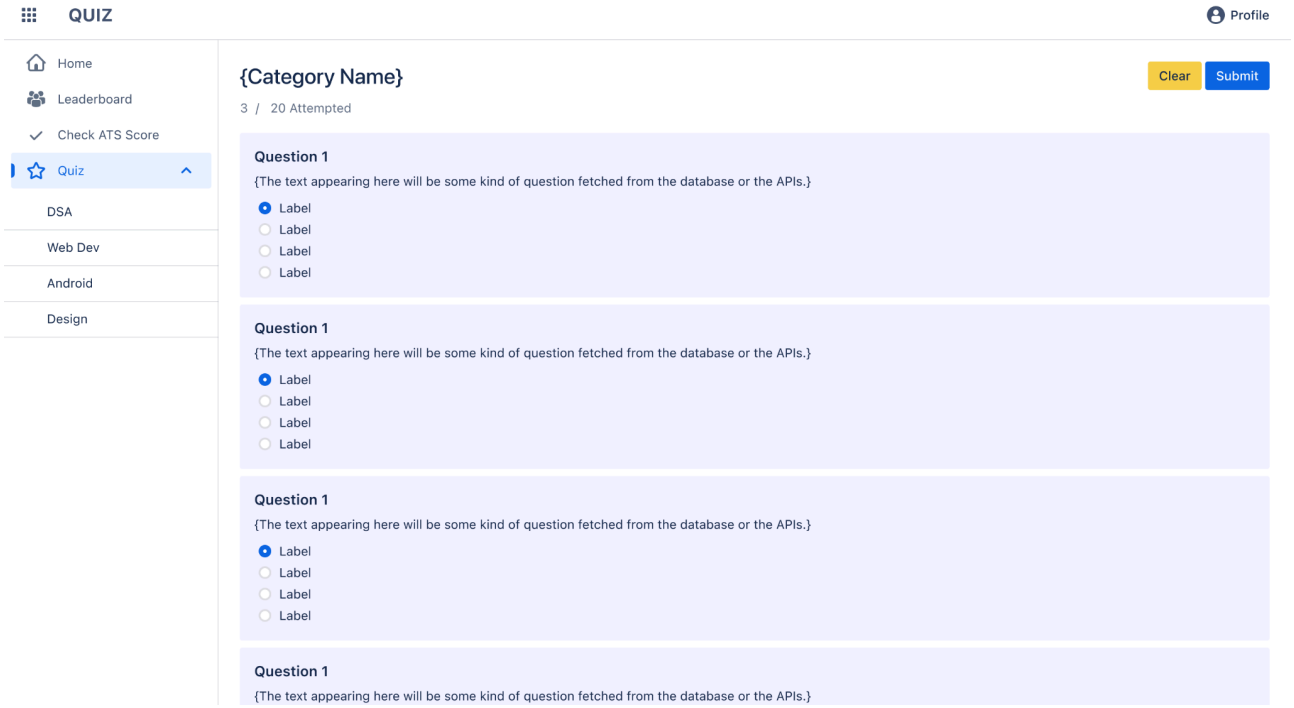
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Home
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3 / 20 Attempted
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Label
Label
Label
Label