

# **Software Requirements Specification (SRS)**

## **AI-Driven Career Recommendation & Skill Pathway System**

Version 1.0

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### **1. Introduction**

#### **1.1 Purpose**

This SRS describes the complete software requirements for the **AI-Driven Career Recommendation & Skill Pathway System**, a web-based intelligent guidance platform that analyses user academic data, interests, and skills to generate personalized career recommendations and learning roadmaps. This SRS covers all modules, interfaces, constraints, and performance expectations.

#### **1.2 Document Conventions**

- **FR-x** denotes Functional Requirements.
- **NFR-x** denotes Non-Functional Requirements.
- Bold text represents mandatory requirements.
- UML diagrams follow standard notation (IEEE/ISO conventions).

#### **1.3 Intended Audience and Reading Suggestions**

- **Developers:** Refer to Sections 2, 3, and 4 for functional and interface requirements.
- **Testers:** Refer to detailed functional requirements in Section 4.
- **Project Managers:** Refer to constraints and dependencies in Section 2.
- **Users/Admin:** Refer to Section 3 (UI and functionalities).

Reading order suggestion: Sections 1 → 2 → 4 → 5.

#### **1.4 Product Scope**

The system helps students and professionals identify suitable careers by analysing academic performance, personality traits, and skills using AI/ML algorithms. It also provides skill gap analysis and course recommendations. Benefits include improved career clarity, personalized guidance, and data-driven insights for institutions.

#### **1.5 References**

- IEEE SRS Standard (IEEE 830-1998)
- Project UML Diagrams (Analysis Models)

- Academic datasets, personality trait models
- Online Course Provider API Docs

## 2. Overall Description

### 2.1 Product Perspective

The system is a new, standalone web application using microservice architecture. It interacts with:

- ML model server for predictions
- External education APIs (Coursera, Udemy, etc.)
- Internal databases for users, profiles, skills, recommendations

### 2.2 Product Functions

- User registration & authentication
- Academic data input
- Interest & psychometric tests
- Career prediction (AI)
- Skill gap analysis
- Personalized roadmap generation
- Course recommendation
- Progress tracking dashboard

### 2.3 User Classes and Characteristics

- **Student (Primary User):** Basic computer and internet literacy.
- **Professional:** Familiar with skill development & online resources.
- **Admin:** Responsible for monitoring model performance, database management.
- **Institution Counsellor:** Uses aggregated reports.

### 2.4 Operating Environment

- Browser-based UI (Chrome, Edge, Firefox)
- Cloud-hosted backend services
- Linux-based servers (Docker/Kubernetes)

### 2.5 Design and Implementation Constraints

- Must use microservices
- Must support HTTPS communication
- Must comply with user privacy standards
- ML model must be deployable independently

## **2.6 User Documentation**

- User Manual
- Online Help/FAQ
- Quick Start Guide
- Admin Guide

## **2.7 Assumptions and Dependencies**

- Users provide accurate information
- Stable API access to course providers
- ML model performance depends on available datasets

# **3. External Interface Requirements**

## **3.1 User Interfaces**

- Modern dashboard with graphs & cards
- Profile completion interface
- Quiz interfaces (interest & personality assessment)
- Recommendation cards with scores
- Skill pathway timeline view
- Consistent header/footer, help button

## **3.2 Hardware Interfaces**

- Compatible with desktops, laptops, tablets, and smartphones
- No specialized hardware required

## **3.3 Software Interfaces**

- External course provider APIs
- ML model server (REST API)
- Database systems (SQL/NoSQL)

### **3.4 Communications Interfaces**

- HTTPS over TLS 1.2+
- REST APIs for microservice communication
- SMTP/Push notification service

## **4. System Features**

### **4.1 User Management**

#### **4.1.1 Description and Priority**

High priority. Allows users to register, authenticate, and manage profiles.

#### **4.1.2 Stimulus/Response**

User submits credentials → System validates → Grants access.

#### **4.1.3 Functional Requirements**

- **FR1:** System shall allow users to register via email/phone.
- **FR2:** System shall validate credentials securely.
- **FR3:** Passwords must be hashed.

### **4.2 Academic & Skill Data Collection**

**Priority: High**

#### **Functional Requirements**

- **FR4:** Users shall enter academic information.
- **FR5:** System shall store skill sets.

### **4.3 Career Recommendation Engine**

**Priority: High**

#### **Functional Requirements**

- **FR6:** System shall process profile data and generate top 3–5 career choices.
- **FR7:** System shall show score justification.
- **FR8:** System shall handle missing data errors.

### **4.4 Skill Pathway Generator**

**Priority: Medium**

- **FR9:** System shall perform skill gap analysis.

- **FR10:** System shall generate personalized learning path.

#### **4.5 Course Recommendation Module**

##### **Priority: Medium**

- **FR11:** System shall fetch course lists via APIs.
- **FR12:** System shall map skills to courses.

#### **4.6 Progress Tracker**

##### **Priority: Medium**

- **FR13:** Users shall update progress.
- **FR14:** System shall adjust recommendations.

#### **4.7 Admin Panel**

##### **Priority: Low**

- **FR15:** Admin shall update ML models.
- **FR16:** Admin shall manage database entries.

### **5. Other Nonfunctional Requirements**

#### **5.1 Performance Requirements**

- **NFR1:** Career suggestions must load  $\leq$  3 seconds.
- **NFR2:** Handle 10,000 concurrent users.

#### **5.2 Safety Requirements**

- No harmful recommendations should be displayed.
- System shall warn when data is incomplete.

#### **5.3 Security Requirements**

- **NFR3:** Passwords hashed using SHA-256 or better.
- **NFR4:** Role-based access control.

#### **5.4 Software Quality Attributes**

- Availability  $\geq$  99% uptime
- Maintainability ensured via microservices
- High usability & accessibility

#### **5.5 Business Rules**

- Only Admin can modify ML rules.
- Users cannot edit generated recommendations.

## 6. Other Requirements

- Data storage must follow privacy laws.
- System logs analytical events.
- Databases must support ACID/BASE based on service type.

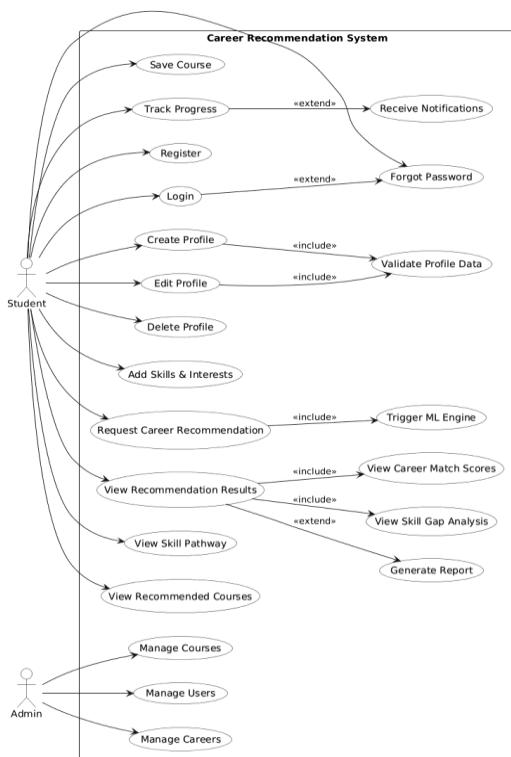
## Appendix A: Glossary

- **Skill Gap:** Difference between existing and required skills.
- **Career Pathway:** A structured learning route.
- **Psychometric Analysis:** Personality assessment.

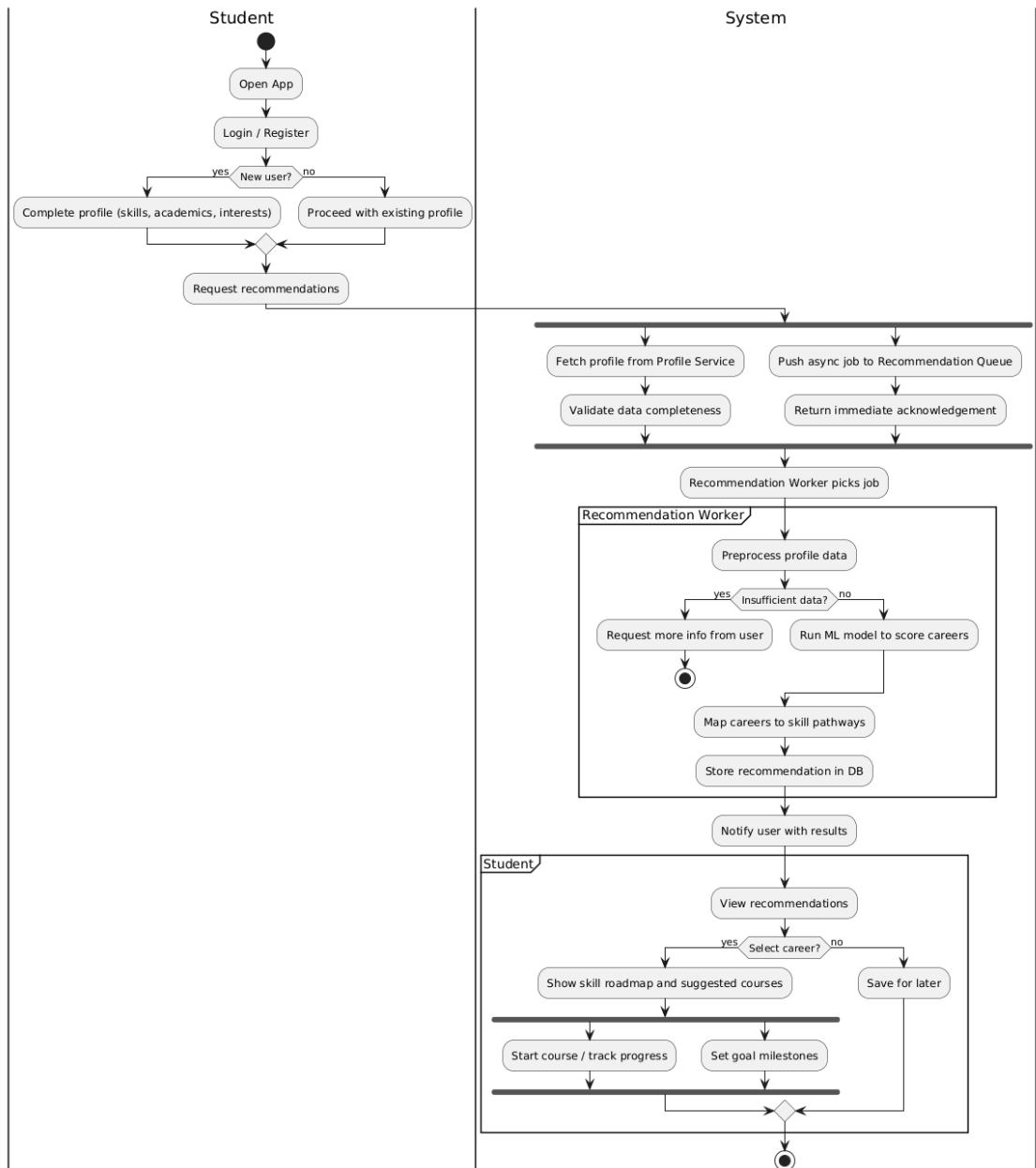
## Appendix B: Analysis Models

- Behavioural Modelling

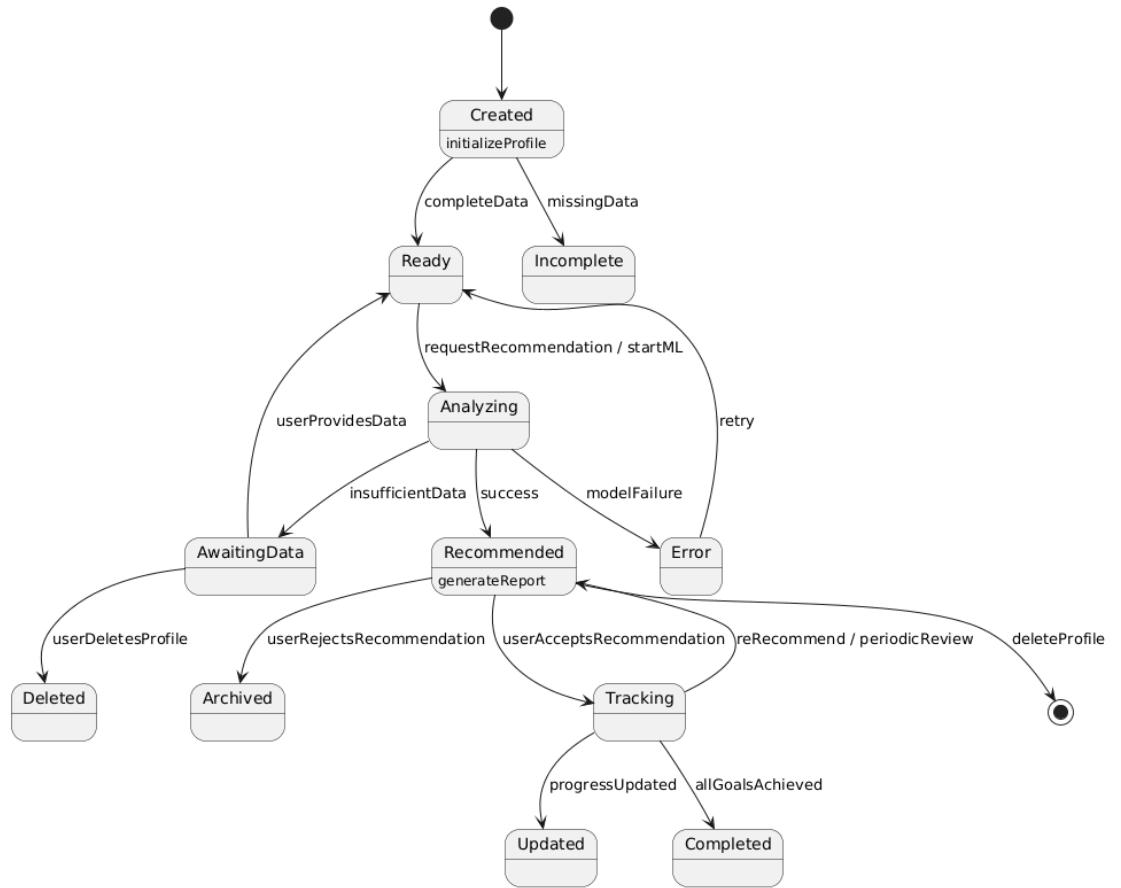
### a) Use-Case Diagram



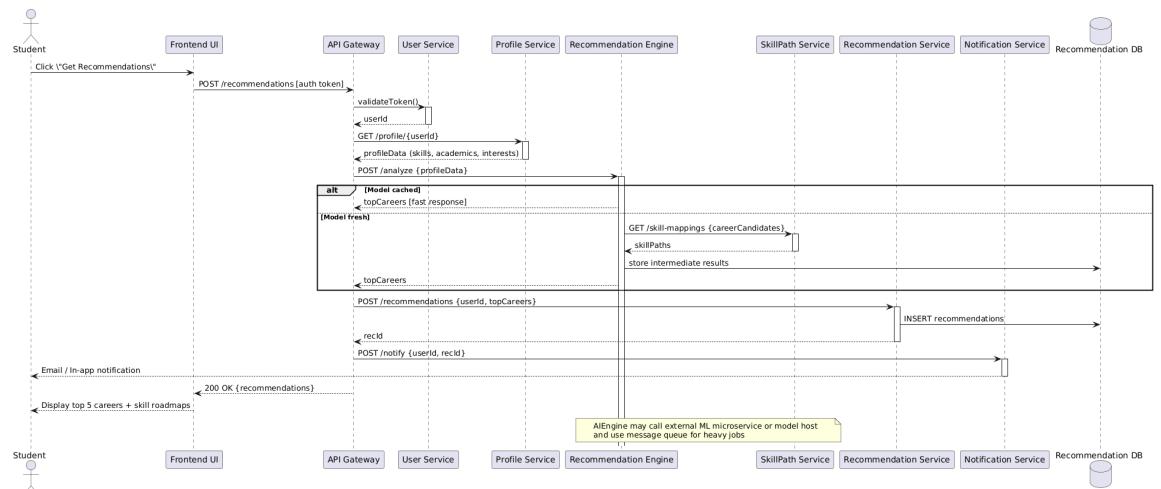
## b) Activity Diagram



### c) State Diagram

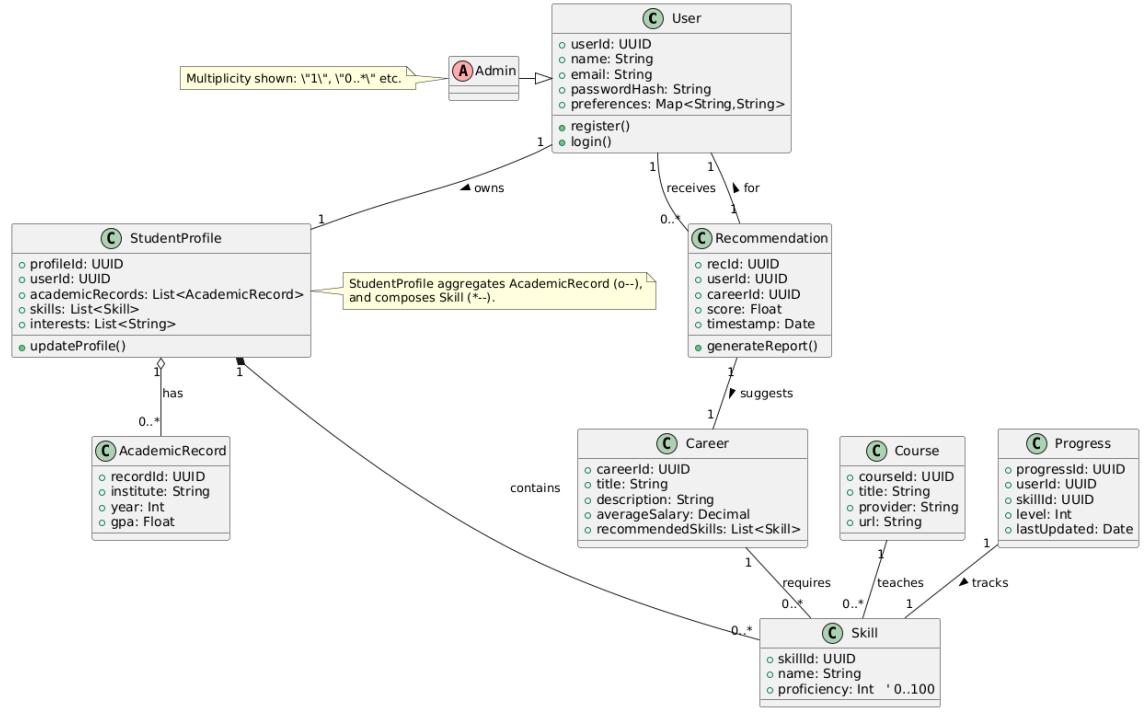


### d) Sequence Diagram



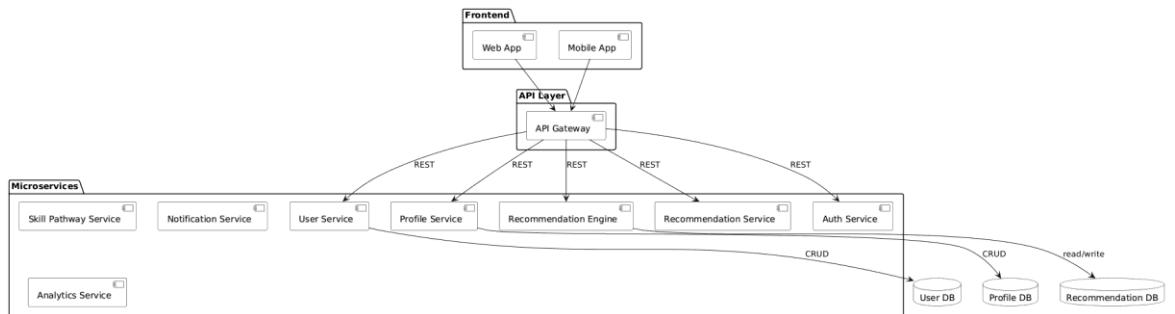
- Structural Modelling

a) Class Diagram

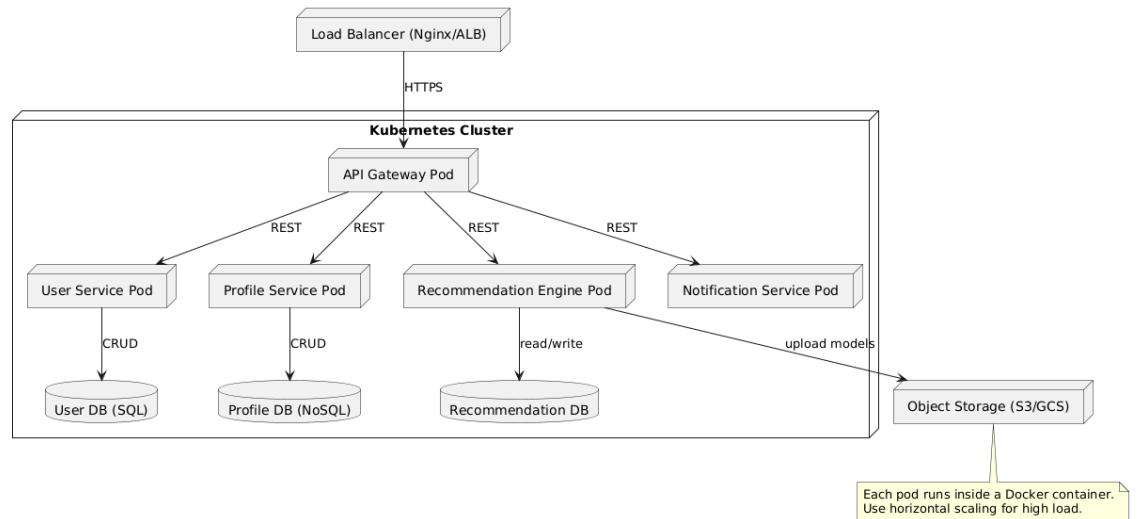


- Architecture Modelling

a) Component Diagram



## b) Deployment Diagram



## Appendix C: To Be Determined List

- TBD-1: Final ML algorithm selection
- TBD-2: API integrations with specific platforms