MODERN CAREER GUIDANCE:

A PERSONLAIZED APPROACH TO SUCCESS

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COMPUTER SCIENCE AND ENGINEERING

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2021-2025

CERTIFICATE

This is to certify that this project entitled **"MODERN CAREER GUIDANCE: A PERSONLIZED APPROACH TO SUCCESS"** is the Bonafide work of **CHAVALA VENKAT KALYAN (21NG1A0509),** who carried out the work under my Supervision, and submitted in partial fulfilment of the requirements for the award of the Degree in Bachelor of Technology in Computer Science and Engineering during the academic year 2024-25

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I hereby declare that the Project entitled **"MODERN CAREER GUIDANCE: A PERSONALIZED APPROACH TO SUCCESS"** is the work done by me during the academic Year 2024-2025 and is submitted in partial fulfilment of the requirements for the award of degree Of **Bachelor of Technology** in **COMPUTER SCIENCE AND ENGINEERING** from **JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA.**

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ABSTRACT

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In today's fast-changing job market, making well-informed career decisions is vital for both students and professionals striving to achieve personal and professional growth. The proposed Modern Career Guidance platform serves as an innovative solution, using advanced technologies like Java Full Stack to provide tailored career planning support. At its core is the **skill gap analysis**, which evaluates users' existing skills to identify areas requiring improvement, helping them align more effectively with industry standards. To bridge these gaps, the platform offers personalized **course recommendations**, updated regularly based on emerging market trends and the latest industry practices, ensuring users stay relevant in their fields. Another critical feature is **job matching functionality**, designed to connect users with employment opportunities that align with their capabilities and long-term career aspirations. By systematically comparing users' skills against specific job requirements, the platform facilitates precise matches, enhancing users' chances of finding fulfilling roles. The platform also includes a dynamic **feedback mechanism**, allowing users to share insights and reviews on the courses they undertake. This feedback loop enriches the overall learning experience by fostering continual improvement in educational content and maintaining high-quality standards. The platform's technical foundation guarantees its reliability, scalability, and ease of use. It leverages **Java 17**, which provides a robust programming environment for efficient development; **Spring Boot 3.0**, offering a flexible framework for building powerful web applications; and **MySQL 8.0**, ensuring seamless, scalable database management. Together, these technologies enable a smooth, responsive user experience and adaptability to evolving needs. By integrating cutting-edge tools and features, the platform empowers users to make informed choices, bridge skill gaps, and achieve their career aspirations in an increasingly competitive job market. Ultimately, the Modern Career Guidance platform represents a transformative approach to career planning, leveraging personalization, up-to-date resources, and user-friendly technology to meet the demands of the modern workforce.

TABLE OF CONTENTS

Chapter No.	Title	Page No.
Chapter 1	Introduction	01
1.1	Overview	02
1.2	Literature Survey	03
1.3	Problem Statement	04
1.4	Objectives of the Project	05
1.5	Scope of the Project	06
Chapter 2	Aim & Scope	08
2.1	Aim of the Project	09
2.2	Scope of the Project	09
	2.2.1 Functional Scope	09
	2.2.2 Technical Scope	10
Chapter 3	System Analysis	12
3.1	Problem Definition	12
3.2	Feasibility Study	12
	3.2.1 Technical Feasibility	12
	3.2.2 Operational Feasibility	12
3.3	Functional Requirements	13
3.4	Non-Functional Requirements	14
Chapter 4	System Design	16
4.1	System Analysis Methods	17
	4.1.1 Use Case Diagram	17
	4.1.2 Data Flow Diagram	18
4.2	System Design Method	20
	4.2.1 Class Diagram	20
	4.2.2 Sequence Diagram	21
	4.2.3 Activity Diagram	22

Chapter No.	Title	Page No.
	4.2.3.1 User Activity Diagram	22
	4.2.3.2 Admin Activity Diagram	23
	4.2.3.3 Skill Gap Analysis Activity Diagram	24
	4.2.3.4 Course Recommendation Activity Diagram	25
	4.2.3.5 Job Recommendation Activity Diagram	26
	4.2.3.6 Feedback Activity Diagram	27
4.2.4	Component Diagram	28
Chapter 5	Implementation	30
5.1	Tools and Technologies Used	30
5.2	Module Implementation	31
	5.2.1 User Management	31
	5.2.2 Skill Gap Management	31
	5.2.3 Course Management	31
	5.2.4 Job Management	31
Chapter 6	Testing	33
6.1	Test Cases and Results	33
	6.1.1 User Registration	33
	6.1.2 User Login	34
	6.1.3 Skill Gap Analysis	36
	6.1.4 Course Recommendation	37
	6.1.5 Job Recommendation	38
6.2	Unit Testing	39
6.3	Integration Testing	39
6.4	Security Testing	40
6.5	System Testing	41
Chapter 7	Screenshots	42
7.1	Home Page	43

Chapter No.	Title	Page No.
7.2	Login Page	43
7.3	Registration Page	44
7.4	User Dashboard Page	44
7.5	User Profile Update Page	45
7.6	Skill Gap Analysis Page	45
7.7	Skill Gap Analysis Report Page	46
7.8	Course Recommendation Page	46
7.9	Courses Playlist Page	47
7.10	Job Recommendation Page	47
7.11	User Feedback Page	48
7.12	Admin Dashboard Page	48
7.13	Admin Course Adding Page	49
7.14	Admin Course Review Page	49
7.15	Admin Job Posting Page	50
7.16	Admin Feedback Review Page	50
Chapter 8	Result	52
Chapter 9	Summary and Conclusion	53
9.1	Summary	54
9.2	Conclusion	54
Chapter 10	Future Enhancements	55
10.1	Proposed Features for Future Development	56
Chapter 11	Bibliography	58
Chapter 12	Published Paper	60

INTRODUCTION

1.INTRODUCTION

The Modern Career Guidance platform is a sophisticated and innovative solution designed to assist users in navigating the rapidly evolving job market. With the rise of new industries, technologies, and changing employment landscapes, individuals must continuously update their skills and strategically plan their careers to remain competitive. This platform addresses these challenges by providing personalized career guidance tailored to each user's unique skills, educational background, and career aspirations.

At the core of the platform are its four integrated modules: Skill Gap Analysis and Learning Plan, Course Recommendation System, Job Matching and Application Assistance, and a Feedback Mechanism. These modules collectively create a seamless and user-friendly experience, enabling users to assess their current skill levels, identify gaps, receive targeted learning recommendations, and discover job opportunities aligned with their goals. The feedback system ensures continuous improvement by adapting learning materials and guidance to market trends and user input.

The platform also emphasizes user empowerment through dynamic adaptability. By constantly updating its recommendations to reflect evolving industry trends, it ensures users gain access to the most relevant skills and opportunities. Furthermore, the job matching feature leverages intelligent algorithms to bridge the gap between users' current competencies and their aspirational roles, streamlining the job search process while enhancing the likelihood of career success. This adaptability makes the platform a sustainable career companion in an ever-changing world.

Built on a robust Java Full Stack architecture, the platform leverages Spring Boot 3.0 for efficient server-side logic, MySQL 8.0 for reliable data storage, and responsive frontend technologies like HTML, CSS, and JavaScript. Advanced algorithms and tools, such as Open NLP for natural language processing, are used to analyze user profiles and industry demands, ensuring accurate insights and recommendations.

This platform goes beyond individual career growth, offering value to organizations and educational institutions by aligning talent development strategies with real-world industry needs. Through automation and data-driven analysis, the platform not only enhances career development but also ensures businesses have access to skilled and capable professionals.

By empowering users with actionable insights and modern tools for career planning, the Modern Career Guidance platform exemplifies a new standard in personalized career support. It represents a commitment to bridging the gap between education, skills, and job opportunities, helping users and organizations alike thrive in a competitive world.

1.1 Overview

In a rapidly changing job market, individuals and organizations face the challenge of staying aligned with evolving industry demands. The Modern Career Guidance platform is a cutting-edge solution designed to address these challenges by offering personalized career development tools. It is built on a robust Java Full Stack architecture and integrates advanced features such as skill gap analysis, course recommendations, job matching, and user feedback mechanisms. These features collectively provide users with actionable insights to achieve their career goals while ensuring relevance to industry trends.

The platform's Skill Gap Analysis and Learning Plan module enables users to evaluate their current skills against market demands and generate tailored learning pathways. By assigning weightages to existing and desired skills, it helps individuals identify areas for improvement and create structured plans for professional growth. This feature ensures users remain competitive in their fields and stay ahead in their career trajectories. Complementing this is the Course Recommendation System, which suggests the most relevant courses and certifications based on career goals, market trends, and individual preferences. Regular updates ensure that users learn the latest in-demand skills to maintain their professional edge.

Another core feature is the Job Matching and Application Assistance module, which acts as a bridge between users and suitable job opportunities. Advanced algorithms and tools, including OpenNLP, analyze user profiles to align their skills and aspirations with available positions. This intelligent matchmaking increases the likelihood of career success by presenting users with roles that match both their current abilities and long-term goals. Additionally, the Feedback Mechanism allows users to evaluate courses and modules, ensuring continuous refinement of the platform's content and alignment with the ever-changing job market.

The platform is powered by a modern technology stack. Spring Boot 3.0 and MySQL 8.0 provide robust back-end support, while HTML, CSS, and JavaScript ensure responsive and interactive front-end experiences. The integration of data-driven technologies ensures reliability, scalability, and seamless operation, offering users an efficient and intuitive interface to navigate their career journeys.

With its innovative features, modern architecture, and user-focused design, the Modern Career Guidance platform sets a new benchmark for career development solutions. It ensures that individuals can take control of their professional growth while enabling businesses and educational entities to adapt to future workforce demands. This platform is not just a tool for today's job seekers but a comprehensive solution for building a sustainable, future-ready workforce.

1.2 Literature Survey

The development of the Modern Career Guidance platform builds upon existing research and technological advancements in career planning, skill development, and job matching systems. Studies in career guidance emphasize the growing importance of personalized and adaptive solutions to meet the unique needs of individuals in diverse industries. Traditional career counseling approaches, while effective in the past, often fall short in addressing the rapidly evolving nature of job markets, skill requirements, and industry trends. This has paved the way for automated platforms powered by advanced technologies, which can provide real-time, data-driven insights for career development.

Career Guidance and Employment Management System

- **Key Features:** Integrates career tests, job postings, and expert consultation services.
- **Limitations:** Lack of real-time updates and personalized guidance.

Career Guidance and Its Impact on Graduate Employability

- **Key Features:** Provides personalized and proactive approaches to career guidance.
- **Limitations:** Mismatch between counseling information and job market demands.

Research underscores the importance of skill gap analysis in bridging the disconnect between academic qualifications and industry expectations, highlighting that platforms assessing and addressing these gaps through targeted learning plans significantly enhance employability. Additionally, extensive studies have shown that feedback mechanisms are crucial for continuous improvement in platform content and usability, refining course recommendations, improving job matching algorithms, and ensuring the relevance of learning materials in dynamic job markets. The iterative development process supported by such feedback systems is essential for user satisfaction and the effectiveness of career platforms.

By synthesizing these insights, the Modern Career Guidance platform incorporates best practices from existing literature and builds upon them with cutting-edge technology. It aims to fill the gaps identified in earlier studies by offering a comprehensive, real-time, and user-centric career development solution that aligns with the needs of individuals, organizations, and educational institutions.

1.3 Problem Statement

The rapidly evolving job market poses significant challenges for individuals, organizations, and educational institutions. With the continuous emergence of new technologies and industries, skill demands are shifting faster than ever before. Individuals often struggle to identify and address the gaps between their existing skills and those required in their desired careers. Traditional career counseling methods and generic online resources fail to provide the personalized, actionable insights needed to navigate this

dynamic landscape effectively. As a result, many job seekers face difficulties in aligning their capabilities with market demands, leading to missed opportunities and career stagnation.

In addition to these challenges, the modern job market demands seamless integration of career planning, skill development, and job matching into a unified platform. Fragmented systems create additional barriers for users, requiring them to rely on multiple tools for learning, job searching, and career guidance. This lack of integration results in inefficiency and frustration for users, hindering their ability to make progress in their careers.

The Modern Career Guidance platform seeks to address these critical problems by providing a comprehensive, technology-driven solution that bridges the gap between users, educators, and employers. It integrates skill gap analysis, personalized learning recommendations, job matching, and feedback systems into a cohesive and user-friendly platform. By leveraging advanced tools such as AI-driven insights, NLP-based job matching, and a scalable Java Full Stack architecture, the platform ensures individuals can align their skills with industry demands, organizations can foster workforce development, and institutions can better prepare students for the future job market.

1.4 Objectives of Project

The objective of the Modern Career Guidance Platform is to empower individuals, organizations, and educational institutions with the tools and insights needed to align skills with the dynamic demands of the job market. The following detailed objectives outline the platform's core goals:

1. Personalized Career Guidance

Develop a system that delivers tailored career insights and recommendations based on an individual's current skills, educational background, career goals, and market trends. This includes generating personalized career roadmaps to help users navigate their professional journeys effectively.

2. Skill Gap Analysis and Learning Path Development

Implement a robust skill gap analysis module that identifies the discrepancies between a user's current skill set and the competencies required for their desired roles. Based on this analysis, create customized learning paths to bridge these gaps and ensure users remain competitive in their chosen fields.

3. Dynamic Course Recommendations

Provide users with targeted course and certification recommendations that reflect the latest industry demands. Ensure these suggestions are updated regularly to keep users equipped with in-demand skills and qualifications.

4. Intelligent Job Matching

Leverage advanced technologies such as Natural Language Processing (NLP) and machine learning algorithms to match users with job opportunities that align with their skills, preferences, and career aspirations. Ensure the system improves employability by presenting the most relevant and viable job options.

5. Feedback Mechanism for Continuous Improvement

Integrate a feedback system to allow users to review and rate courses, modules, and other platform features. Use this feedback to refine the system's offerings, ensuring alignment with user needs and market trends while maintaining high-quality resources.

6. Promoting Accessibility and Scalability

Design the platform with scalability and accessibility in mind, ensuring it can cater to a diverse user base across various industries, roles, and geographies. Utilize a modern tech stack, including Java Full Stack architecture, to deliver a seamless experience.'

1.5 Scope of the Project

The Modern Career Guidance Platform is a comprehensive solution aimed at addressing the diverse career development needs of individuals, educational institutions, and organizations. For individual users, the platform offers personalized features such as skill gap analysis, dynamic course recommendations, and AI-powered job matching. By evaluating a user's current skills against market demands, the system generates tailored learning paths to help them remain competitive. Additionally, the feedback mechanism enables users to share insights on courses and platform features, fostering continuous improvement and alignment with evolving industry trends.

Built on a robust Java Full Stack architecture, the platform integrates cutting-edge technologies such as Spring Boot 3.0, MySQL 8.0, and AI-driven NLP algorithms. This ensures scalability, reliability, and real-time responsiveness, making the platform adaptable to diverse user needs and market conditions. By unifying career guidance, skill development, and job matching into a single, user-friendly interface, the Modern Career Guidance Platform aims to empower users and stakeholders to thrive in a dynamic and competitive job market.

Key Features:

- **Skill Gap Analysis and Learning Plan**
  - Assesses users' current skills and compares them with industry demands.
  - Generates personalized learning plans to address skill gaps.
  - Aligns recommendations with market trends and academic backgrounds.

- **Course Recommendation System**
  - Suggests relevant courses and certifications based on career goals and market needs.
  - Updates recommendations dynamically to reflect industry changes.
- **Job Matching and Application Assistance**
  - Matches users with job opportunities tailored to their skills and aspirations.
  - Uses advanced technologies to align job suggestions with long-term career goals.
- **Feedback System**
  - Collects user feedback on completed courses and modules.
  - Analyzes feedback to improve course quality and relevance.
- **Technology Stack**
  - Frontend: HTML, CSS, JavaScript for responsive interfaces.
  - Backend: Java 17 and Spring Boot 3.0 for server-side logic.
  - Database: MySQL 8.0 for efficient data storage and retrieval.
- **User Empowerment**
  - Helps users make informed career decisions by aligning skills with job market demands.
  - Provides tools for continuous skill development and career growth.

AIM & SCOPE

2.1 Aim of the Project

The aim of the Modern Career Guidance Platform is to provide a comprehensive, technology-driven solution for personalized career development by bridging the gap between individual skills and market demands. The platform is designed to empower individuals, educational institutions, and organizations through features such as skill gap analysis, tailored learning recommendations, AI-driven job matching, and continuous feedback mechanisms. Its scope encompasses enabling users to align their skills with industry trends, helping institutions better prepare students for employability, and assisting organizations in workforce development through targeted skill enhancement plans. By leveraging a robust Java Full Stack architecture, and real-time data analytics, the platform ensures scalability, adaptability, and a seamless user experience. Unifying career planning, skill development, and job matching into a single interface, the platform serves as a dynamic tool for navigating the complexities of modern career growth and workforce optimization.

2.2 Scope of the Project

The Modern Career Guidance project aims to revolutionize career development by offering a personalized, data-driven platform that assists users in aligning their skills with industry demands. Its scope includes skill gap analysis to identify deficiencies, tailored course recommendations to bridge those gaps, intelligent job matching to connect users with suitable opportunities, and a feedback system to continuously improve learning materials. Built on a robust Java Full Stack framework, the platform ensures scalability and reliability while empowering users to make informed career decisions, stay competitive in the job market, and achieve long-term professional growth. This system benefits individuals seeking career advancement as well as organizations and institutions focused on talent development.

2.2.1 Functional Scope:

- **User Profile Management –** Allows users to create, update, and manage their profiles, including skills, education, and career preferences.
- **Skill Gap Analysis** – Evaluates users' existing skills against industry requirements and generates personalized reports highlighting skill deficiencies.
- **Personalized Learning Plans –** Recommends structured learning paths, including courses and certifications, to address identified skill gaps.
- **Course Recommendation System –** Suggests relevant courses based on career goals, market trends, and user preferences, with dynamic updates.
- **Job Matching & Application Support –** Used to match users with suitable job opportunities and assists in application processes.

- **Feedback & Review System** – Collects and analyzes user feedback on courses and modules to improve content quality and relevance.
- **Admin Dashboard –** Enables administrators to manage users, courses, job listings, and feedback analytics for system optimization.
- **Reporting & Analytics** – Provides insights into user progress, skill development trends, and job market alignment through data visualization.

2.2.2 Technical Scope:

- **Frontend Development:** Built with HTML5, CSS3, and JavaScript (ES6+) for a responsive and interactive interface. Uses AJAX for seamless data fetching without page reloads.
- **Backend Development:** Powered by Java 17 for high performance and scalability. Spring Boot 3.0 framework for building RESTful APIs and MVC architecture. Spring Security for robust authentication (JWT/OAuth2) and role-based access control (RBAC).
- **Database & Storage:** MySQL 8.0 as the primary relational database for structured data. Hibernate/JPA for efficient database interactions and ORM. Optional Redis for caching to enhance performance.

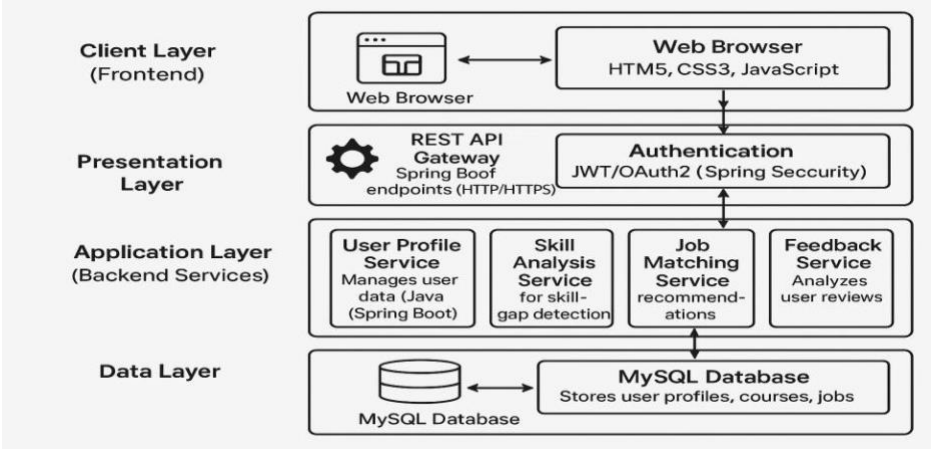

Figure:2.2.2 System Architecture of Modern Career Guidance

SYSTEM ANALYSIS

3. System Analysis:

3.1 Problem Definition:

Many people struggle to find the right career path because they don't know what skills they lack or which jobs match their abilities. Existing career guidance tools often give generic advice, leaving users confused and unprepared for today's fast-changing job market. This project creates a **smart career guidance system** that uses technology to analyze skills, recommend courses, and match users with the best job opportunities—helping them build the right skills and find fulfilling careers.

3.2 Feasibility Study:

The feasibility study for the Modern Career Guidance platform indicates a high potential for success due to its innovative approach to personalized career development. Overall, the study underscores the platform's capability to meet market demands and deliver significant value to its users.

3.2.1 Technical Feasibility:

- **Frontend Technologies:** HTML, CSS, and JavaScript are used to develop a responsive, user-friendly interface that works across different devices.
- **Backend Technologies:** Java handles complex business logic such as skill gap analysis, course recommendation and job recommendations, Feedback Handling etc.
- **Database:** MYSQL provides flexible and scalable data storage, allowing quick retrieval of user profiles, courses, job listings and user feedbacks etc.
- **API Integration:** RESTful APIs ensure seamless communication between the frontend, backend, and database, enabling efficient request handling.

3.2.2 Operational Feasibility:

- **User-Friendly Design:** The platform provides a simple and intuitive user interface. It offers a seamless experience by integrating skill gap analysis, course recommendations, and job matching into one system.
- **Personalization:** The system dynamically generates personalized career insights and recommendations tailored to users' unique skills, preferences, and goals.
- **Support for Multiple Stakeholders:** For Individuals: Helps users achieve career growth and find opportunities that match their aspirations. For Institutions: Assists educational organizations and businesses in developing talent pipelines by aligning users with relevant courses and skills.
- **Maintenance and Upgrades:** Regular updates to incorporate industry trend changes and keep recommendations current. Feedback from users ensures continuous improvement of the system's features and usability.

3.3 Functional Requirements:

User Management

- User registration (email/password or OAuth)
- Profile creation/editing (skills, education, work experience)
- Role-based access (Admin, User, Guest)
- Password reset and account recovery

Skill Gap Analysis

- Skill self-assessment questionnaire
- Automated skill gap detection (vs. target job roles)
- Visualized skill gap reports (charts/graphs)

Course Recommendation

- Personalized course suggestions based on:
  - Skill gaps
  - Career goals
- Course filtering (by skill, difficulty, provider)

Job Matching

- Job recommendations based on:
  - User profile
  - Skill matches
  - Location/salary preferences
- Job search/filtering (title, company, remote/hybrid)

Feedback System

- Rate/review completed courses (1–5 stars, comments)
- Feedback analysis dashboard (sentiment trends)
- Flag irrelevant/outdated course content

Admin Dashboard

- Update course/job databases
- Monitor system analytics (active users, top courses)

Security & Compliance

- GDPR-compliant data storage/anonymization
- Encryption for sensitive data (HTTPS, BCrypt)
- Session timeout after inactivity

Integration Requirements

- REST APIs for third-party integrations (LinkedIn, Indeed)
- Single Sign-On (SSO) support (Google/Microsoft)

3.4 Non-Functional Requirements:

To ensure a smooth and reliable experience, the system must meet several non-functional requirements:

1. **Scalability**
    - The system should handle increasing numbers of users, data, and requests as the platform grows.
    - Built on **Java Full Stack**, ensuring modular scalability.
2. **Reliability**
    - The application must operate consistently without failures.
    - Must ensure uptime for critical services like skill gap analysis and job matching.
3. **Usability**
    - The user interface (built with **HTML, CSS, JavaScript**) must be intuitive and accessible to both tech-savvy and non-technical users.
    - Feedback mechanisms ensure the platform remains user-friendly and relevant.
4. **Performance**
    - The system should respond quickly to user queries, especially for real-time recommendations and job matches.
    - Backend technologies like **Spring Boot 3.0** ensure optimized server-side performance.
5. **Maintainability**
    - The modular architecture should make it easy to update, fix bugs, or enhance specific components (e.g., job matching or course recommendations).
    - Feedback loops help identify areas for improvement.
6. **Security**
    - User data, including skills, job preferences, and feedback, should be securely stored and protected using secure database practices (e.g., **MySQL 8.0**).
    - Access control and secure communication protocols should be enforced.
7. **Availability**
    - The platform should be available to users 24/7 with minimal downtime.
8. **Data Integrity**
    - The system must ensure that user data is accurate, consistent, and not lost during interactions or updates.

SYSTEM DESIGN

4. SYSTEM DESIGN

The Modern Career Guidance platform is designed using a multi-tier architecture to ensure scalability, reliability, and ease of maintenance. Here's an overview of the architecture:

1. Presentation Layer (Frontend):

It is developed using core web technologies such as HTML, CSS, and JavaScript, which provide structure, styling, and interactivity, respectively. This layer facilitates a range of essential functionalities, including user registration, profile management, an interface for conducting skill gap analyses, tailored course recommendations, job matching capabilities, and a mechanism for feedback collection.

1. Application Layer/Businness Logic Layer (Backend):

This layer handles the business logic and processes user requests. It includes: • Technologies: Java 17, Spring Boot 3.0 • Skill gap analysis: Evaluates user skills against industry standards. Course recommendation engine: Suggests courses based on user profiles. Job matching engine: Matches user skills with relevant job opportunities. Feedback processing: Collects and processes user feedback to improve the platform.

2. Data Layer (Database):

The data layer plays a critical role in managing data storage, retrieval, and overall organization. Built using MySQL 8.0, it ensures reliable and scalable database management to support the platform's functionalities. This layer handles user data management by storing user profiles, skill assessments, and personalized learning plans. It also includes course catalog management, maintaining detailed information about available courses and educational resources to aid users in career planning. The job database is responsible for managing job listings and related data, enabling efficient job matching functionality.

Additionally, the layer hosts a feedback repository that stores user feedback and course reviews, facilitating continual improvement of the platform’s offerings.

4.1 System Analysis Methods:

4.1.1 Use Case Diagram:

The Use Case Diagram for the Modern Career Guidance project illustrates the interactions between two main actors: the User and the Admin. The User can register, log in, update their profile, select a target role, and analyze their skills to receive a personalized learning plan. They can also browse courses, get job matches, and provide feedback on their experiences. On the other hand, the Admin is responsible for updating job and course listings, viewing analytics, and monitoring feedback to improve the system. The diagram visually represents these interactions, showcasing how the system facilitates career development by aligning users' skills with job market demands. It highlights the core functionalities of the platform, ensuring both users and admins can efficiently navigate and utilize its features.

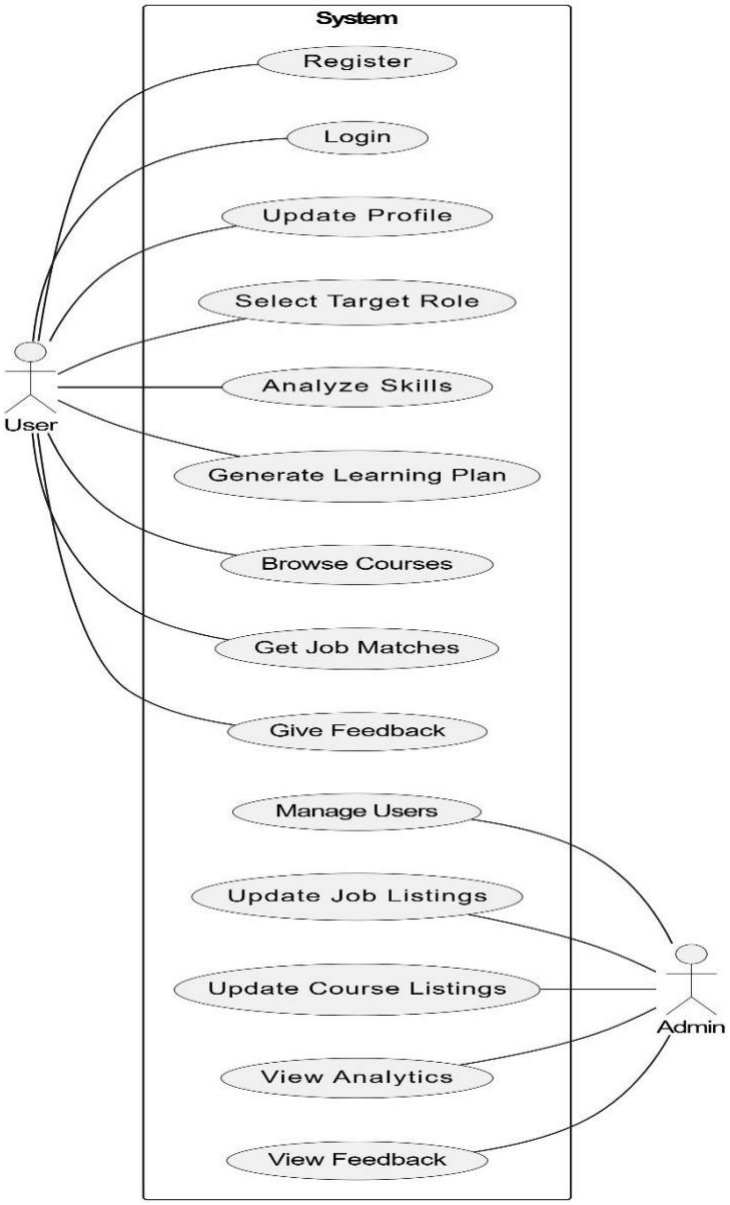

Figure 4.1.1: Use Case Diagram for Modern Career Guidance

4.1.2 Data Flow Diagram:

The **Data Flow Diagram (DFD)** for the Modern Career Guidance project maps data movement from user inputs (profiles, skills) through backend processing (skill analysis, course recommendations) to external integrations (job APIs) and database storage (MySQL). It shows how information flows between users, system modules, and admins while maintaining security and personalization.

To better understand the flow of data within thesystem, a Data Flow Diagram (DFD) is created, Breaking down the components into multiple levels:

Level 0(Context Diagram) –Ahigh-level overview of the system.
Level 1(Detailed Functional Breakdown) –A deeper look into functional modules.
Level 2 (In-Depth Process Breakdown)–Detailed breakdown of student, and Admin workflows.

Level 0 DFD – Context Diagram:

This zero-level data flow diagram provides a clear and concise overview of the Modern Career Guidance System, highlighting how users interact with various components to receive tailored career support. Users and administrators engage with the system, which consists of essential modules such as Skill Gap Analysis, Course Recommender, Job Matching, User Management, Admin Dashboard, and Feedback System. These modules work together to process data, leveraging information stored in dedicated databases like Courses DB, User Profiles DB, Feedback DB, and Jobs DB. External APIs contribute additional data to enhance the system's functionality, while analytics and reports are generated to provide meaningful insights. Overall, this diagram visually represents how different elements integrate seamlessly to empower users in career planning and decision-making.

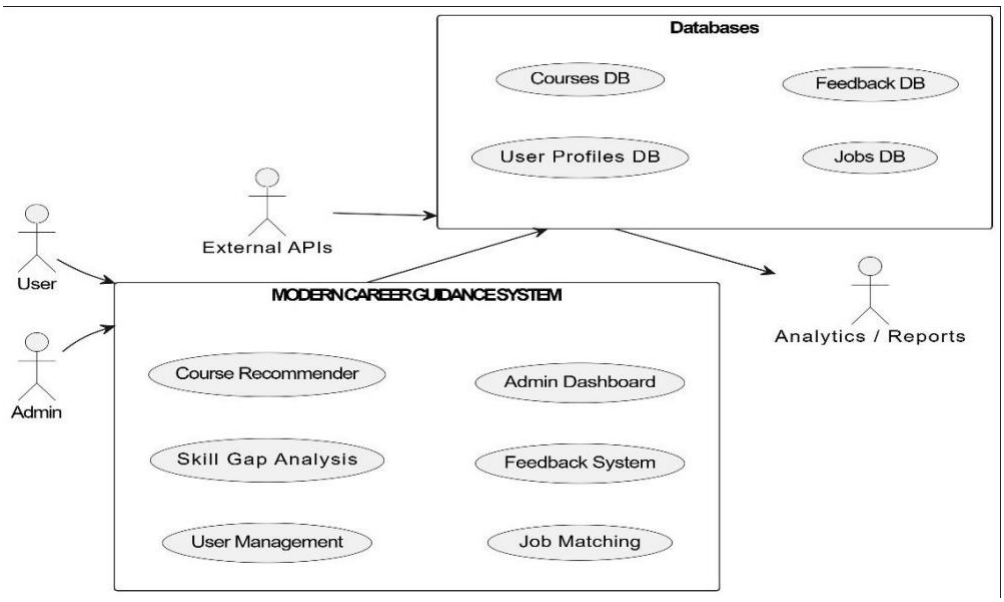

Figure 4.1.2.1– Data Flow Diagram (DFD)- Level 0 (Context Diagram)

Level 1 DFD – Detail Functional Breakdown:

The first-level data flow diagram for the Modern Career Guidance System provides a detailed view of the interactions between users, administrators, and the platform's core processes. Users engage with features like skill gap analysis, course recommendations, and job matching, while administrators manage user profiles and job listings. The system relies on interconnected modules such as the Skill Gap Analysis, Course Recommender, Job Matching, Feedback System, and User Management, which all draw data from databases like User Profiles DB, Courses DB, Jobs DB, and Feedback DB.

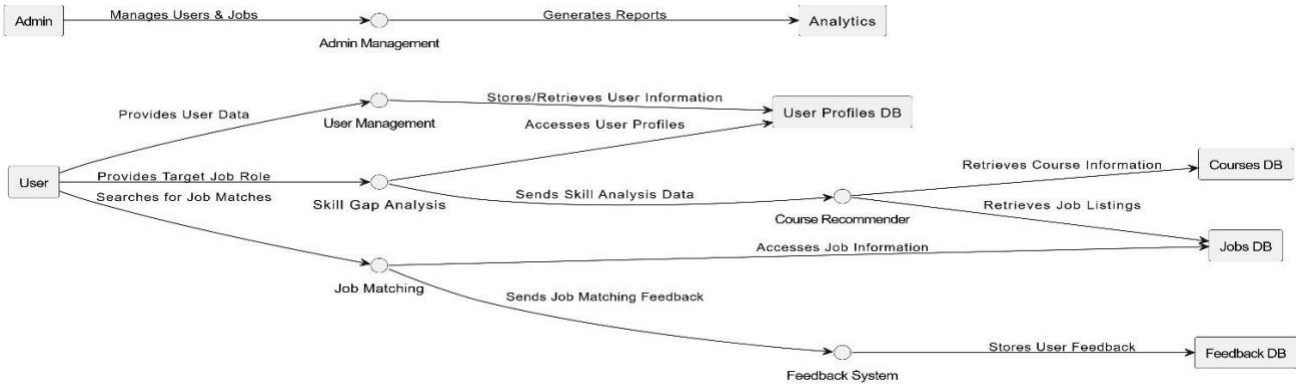

Figure 4.1.2.2– Data Flow Diagram (DFD)-Level 1(High-Level Process Flow)

Level 2 DFD – In-Depth Process Breakdown:

The second-level data flow diagram for the Modern Career Guidance System highlights the detailed process of identifying skill gaps and creating personalized learning plans for users. It starts by retrieving user data from the User Profiles DB and job-related data from the Jobs DB, both of which are converted into JSON format for further processing. User skills are assigned weightage, and a comparison is made with required job skills to generate a skill gap report. Based on this analysis, a learning plan is formulated, incorporating courses fetched from the Courses DB to address skill deficiencies.

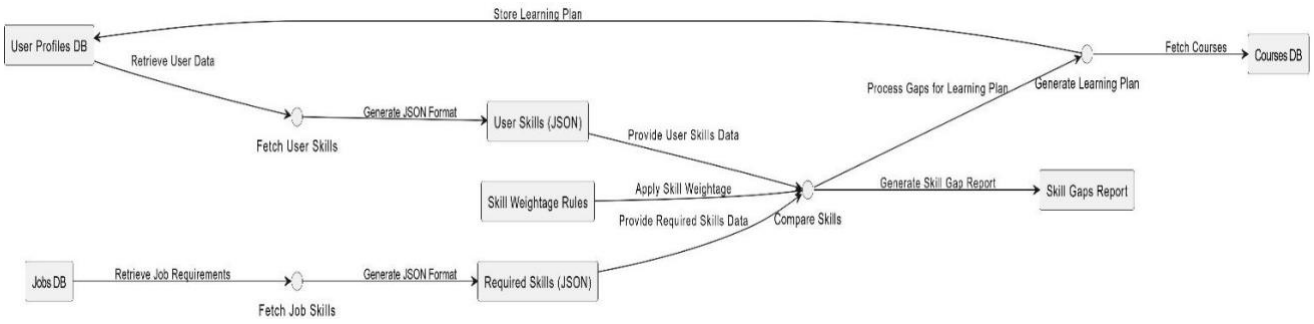

Figure 4.1.2.3– Data Flow Diagram (DFD)-Level 2(Detailed Process Flow)

4.2 System Design Method:

4.2.1 Class Diagram:

The class diagram for the Modern Career Guidance system illustrates the structural design and interconnections among the various components to facilitate career development. At its core, the User class captures attributes like userId, name, email, and password, enabling users to register, log in, and manage their profiles. It supports multiple skills, each defined by attributes such as skillId, skillName, and proficiency, with methods to add or update skills. Users can enroll in courses, which include attributes like courseId, title, provider, duration, and avgRating, and can provide ratings for these courses. The Admin class ensures system efficiency by managing users, courses, and job postings, and by accessing analytics. The Job class, characterized by jobId, title, company, and salaryRange, includes methods to post and match jobs to users based on their skills. Courses, in turn, contribute to skill development and accept feedback, which comprises feedbackId, rating, and comment, submitted through a specific feedback method. This diagram holistically maps out the system's functionality, ensuring a seamless interaction between users, administrators, skills, jobs, and courses, to empower users with the tools they need to enhance their skills and achieve their career goals.

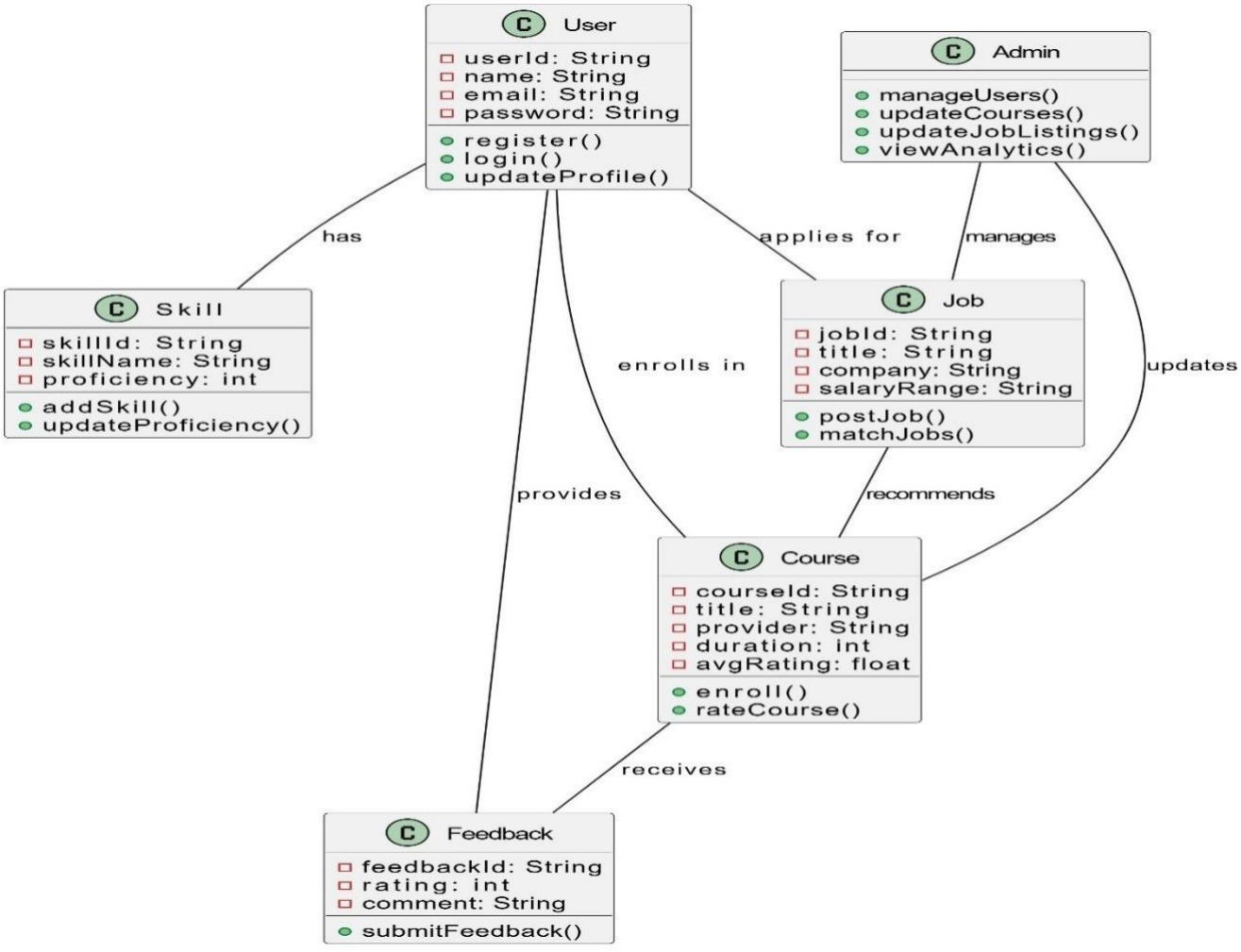

Figure 4.2.1 – Class Diagram for Modern Career Guidance

4.2.2 Sequence Diagram:

This sequence diagram illustrates the workflow of the Modern Career Guidance System, starting with user registration and profile verification, followed by role selection and skill analysis from the **Profile DB** and **Job DB**. The system recommends courses from the **Course DB**, allows users to review feedback from the **Feedback DB**, and tracks progress upon course completion. Users can apply for jobs, with application details stored in the **Job DB**. This seamless interaction ensures personalized career guidance through intelligent data handling and processing.

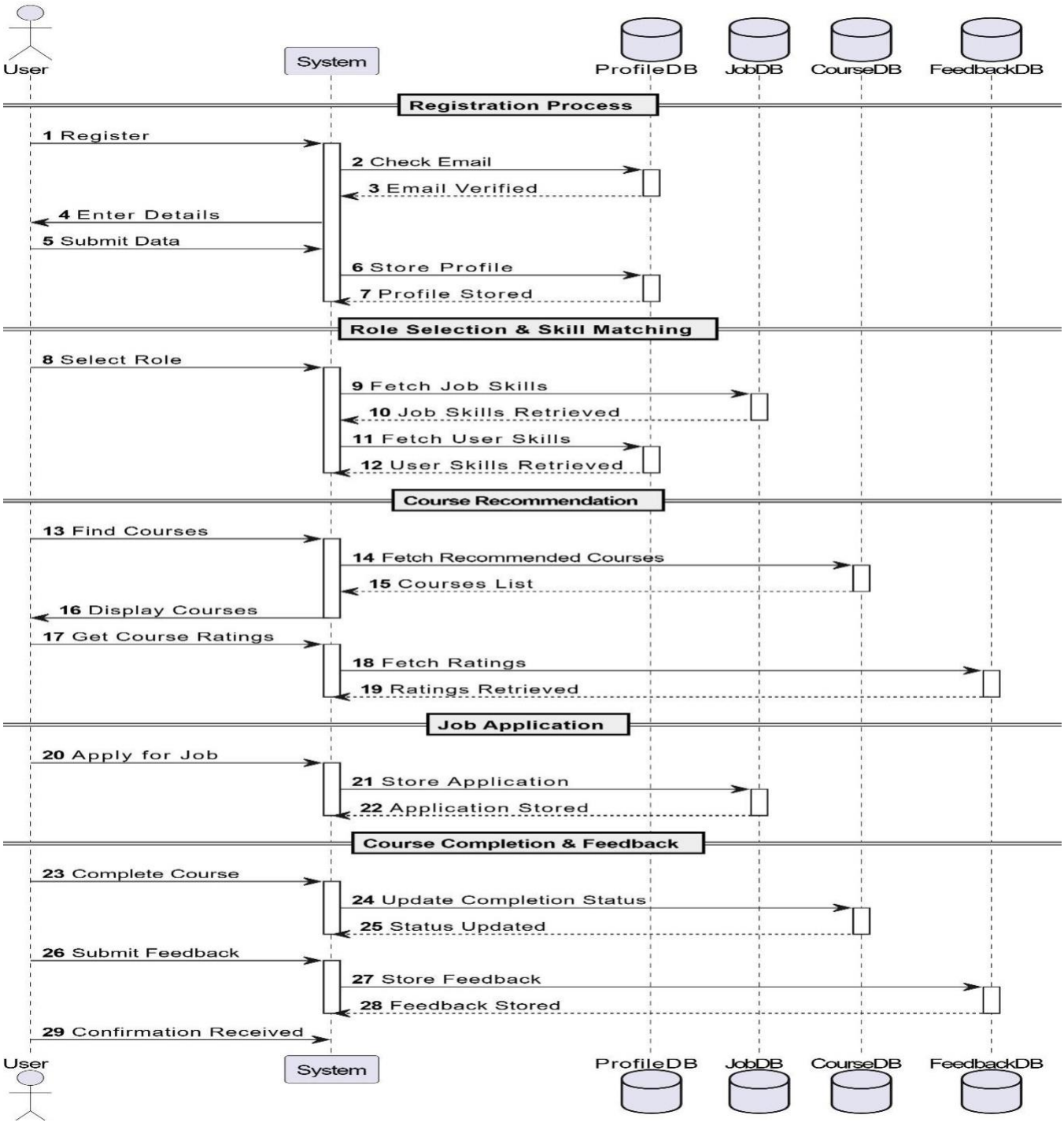

Figure 4.2.2 – Sequence Diagram for Modern Career Guidance

4.2.3 Activity Diagrams:

4.2.3.1 User Activity Diagram:

The user login activity diagram shows the step-by-step process for secure user registration and login. It begins with the user filling out a registration form. The system validates the email, checks for duplicates, and either stores the data securely or displays an error if the email is invalid or already in use. Upon successful registration, the user can log in by entering their credentials, which the system verifies against the database. If correct, access to the dashboard is granted; if incorrect, an error message prompts the user to retry. This ensures a smooth and secure authentication process.

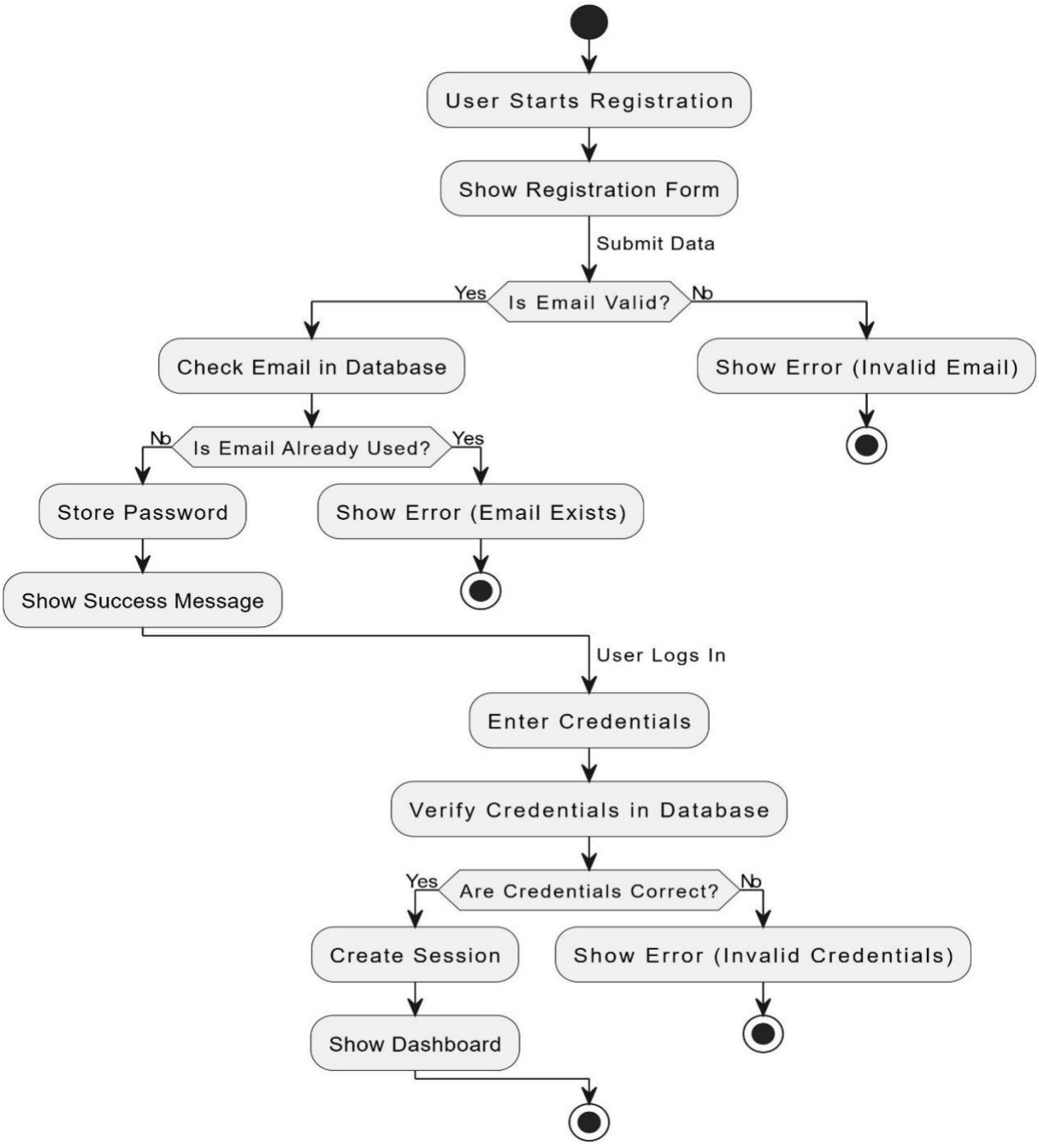

Figure 4.2.3.1 – User Activity Diagram for Modern Career Guidance

4.2.3.2 Admin Activity Diagram:

The admin activity diagram for the Modern Career Guidance System outlines the process flow for admin interactions, ensuring secure and effective system management. It starts with the admin logging in, where the system verifies credentials for authentication. Upon successful verification, the admin accesses the dashboard, which provides options to manage tasks such as updating courses or executing changes in the database. Once the admin selects a specific action, the system processes and confirms the updates to ensure data integrity. If the admin's credentials fail verification, an authentication error is displayed, denying access. This diagram emphasizes a structured and secure workflow for administrators, ensuring only authorized personnel can manage critical functionalities like courses, user profiles, and job postings, contributing to the platform's reliability and efficiency.

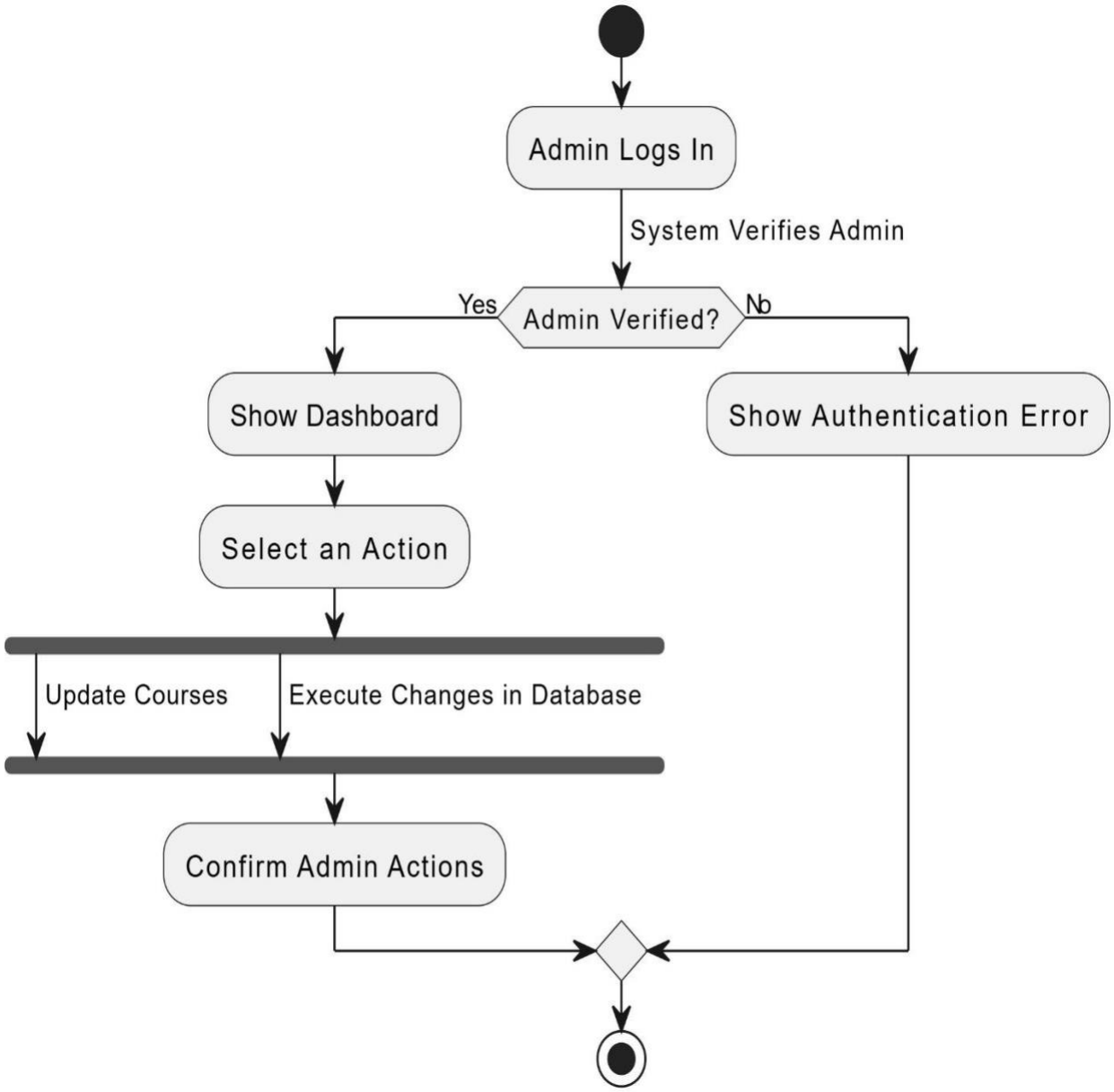

Figure4.2.3.2 – Admin Activity Diagram for Modern Career Guidance

4.2.3.3 Skill Gap Analysis Activity Diagram:

The skill gap analysis activity diagram for the Modern Career Guidance System demonstrates the systematic process of identifying and addressing skill deficiencies to guide users towards their career goals. It begins with the user selecting a desired role, prompting the system to retrieve required job skills from the JobDB and the user's existing skills from the ProfileDB. If either set of skills is not successfully fetched, an error message is displayed. If both are retrieved, the system compares the job's required skills against the user's skills to identify gaps. If gaps are found, these are displayed along with relevant course recommendations sourced from the CourseDB, designed to bridge the identified skill gaps. The recommendations and a personalized learning plan are then stored for future reference. If no skill gaps are detected, a message is shown indicating that the user's skills align with job requirements. This activity diagram emphasizes a thorough and structured approach to skill assessment, ensuring users receive targeted guidance to enhance their competencies effectively.

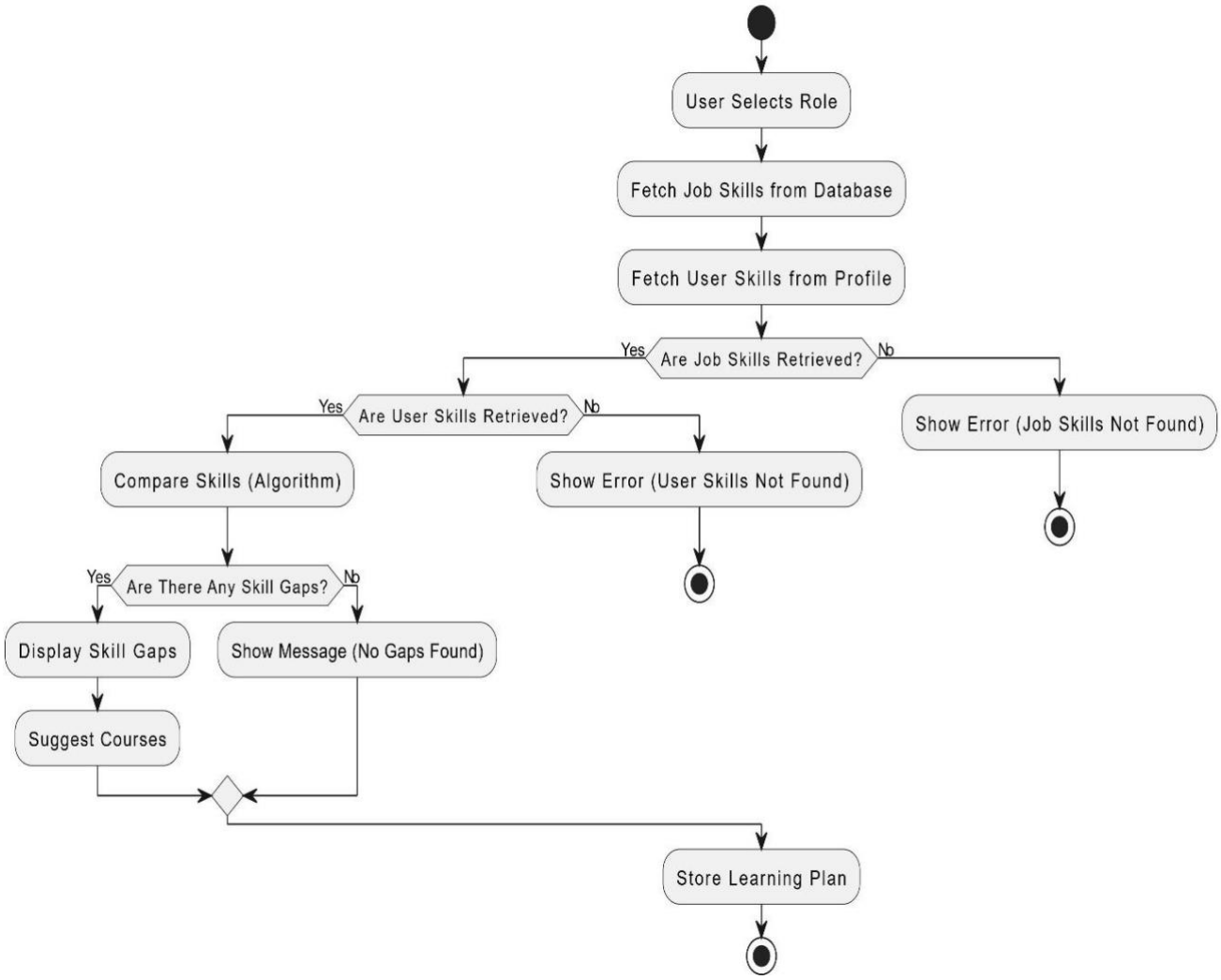

Figure 4.2.3.3 - Skill Gap Analysis Activity Diagram

4.2.3.4 Course Recommendation Activity Diagram:

The course recommendation activity diagram outlines a systematic process for guiding students in selecting suitable courses based on their skills and past learning history. The process begins with the system fetching a student's skills and previous learning data, followed by querying the database to match relevant skills with job placements. The system then evaluates whether the student meets the eligibility criteria. If eligible, it proceeds to course mapping and performs priority matching to ensure alignment with the student's needs. If a match is found, the system displays the course recommendation result. If no match is identified, it suggests alternative courses or pre-requisite learning pathways to address gaps. Finally, the system finalizes the course selection and presents course enrollment options to the student. This structured approach ensures personalized course suggestions, enabling students to advance their careers effectively.

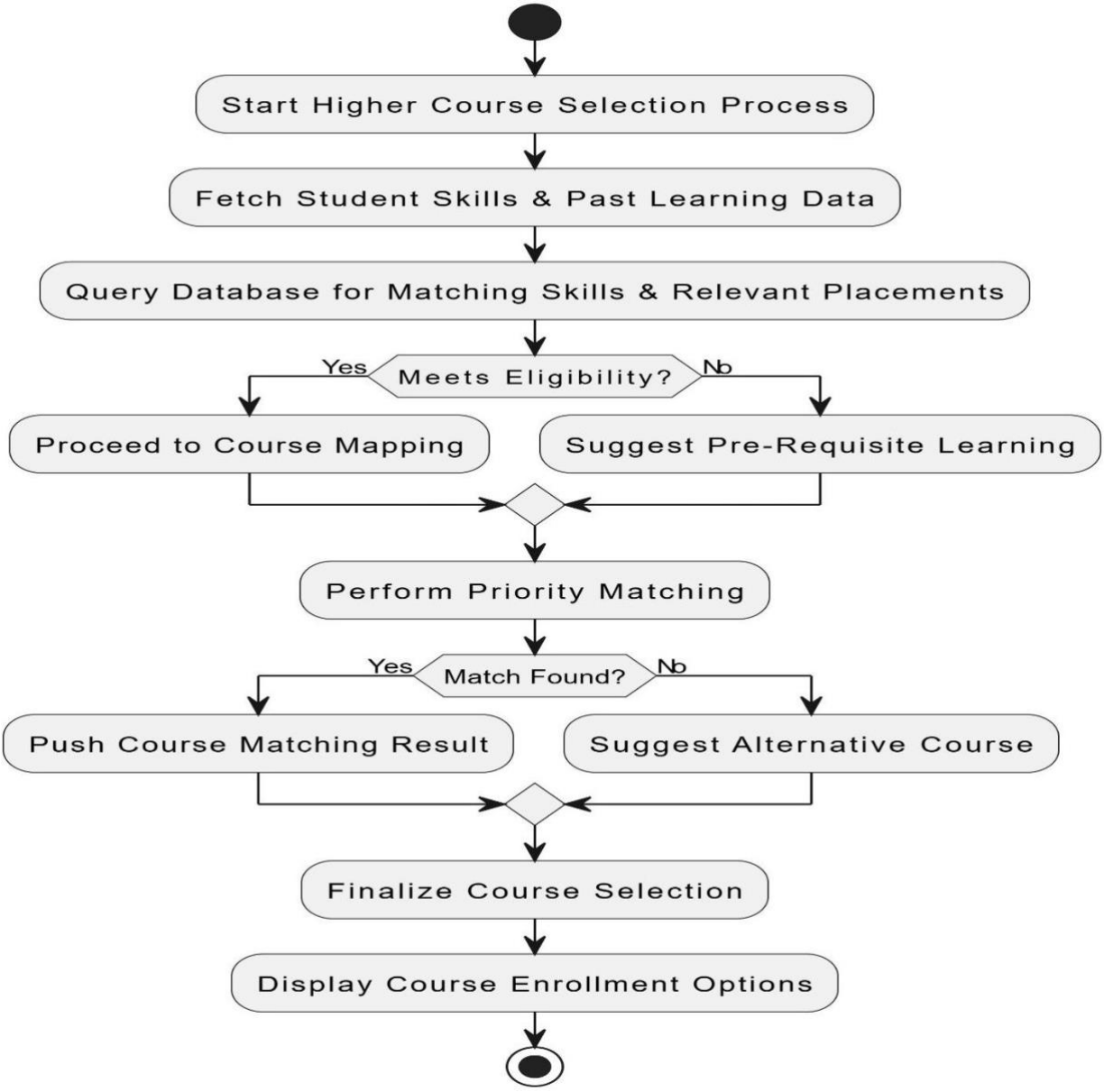

Figure 4.2.3.4 - Course Recommendation Activity Diagram

4.2.3.5 Job Recommendation Activity Diagram:

The job recommendation activity diagram illustrates a structured process for helping users discover and apply for relevant job opportunities. The process begins with the user initiating a job search, which prompts the system to access its job database and retrieve a list of available openings. If jobs are found, the system employs a matching algorithm that compares the user's skills and location with the requirements of the jobs in the database. The matched jobs are then displayed to the user, allowing them to review and optimize their resume before submitting applications. In cases where no jobs are found that match the user's profile, the system suggests potential areas for skill improvement to enhance future job compatibility. This diagram showcases an intelligent and user-centric workflow, emphasizing the importance of skill matching and personalized guidance in modern career planning.

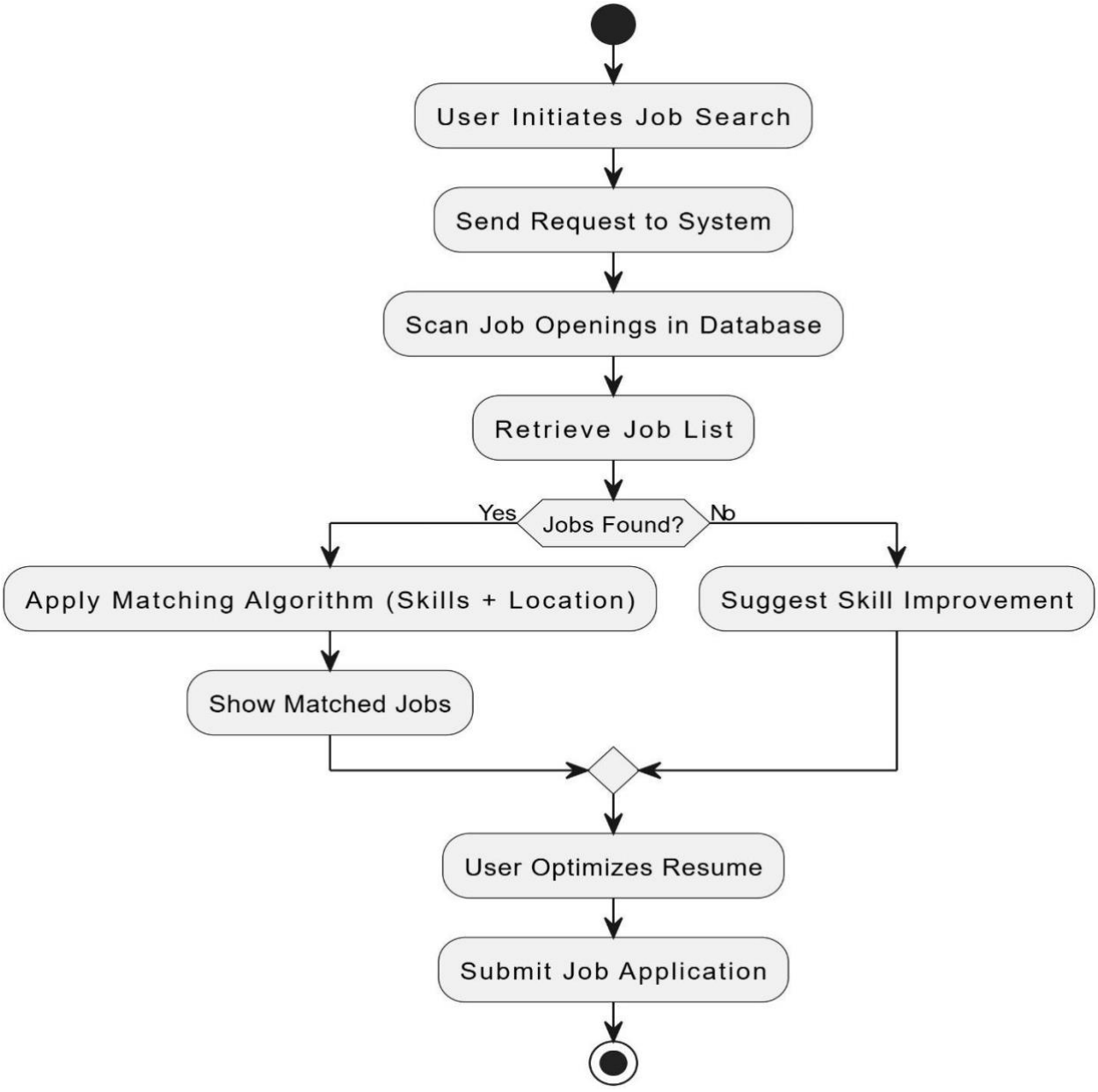

Figure 4.2.3.5 - Job Recommendation Activity Diagram

4.2.3.6 Feedback Activity Diagram:

The feedback activity diagram illustrates the streamlined process for collecting user reviews upon course completion in the Modern Career Guidance platform. It begins when a user finishes a course, triggering a system request to update the course status as complete within the database. The system then presents the user with the option to rate the course. If the user opts to provide feedback, the rating and comments are submitted and stored in the database, updating the course's overall rating based on aggregated responses. A thank-you message is displayed to acknowledge the user's contribution. If the user skips the rating step, the system directly proceeds to display the thank-you message. This diagram highlights the importance of user feedback in improving course quality and ensuring satisfaction, while maintaining an efficient and user-friendly process.

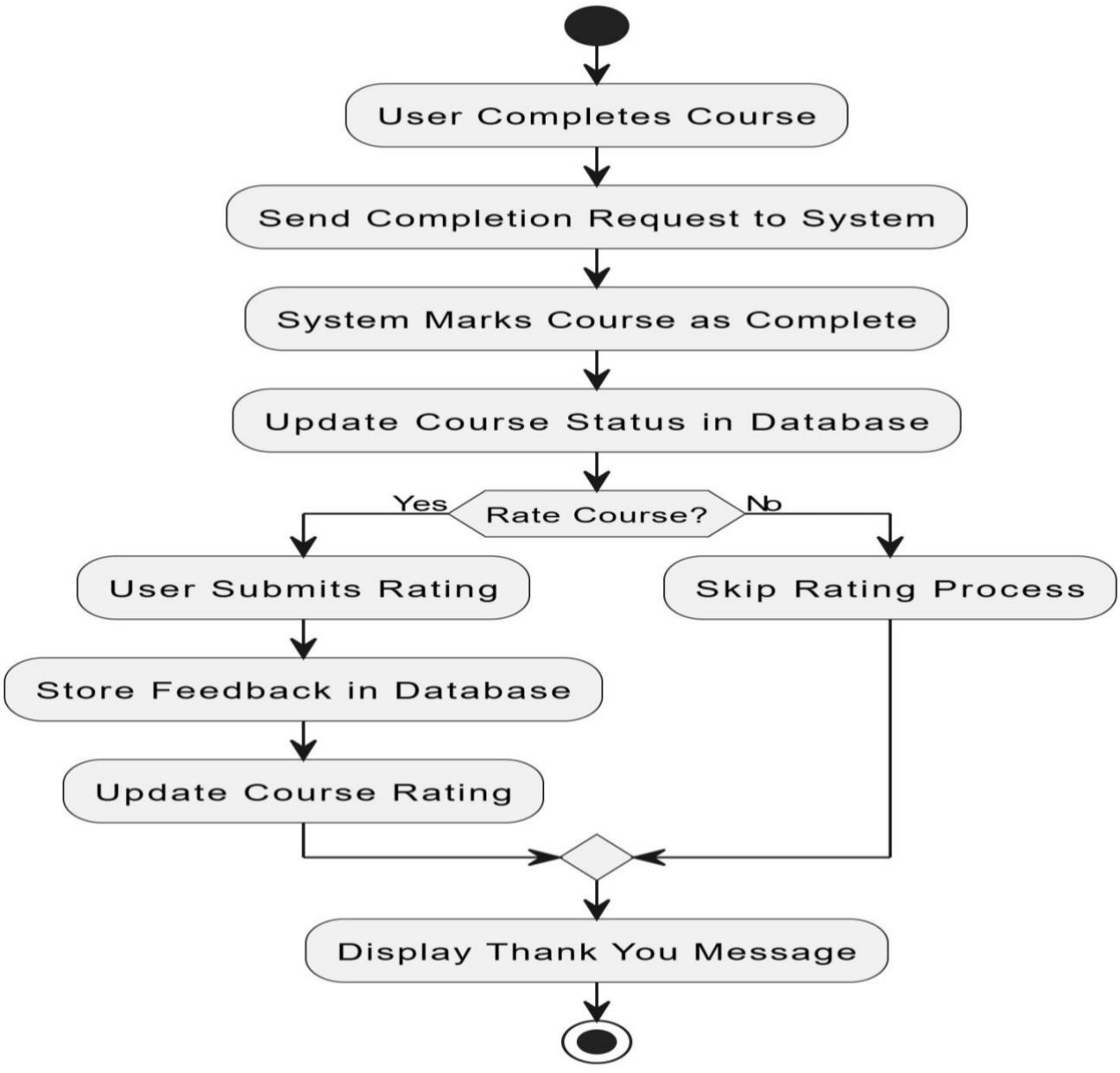

Figure 4.2.3.6 - Feedback Activity Diagram

4.2.4 Component Diagram:

The component diagram provides a comprehensive view of the architectural design for the Modern Career Guidance System, showcasing how various components work in tandem to deliver career guidance services. The system comprises three primary layers: frontend, backend, and database, alongside external APIs for supplementary data. The frontend layer, built using HTML, CSS, and JavaScript, serves as the user interface, enabling seamless interaction and communication with the backend through REST API calls over HTTPS. The backend layer, developed using Spring Boot 3.0, handles business logic and processes data requests. It interacts with external APIs, such as Job Listings and Course Providers, to fetch relevant information and with the database layer, which uses MySQL 8.0 for robust storage and management of user profiles, courses, jobs, and feedback. The backend employs JDBC for executing SQL queries and ensuring data consistency. This integration of frontend, backend, and database, supplemented by external APIs, creates a scalable and reliable platform that empowers users with personalized career planning solutions.

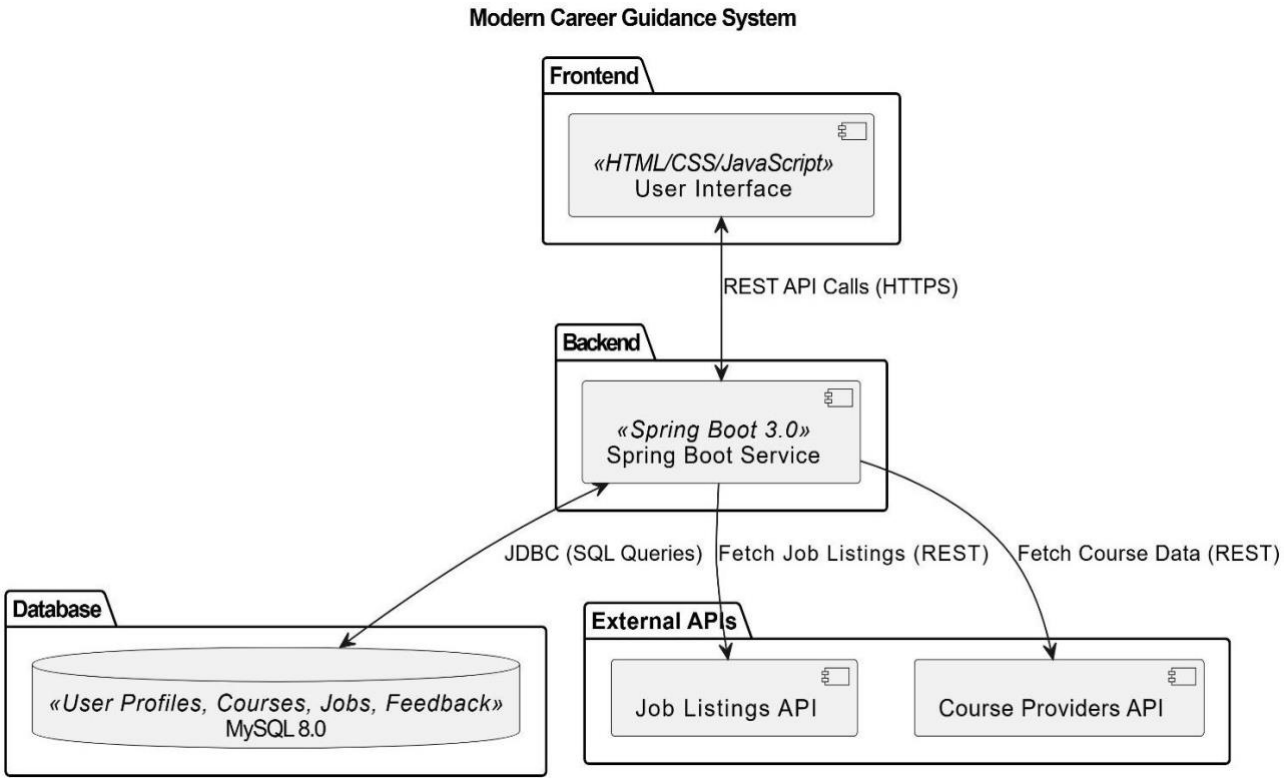

Figure 4.2.4 - Component Diagram

IMPLEMENTATION

5. Implementation:

The implementation of the Modern Career Guidance platform involves a multi-phase approach, starting from planning and requirement analysis to deployment and maintenance. Each phase focuses on leveraging advanced technologies to ensure a robust, scalable, and user-friendly solution for personalized career development.

5.1 Tools and Technologies used:

1. Frontend Technologies:

I. HTML (Hyper Text Markup Language):

- ✓ **Purpose:** Provides the structure of web pages.
- ✓ **Features:** Enables the creation of web page elements such as text, images, forms, and links.

II. CSS (Cascading Style Sheets):

- ✓ **Purpose:** Controls the presentation and layout of web pages.
- ✓ **Features:** Allows for styling elements, including colors, fonts, spacing, and responsive design.

III. JavaScript:

- ✓ **Purpose:** Adds interactivity and dynamic behavior to web pages.
- ✓ **Features:** Enables client-side scripting for animations, form validation, and event handling.

2. Backend Technologies:

I. Java 17:

- ✓ **Purpose:** A robust and efficient programming language used for server-side development.
- ✓ **Features:** Offers strong security features, extensive libraries, and high performance.

II. Spring Boot 3.0:

- ✓ **Purpose:** A framework for building web applications and microservices.
- ✓ **Features:** Provides pre-configured templates, simplifies development, and supports seamless integration with other components.

3. Database Technologies:

I. MySQL 8.0:

- ✓ **Purpose:** A relational database management system for data storage and retrieval.
- ✓ **Features:** Ensures reliability, scalability, and robust data handling capabilities.

5.2 Module Implementation:

5.2.1 User Management:

Description: This module handles user registration, authentication, and profile management.

Features:

- ✓ **Registration and Login:** Allows users to register using their email or social media accounts and securely log in.
- ✓ **Profile Management:** Users can create, update, and manage their profiles, including personal information, educational background, skills, and career goals.
- ✓ **Authentication:** Utilizes secure protocols to ensure user data privacy and integrity.

5.2.2 Skill Gap Management:

Description: This module assesses users' current skills and identifies gaps relative to industry standards.

Features:

- ✓ **Skill Matching:** Matches the User Skill sets with the Industries Skill Sets.
- ✓ **Gap Identification:** Compares current skills with industry requirements and identifies areas for improvement.
- ✓ **Personalized Learning Plans:** Generates customized learning plans to help users bridge their skill gaps.

5.2.3 Course Management:

Description: This module provides tailored course suggestions based on users' profiles and skill gaps.

Features:

- ✓ **Course Database:** Maintains a comprehensive catalog of courses and educational resources.
- ✓ **Personalized Recommendations**: Suggests courses that match users' skill gaps and career goals.
- ✓ **Market Trends Update:** Regularly updates course recommendations based on the latest industry trends and user progress.

5.2.4 Job Management :

Description: This module matches users' profiles with relevant job opportunities.

Features:

- ✓ **Profile Analysis:** Analyzes users' profiles, including skills, education, and career aspirations.
- ✓ **Job Database: Maintains** a list of available job postings from various sources.
- ✓ **Matching Algorithm:** Matches users with suitable job opportunities based on their profiles.

TESTING

6.1 Test Cases and Results:

Test cases are fundamental to verifying that the features and functionality of the Modern Career Guidance system works as expected. Each test case provides a detailed step-by-step guide on what needs to be tested the expected results and how to validate the outcome.

6.1.1 User Registration:

Table:

Test Description	Test Steps	Expected Result
Register with valid details	Enter valid name, email, password, and other details, then click submit.	User is registered successfully and redirected to the home page.
Register with missing details	Leave one or more mandatory fields blank, then submit.	Error message displayed, and form submission is blocked.
Register with Invalid details	Use an username and Password that is already registered and submit the form.	An error message is displayed: "Username or Password are Invalid"

Table:6.1.1.1 User Registration Table

Register with valid details:

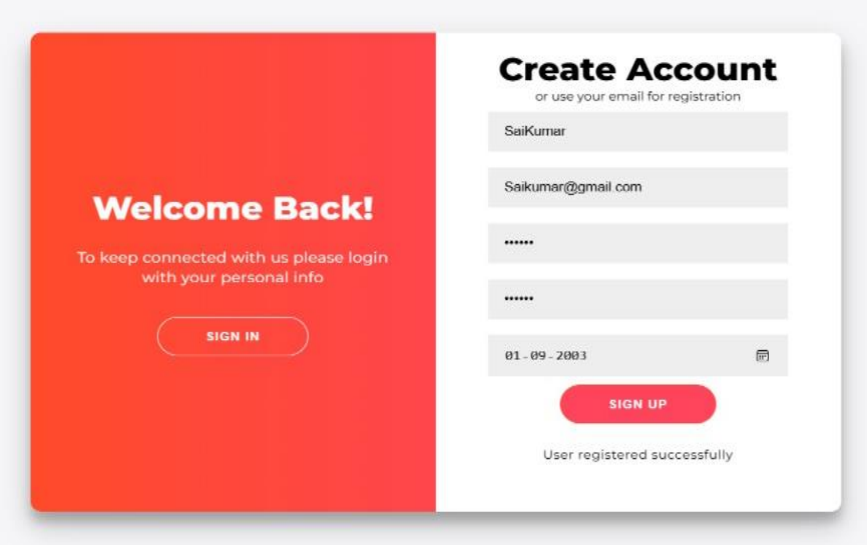

Figure:6.1.1.1 Register with valid details

Register with missing details:

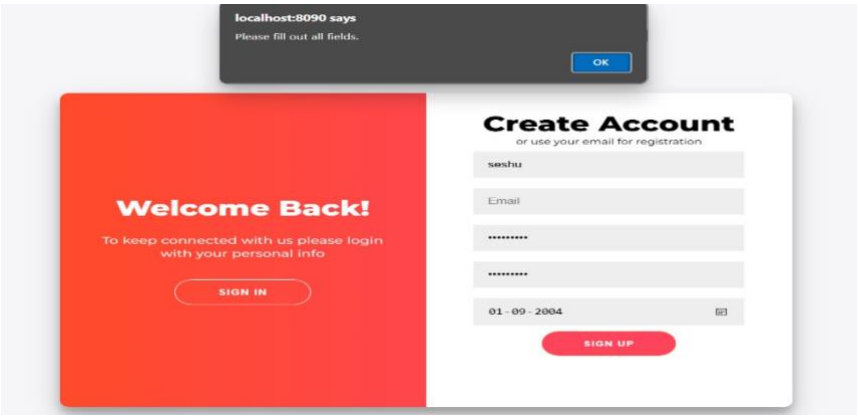

Figure:6.1.1.2 Register with Missing details

Register with Invalid details:

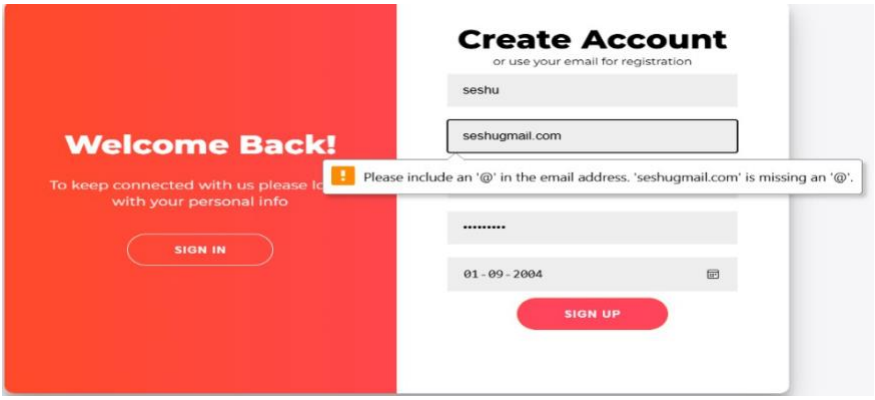

Figure:6.1.1.3 Register with Invalid details

6.1.2 User Login:

Table:

Test Description	Test Steps	Expected Result
Login with valid credentials	Enter a registered email and password, then submit.	User is logged in and redirected to the dashboard.
Login with incorrect credentials	Enter an invalid email/password and submit.	Error message displayed: "Invalid email or password."
Login with empty fields	Leave the email/password blank and submit.	Error message displayed: "Please fill out this field."

Table:6.1.2 User Login Table

Login with valid credentials:

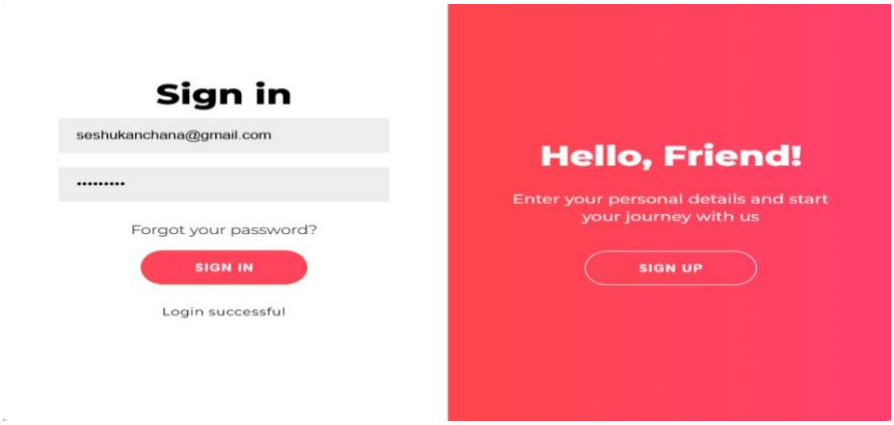

Figure: 6.1.2.1 Login with valid Credentials details

Login with incorrect credentials:

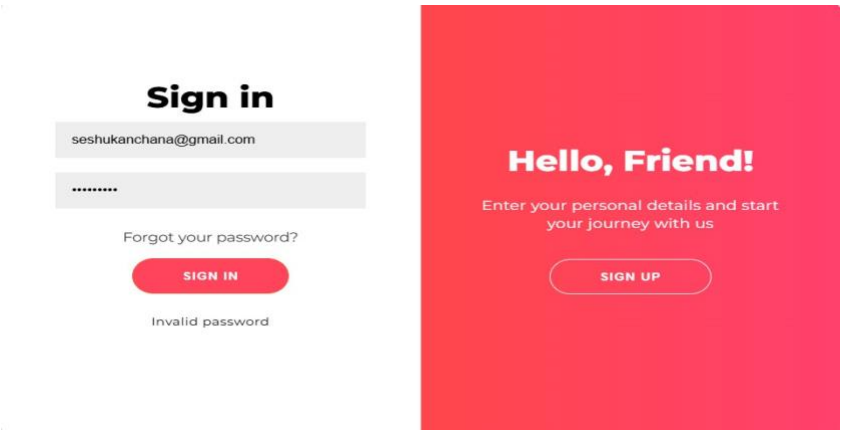

Figure: 6.1.2.2 Login with incorrect credentials

Login with empty fields:

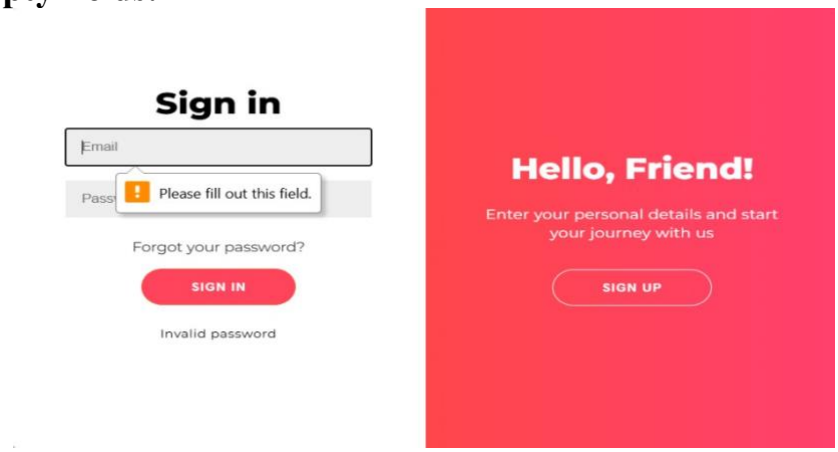

Figure: 6.1.2.3 Login with empty fields

6.1.3 : Skill Gap Analysis:

Test Description	Test Steps	Expected Result
Giving the valid Skills for skill gap analysis	Give skills to analyze the skill gap	Skill Gap Report is Generated
Giving Invalid Skills for Skill gap analysis	Give incorrect Skills to analyze skill gap	Skill gap report is not generated

Table:6.1.3 Skill Gap Analysis

Giving the valid Skills for skill gap analysis:

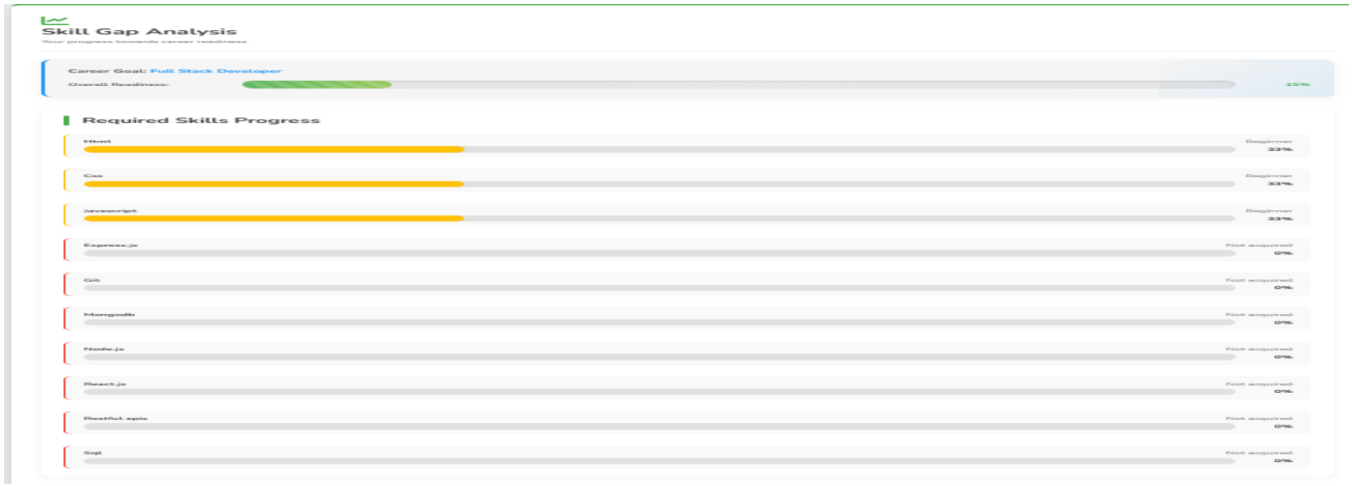

Figure: 6.1.3.1 Giving the valid Skills for skill gap analysis

Giving Invalid Skills for Skill gap analysis:

Figure: 6.1.3.2 Giving the invalid Skills for skill gap analysis

6.1.4 : Course Recommendation:

Test Description	Test Steps	Expected Result
When the user skills are matched with course skills	Enter same User Skills that matches with Course skills	Recommended courses are showed
When the user skills are not matched with course skills	Enter different User Skills that matches with Course skills	No courses are found

Table:6.1.4 Course Recommendation

When the user skills are matched with course skills:

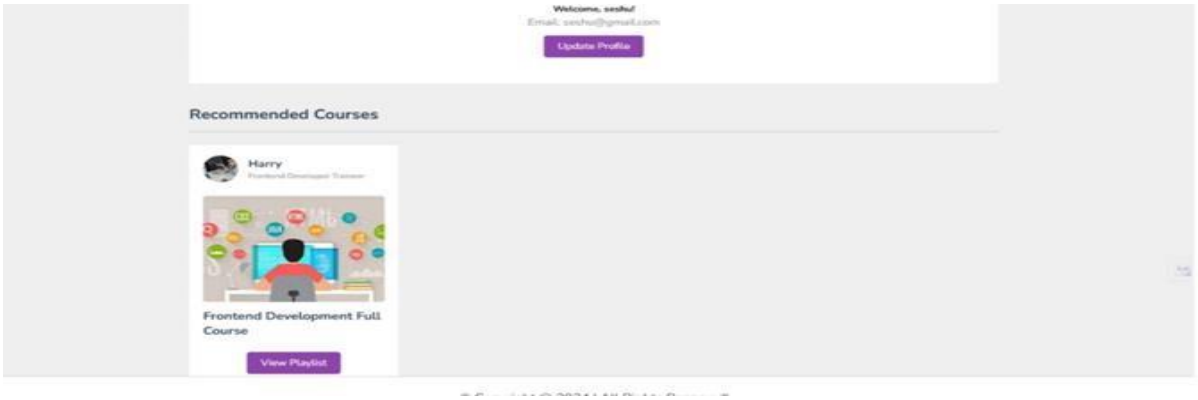

Figure: 6.1.4.1 When the user skills are matched with course skills

When the user skills are not matched with course skills:

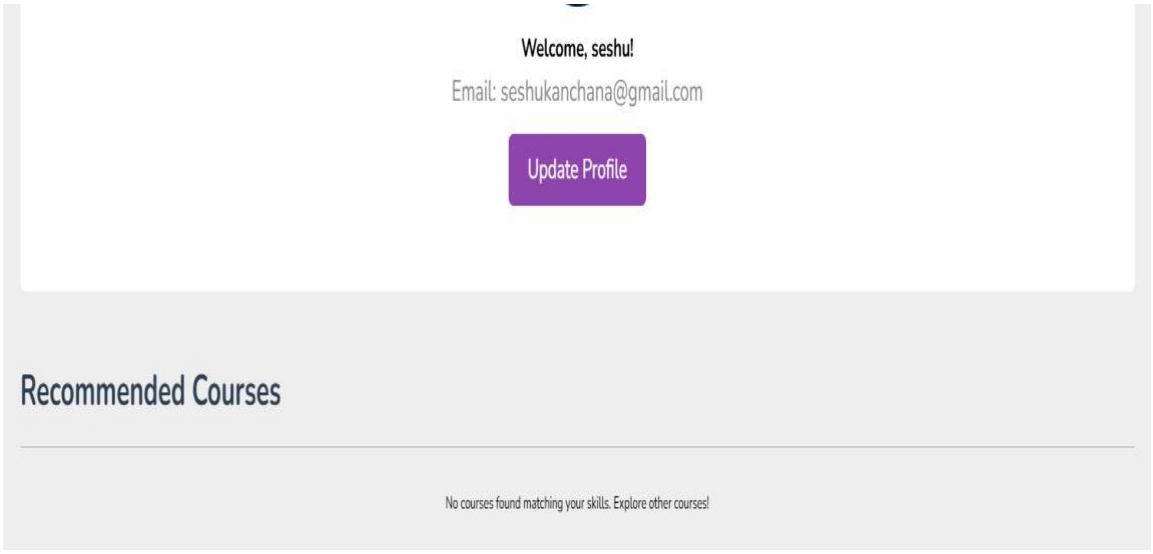

Figure: 6.1.4.2 When the user skills are not matched with course skills

6.1.5 : Job Recommendation:

Test Description	Test Steps	Expected Result
When the user skills are matched with job skills	Enter same, User Skills that matches with job skills	Recommended jobs are showed
When the user skills are not matched with job skills	Enter different User Skills that matches with job skills	No jobs are found

Table:6.1.5 Job Recommendation

When the user skills are matched with job skills:

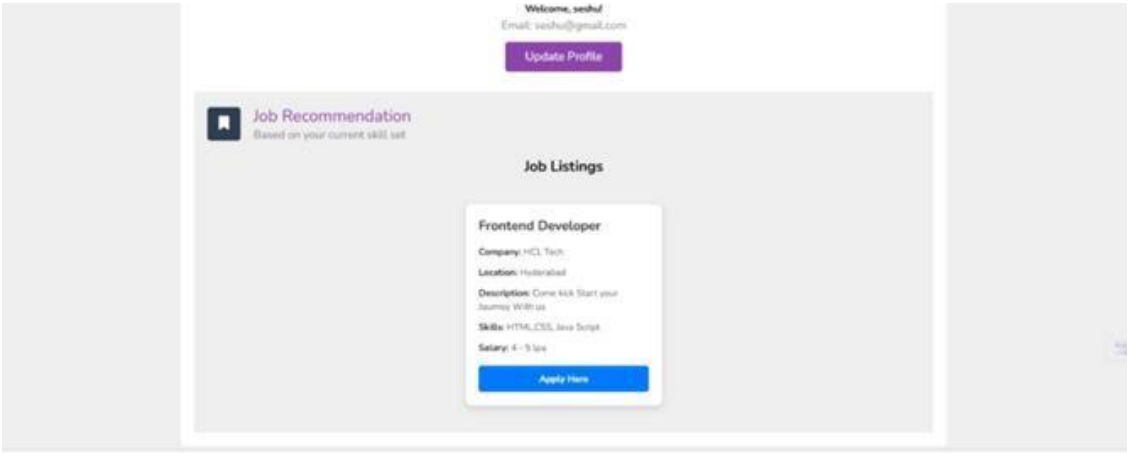

Figure: 6.1.5.1 When the user skills are matched with job skills

When the user skills are not matched with job skills:

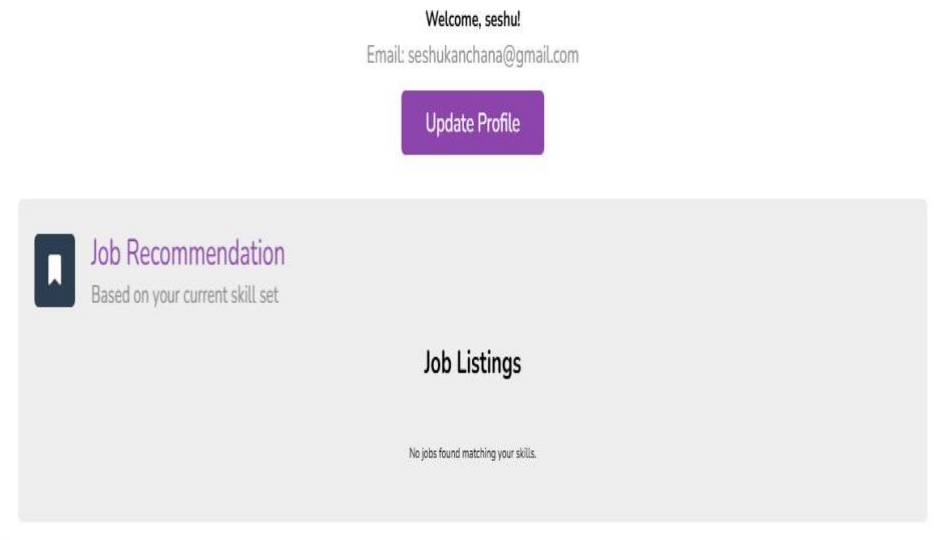

Figure: 6.1.5.2 When the user skills are not matched with job skills

6.2 Unit Testing:

Unit testing ensures each component functions correctly in isolation. Below is the testing strategy for key modules using JUnit 5, Mockito, and Spring Boot Test.

1. Authentication

- **Auth Controller:** Test login success/ failure.
- **JWT Util**: Validate token generation/ expiry.

2. Skill Gap Analysis

- **Skill Service:** Verify gap calculation and recommendations.
- **Open NLP:** Test skill extraction from job descriptions.

3. Course Recommendations

- **Recommender Service:** Check course filtering/sorting.
- **External APIs:** Mock responses for Coursera/edX.

4. Job Matching

- **Job Matching Service:** Validate skill/location filters.
- **Resume Parser:** Test PDF/Word parsing.

5. Feedback System

- **Feedback Service**: Test sentiment analysis and flagging.

6. Database

- **User Repository:** Test CRUD operations with H2.

6.3 Integration Testing:

1. Authentication & User Flow

Test Cases:

1. **User Registration → Profile Creation → Login**
    - Validate end-to-end flow with database persistence.
    - Verify JWT token generation after successful login.
2. **Role-Based Access Control (RBAC)**
    - Ensure /admin routes reject unauthorized users.

Tools:

- @SpringBootTest with Test Rest Template.
- Test Containers for real MySQL instance.

2. Skill Gap Analysis + Course Recommendations

Test Cases:

1. **Skill Assessment → Course Suggestions**
    - Submit skills → Verify recommended courses match gaps.
    - Test cache behavior (Redis) for repeated requests.

2. **External Course API Integration**
    - Mock Coursera/edX APIs (Wire Mock) to test fallback logic.

Validation:

- Check response structure and relevance scores.

3. Job Matching + External APIs

Test Cases:

1. **Profile → Job Recommendations**
    - Validate job matches align with skills/location.
    - Test resume parsing → job matching pipeline.
2. **LinkedIn/Indeed API Integration**
    - Simulate API downtime → Verify cached results.

Tools:

- Mock MVC for HTTP layer testing.
- JSON Path to assert response fields.

4. Feedback System + Analytics

Test Cases:

1. **Submit Feedback → Database → Dashboard**
    - Ensure feedback appears in admin analytics.
    - Test sentiment analysis scoring.

Data:

- Seed test reviews (@Sql annotations).

6.4 Security Testing:

1. Authentication & Authorization

- **Brute Force Protection** – Test account lockout after 5 failed attempts.
- **JWT Security** – Validate token expiration, signature, and invalidation on logout.
- **Role-Based Access Control (RBAC)** – Ensure /admin routes block unauthorized users.
- **Password Policies** – Enforce strong passwords (8+ chars, special symbols).

2. API & Input Security

- **SQL Injection (SQLi)** – Test input fields with malicious queries.
- **Cross-Site Scripting (XSS)** – Submit scripts in forms; verify sanitization.
- **Cross-Site Request Forgery (CSRF)** – Check CSRF token enforcement.
- **Rate Limiting** – Prevent API abuse (e.g., 100 requests/minute).

3. Data Protection

- **HTTPS Enforcement** – No mixed content; TLS 1.2+ required.

- **Password Hashing** – Verify BCrypt (no plaintext storage).
- **Sensitive Data Masking** – Hide PII in logs/error messages.
- **Encryption at Rest** – Check database encryption for resumes/emails.

6.5 System Testing:

1. End-to-End Workflow Validation

- User Registration → Profile Setup → Skill Assessment
- Course Enrollment → Completion → Feedback Submission
- Job Matching → Application → Status Tracking

2. Performance & Load Testing

- **Response Times –** ≤2s for 90% of requests under 1,000 concurrent users.
- **Database Load –** Test with 50K+ user profiles for query efficiency.
- **API Throughput –** Handle 100+ requests/second without errors.
- **Stress Testing –** Identify breaking points (e.g., 10K+ users).

3. Security & Compliance

- **Data Encryption –** Verify HTTPS/TLS for all communications.
- **Authentication Flows –** Test JWT expiry, logout, and session hijacking.
- **Role-Based Access –** Ensure admins/users/guests see only permitted data.

4. Error Handling & Recovery

- **API Failures –** Graceful degradation (e.g., show cached jobs if APIs fail).
- **Database Downtime –** Verify error messages (no stack traces).
- **Network Interruptions –** Resume sessions after reconnection.

SCREENSHOTS

Home Page:

The home page of the Modern Career Guidance Project features a sleek design with a purple gradient background and an engaging illustration of a person interacting with a checklist, symbolizing organized career planning. It highlights the platform's personalized approach to helping users achieve success through structured guidance.

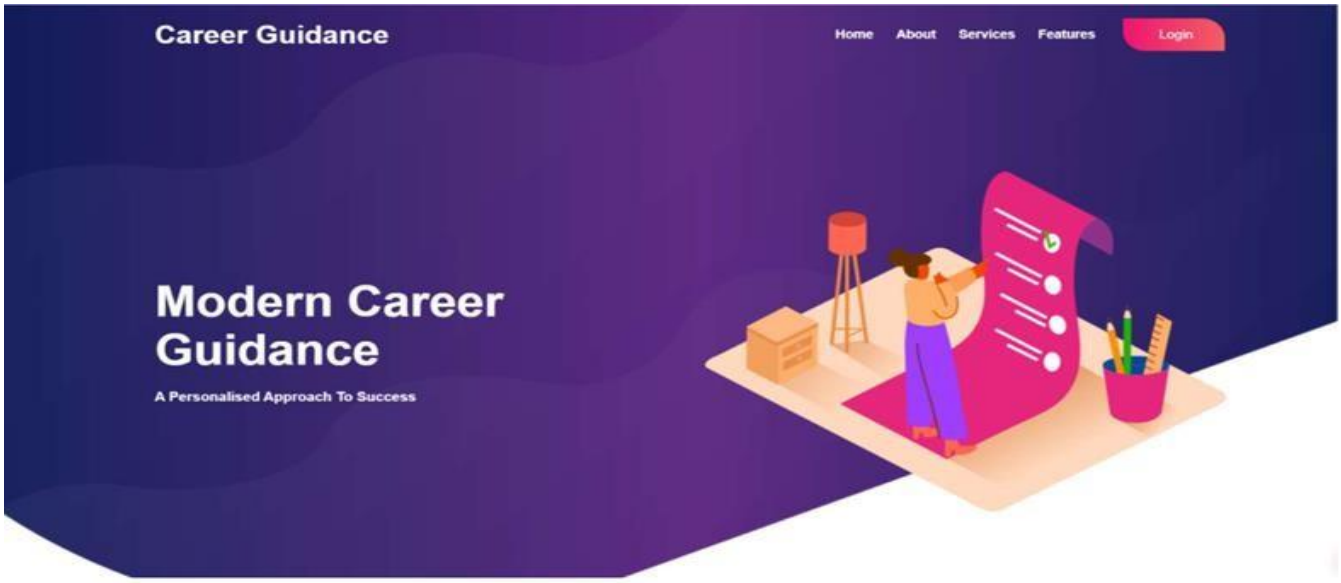

Figure 7.1 Home Page

User Login Page:

The login page provides a user-friendly interface with options for existing users to sign in and new users to sign up, ensuring seamless access to career guidance services.

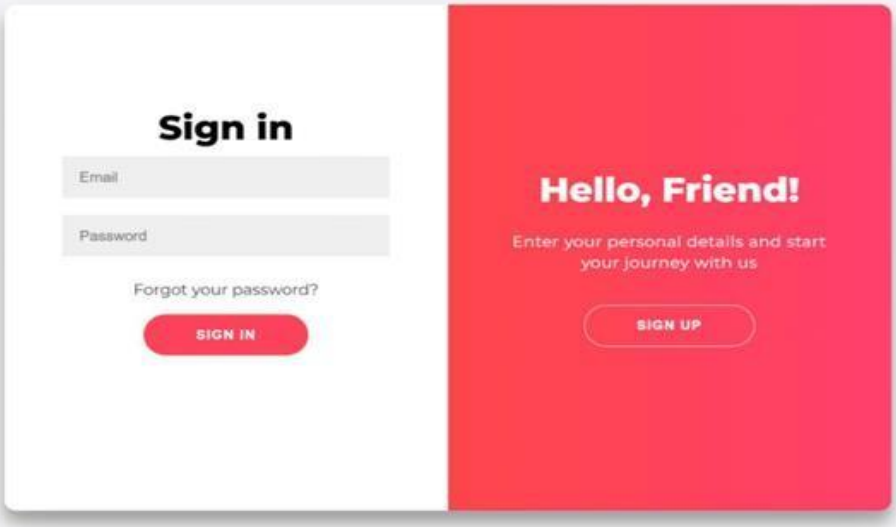

Figure 7.2 Login Page

User Registration Page:

The registration page features a dual-panel design with intuitive fields for account creation, ensuring a seamless and user-friendly onboarding experience.

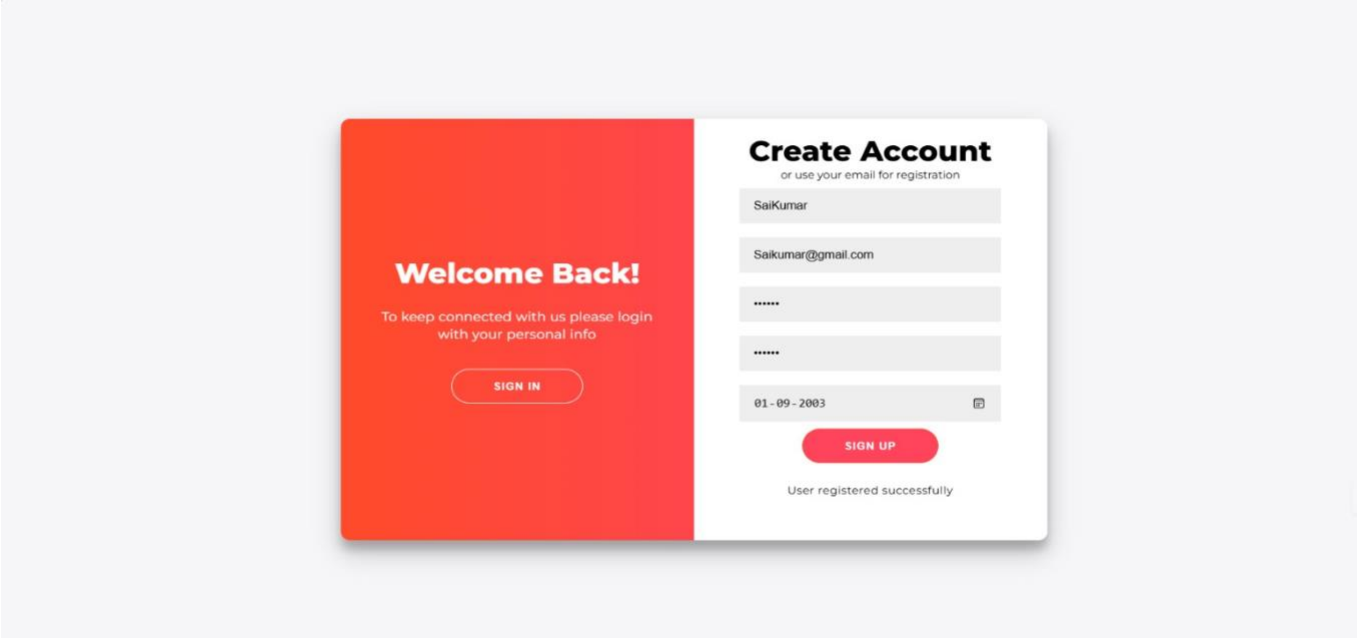

Figure 7.3 Registration Page

User Dashboard Page:

The user dashboard page displays personalized information including profile details, skills, interests, certifications, and achievements, with navigation options for seamless access to career guidance features.

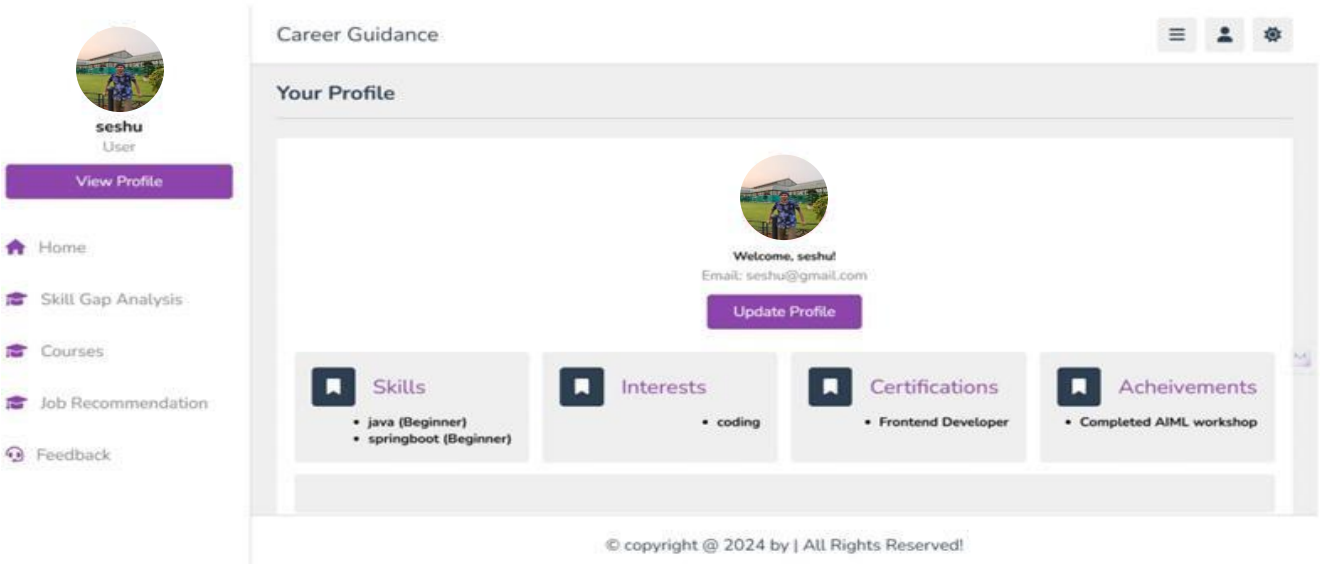

Figure 7.4 User Dash Board Page

User Profile Update Page:

The user profile update page allows users to seamlessly edit their profile details, including profile picture, job title, email, interests, certifications, and achievements.

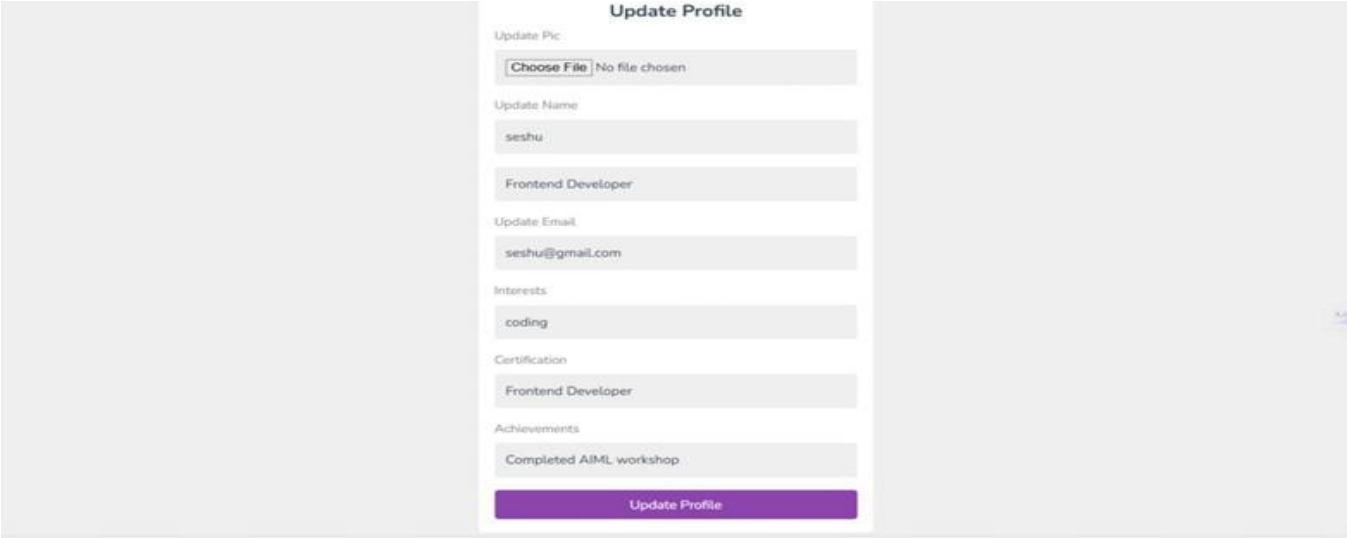

Figure 7.5 User Profile Update Page

Skill Gap Analysis Page:

The skill gap analysis page helps users identify gaps between their current skills and the skills required for their career goals, offering tailored recommendations.

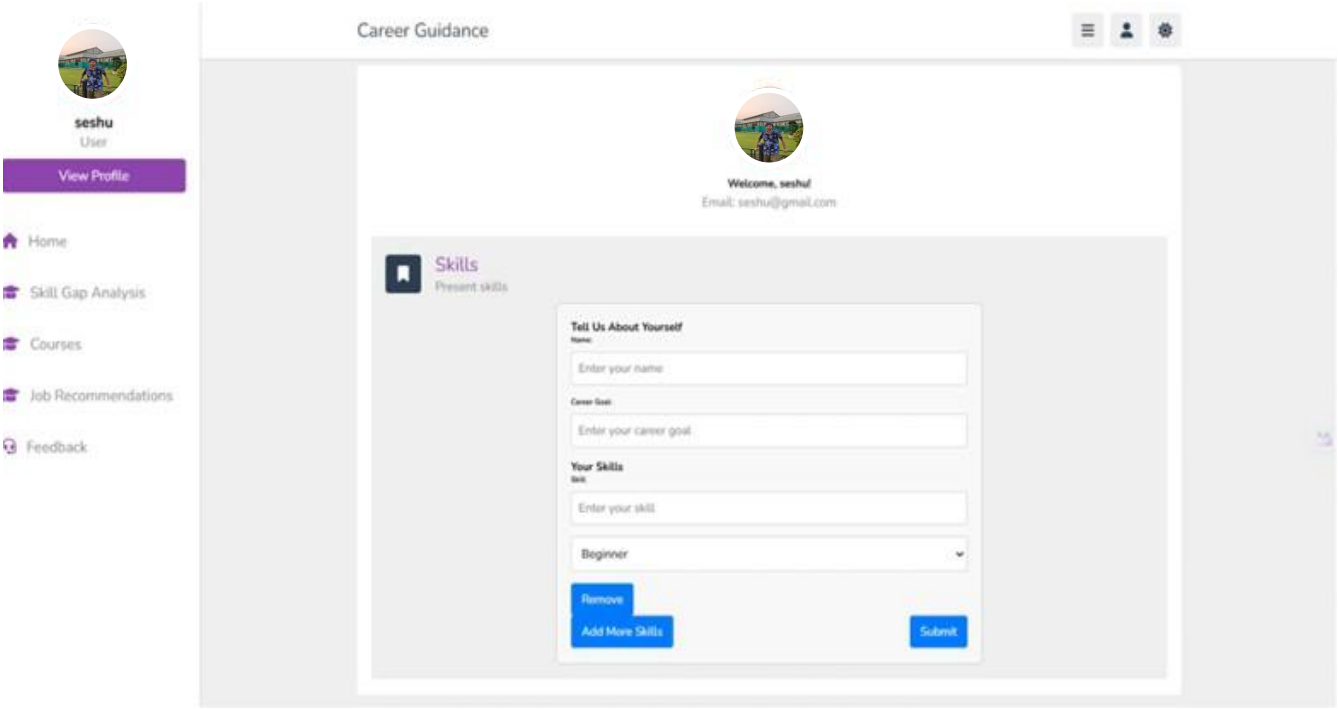

Figure 7.6 Skill Gap Analysis Page

Skill Gap Analysis Report Page:

The skill gap analysis report page visually presents users' proficiency levels, highlighting mastered skills and areas requiring improvement to achieve their career goals.

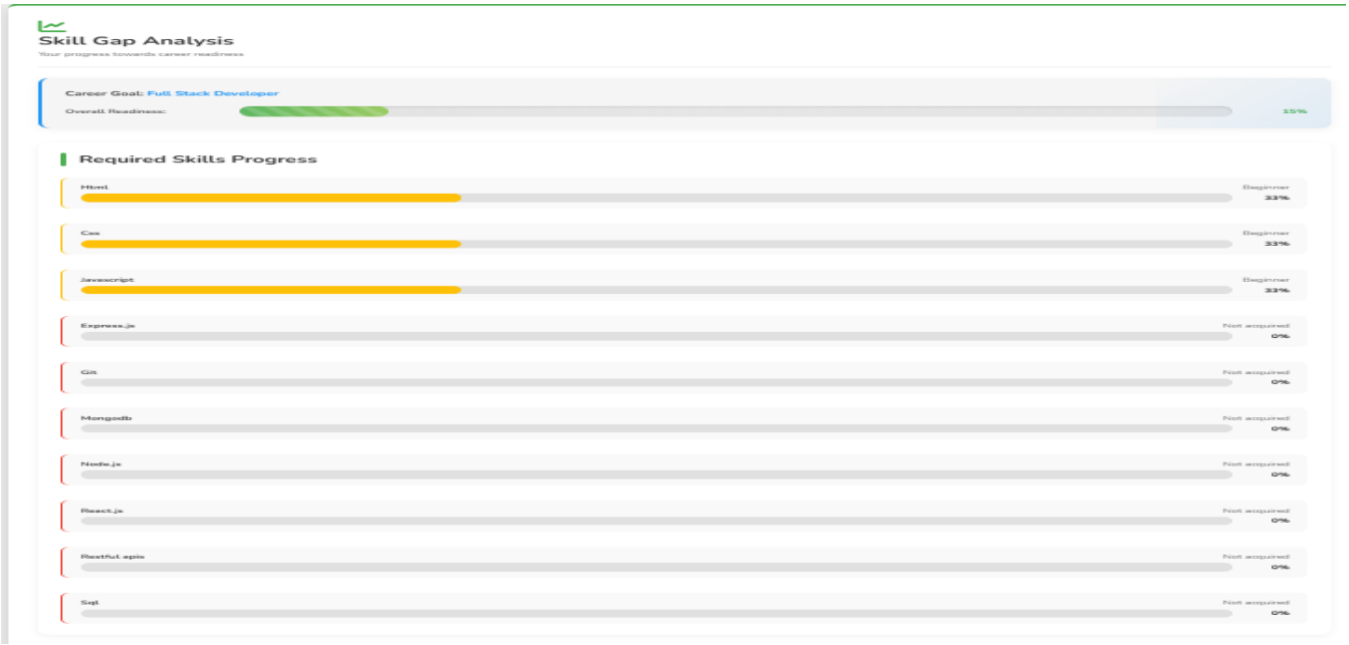

Figure 7.7 Skill Gap Analysis Report Page

Course Recommendation Page:

The course recommendation page displays personalized course suggestions alongside user profile details, enabling effective skill development tailored to career goals.

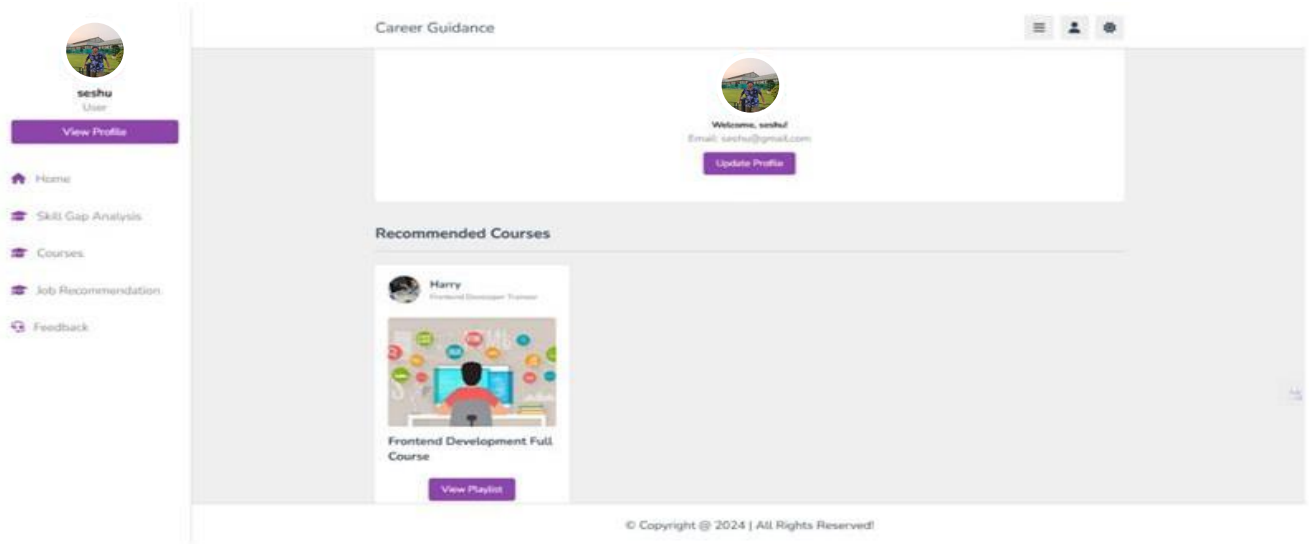

Figure 7.8 Course Recommendation Page

Courses Playlist Page:

The courses playlist page showcases curated video playlists, like "Frontend Development Full Course," guiding users through structured learning paths to master essential skills.

Figure 7.9 Courses Playlist Page

Job Recommendation Page:

The job recommendation page helps users discover tailored job opportunities based on their skills and preferences, providing detailed information like required skills, company, location, and salary range. It simplifies career exploration by enabling direct applications for matched roles.

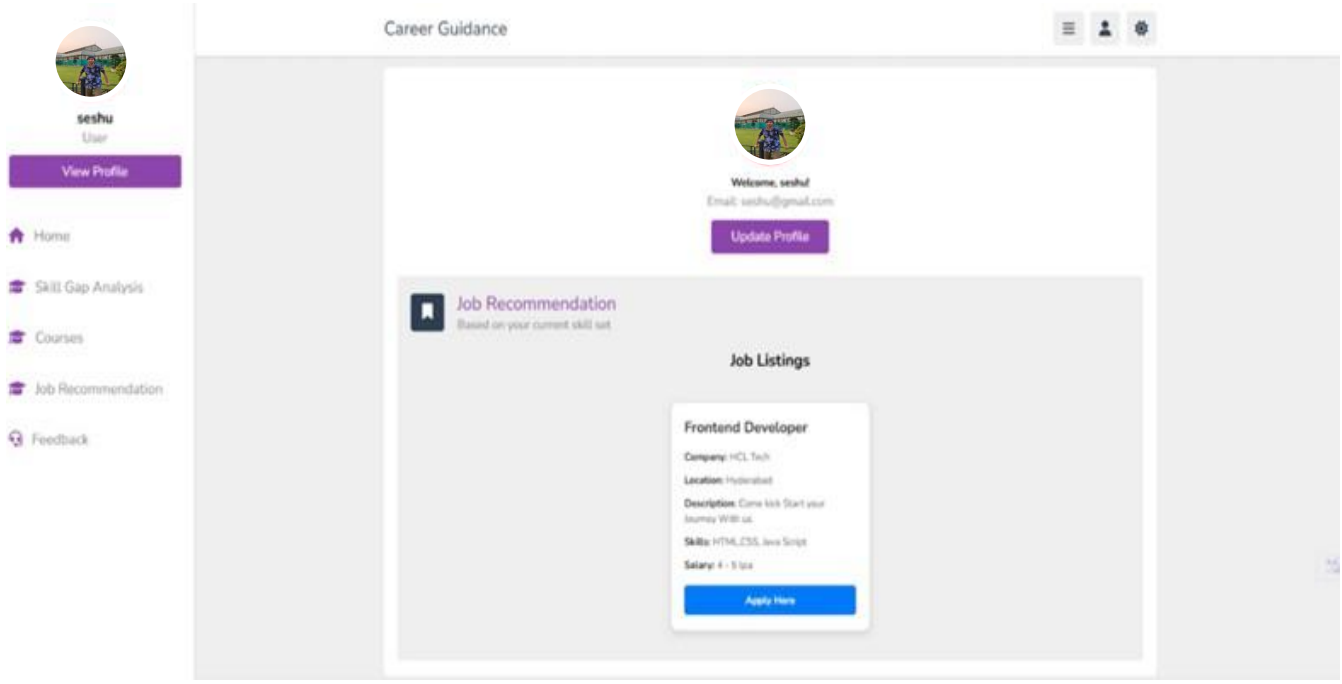

Figure 7.10 Job Recommendation Page

User Feedback Page:

The feedback page enables users to share their experiences and suggestions through an intuitive form, including fields for name, email, and message. This promotes user engagement and helps improve the platform's quality and services.

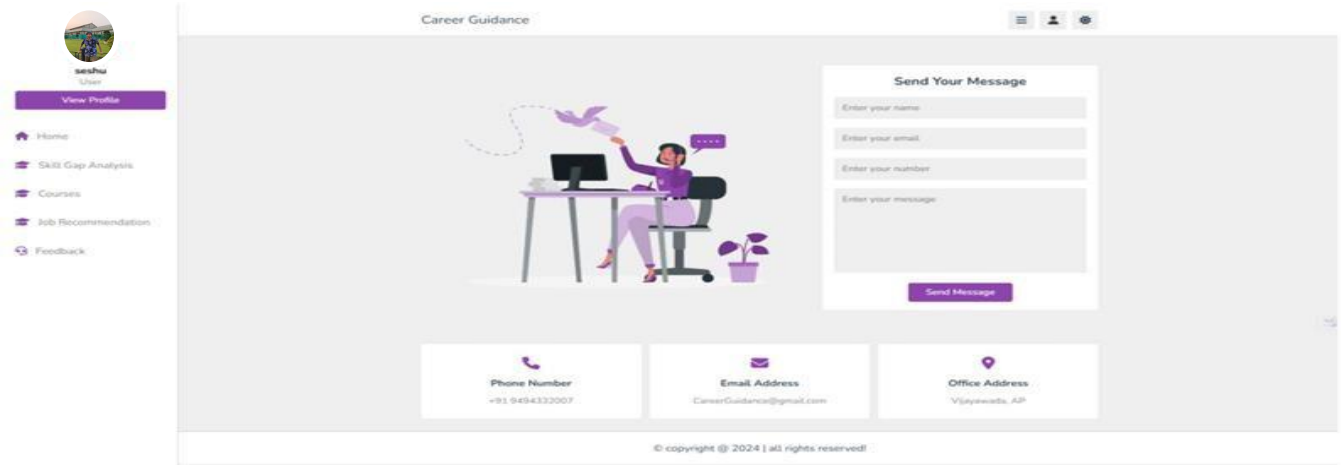

Figure 7.11 User Feedback Page

Admin Dashboard Page:

The admin dashboard page offers administrators a streamlined interface to efficiently manage courses, job postings, and user messages. With clear navigation options, it ensures smooth handling of all administrative tasks within the platform.

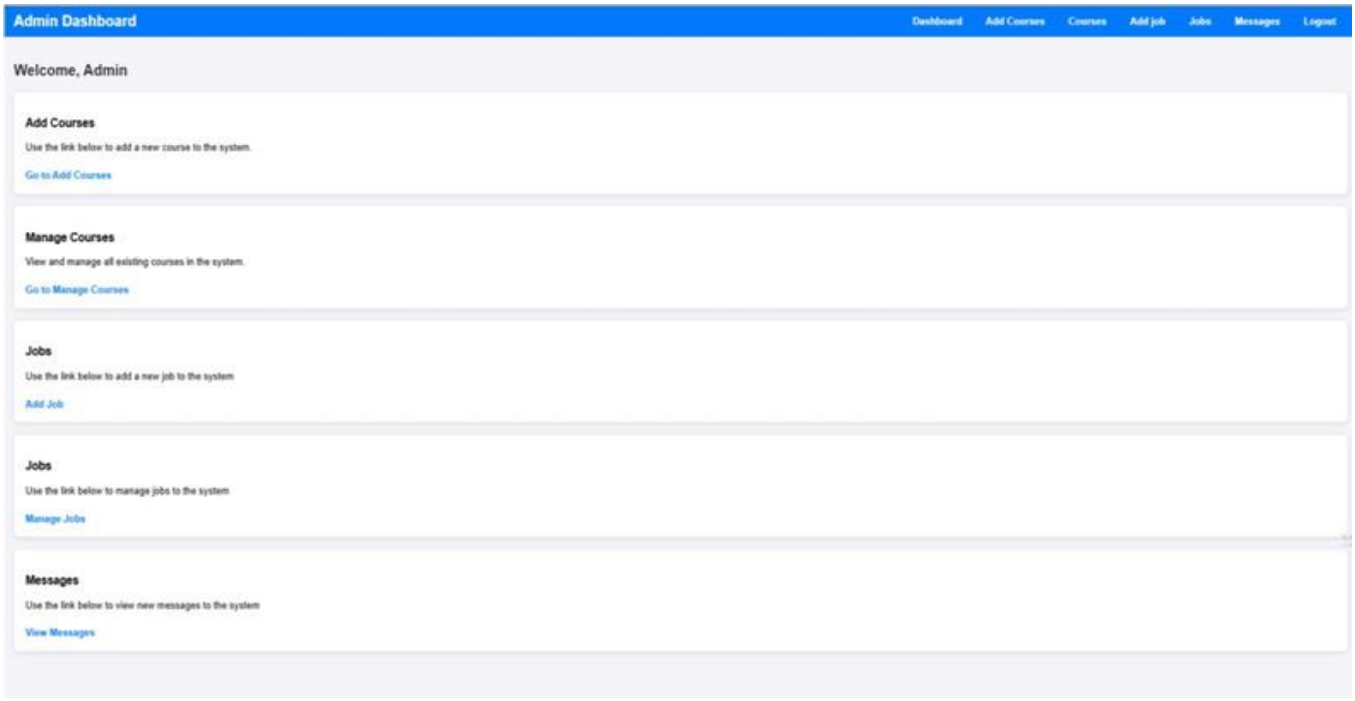

Figure 7.12 Admin Dashboard page

Admin Course Adding Page:

The admin course-adding page allows administrators to input comprehensive details like course title, description, skills required, and trainer information, streamlining course management. It ensures an intuitive interface for adding and maintaining high-quality courses on the platform.

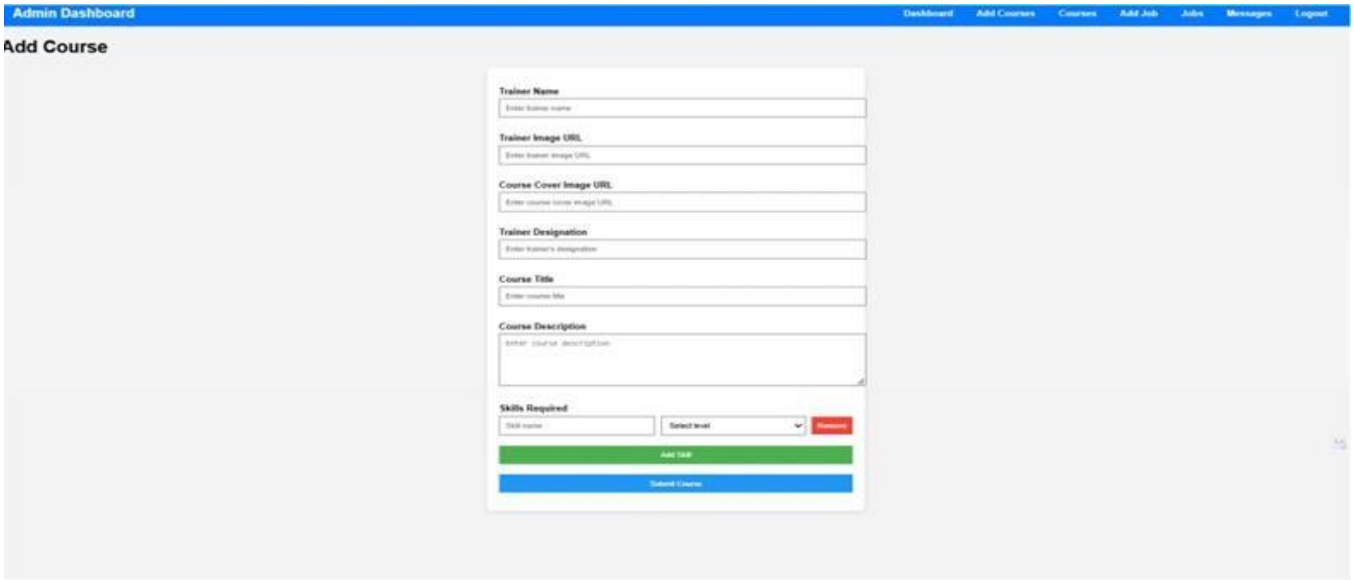

Figure 7.13 Admin Course Adding page

Admin course Review Page:

The admin course review page allows administrators to efficiently manage and review course details, including content, skills taught, and playlists, ensuring comprehensive educational offerings. It provides options to edit, delete, or add content for streamlined management of career guidance courses.

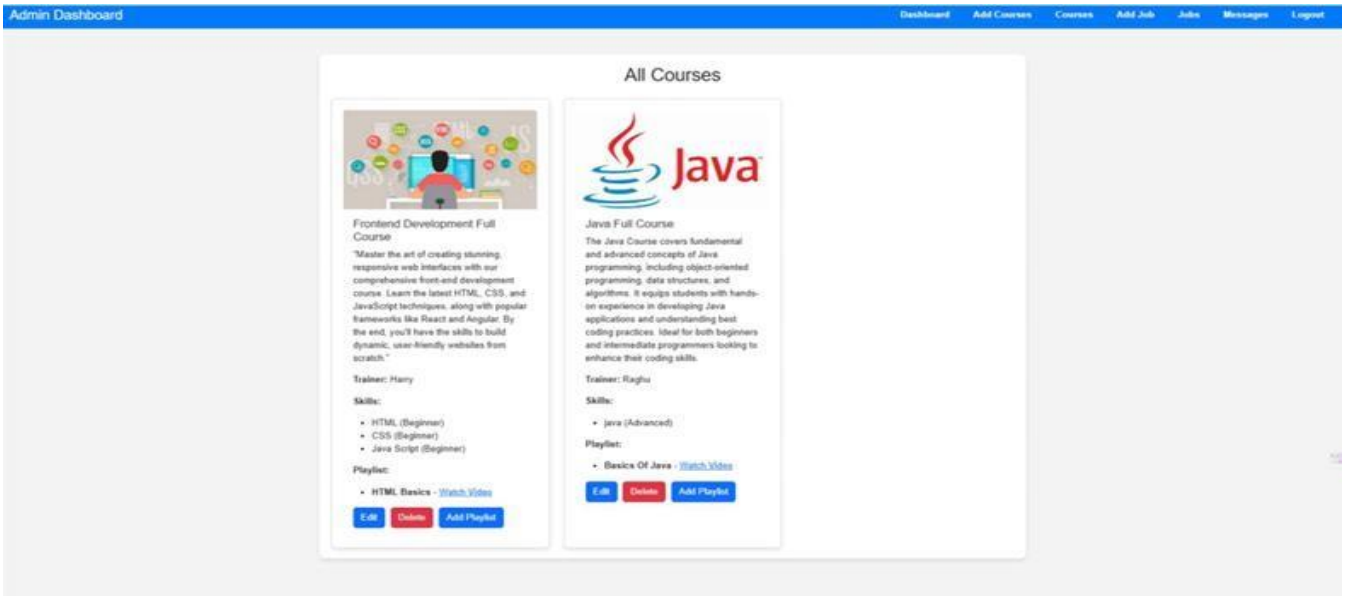

Figure 7.14 Admin Course Review Page

Admin Job Posting Page:

The job posting page allows administrators to create job listings by entering details like job title, company, location, required skills, and salary range. This user-friendly interface ensures streamlined management and visibility of job opportunities.

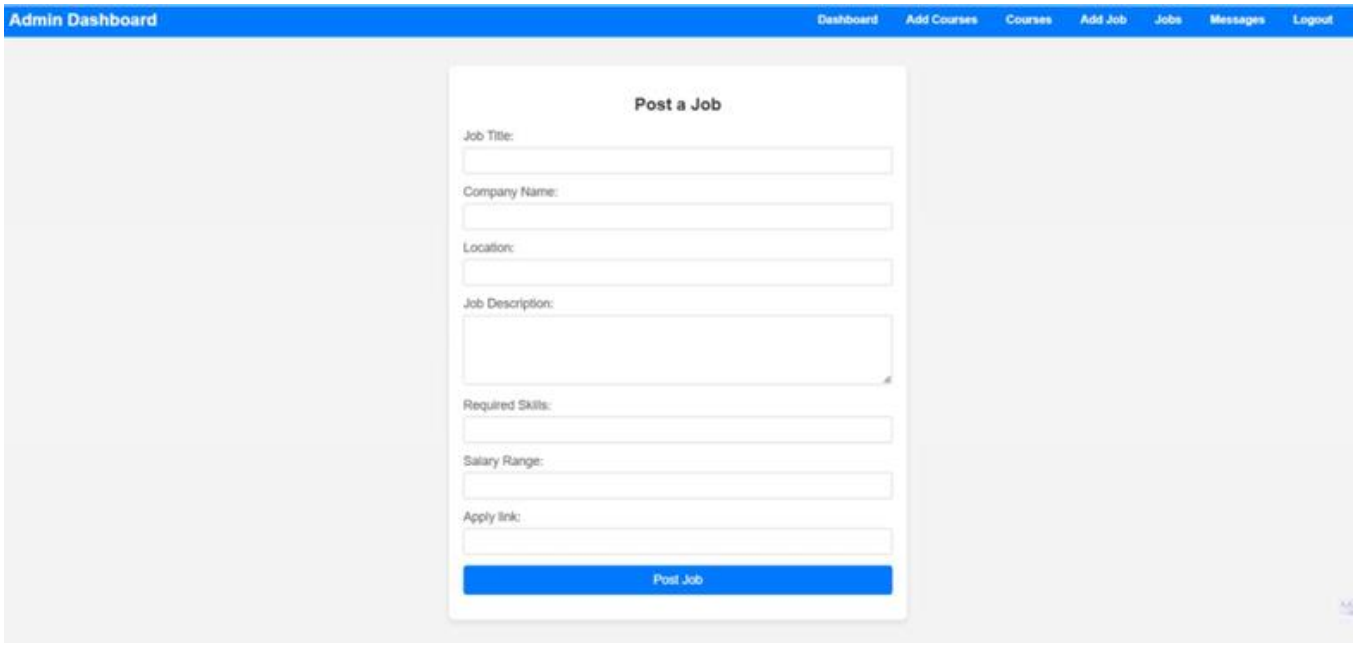

Figure 7.15 Admin Job Posting Page

Admin Feedback Review Page:

The admin feedback review page allows administrators to efficiently manage and respond to user requests, including adding courses and jobs based on specific fields. It features user details like name, email, contact number, and messages for streamlined feedback handling.

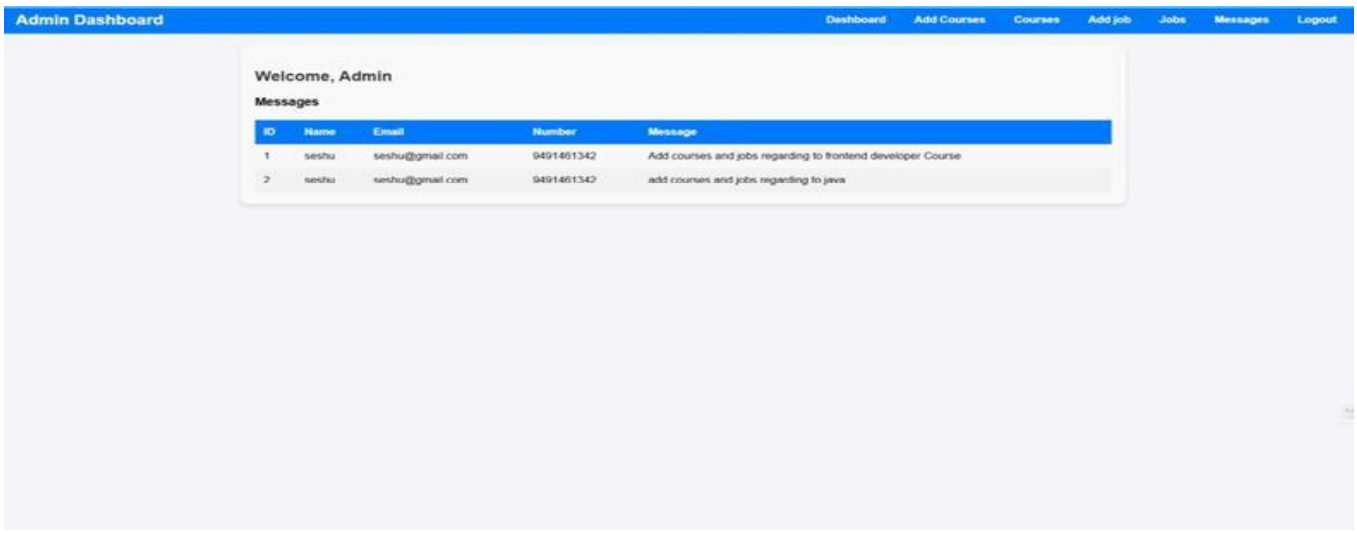

Figure 7.16 Admin Feedback Review Page

RESULT

8. Result:

Functionality and Performance:

The Modern Career Guidance platform successfully met the functional requirements, providing seamless user registration, profile management, skill gap analysis, and course recommendations. The system demonstrated robust performance, handling concurrent user access and large data volumes efficiently. Response times remained well within acceptable limits, ensuring a smooth user experience. The integration of real-time data processing allowed for timely updates in course recommendations and job matches, further enhancing the platform's relevance and effectiveness.

User Feedback and Satisfaction:

User Acceptance Testing (UAT) involved a diverse group of students and professionals who provided valuable feedback on the platform's usability and functionality. Users appreciated the intuitive interface and the personalized nature of the recommendations. The skill gap analysis and learning plans were particularly well-received, as they offered clear and actionable insights for career development. Minor usability issues identified during UAT were promptly addressed, leading to a high level of user satisfaction.

Security and Compliance:

The platform successfully implemented strong security measures, including authentication, authorization, and data encryption, ensuring user data protection and privacy. Security testing confirmed the platform's compliance with relevant regulations such as GDPR and CCPA. There were no significant vulnerabilities detected, and regular security updates and monitoring protocols were established to maintain a secure environment. Scalability and Reliability: The system's architecture proved to be highly scalable, leveraging cloud services to accommodate increasing user loads without compromising performance. The use of Docker and Kubernetes facilitated efficient deployment and management of the application, ensuring high availability and reliability. Regular backups and disaster recovery plans were implemented to safeguard against data loss and ensure continuity of service.

Continuous Improvement:

Feedback mechanisms and real-time data processing enabled continuous improvement of the platform. User feedback was systematically collected, analyzed, and used to refine algorithms and enhance features. Regular updates were rolled out based on user needs and market trends, ensuring that the platform remained relevant and valuable to its users.

SUMMARY&CONCLUSION

Summary:

The "Modern Career Guidance" platform is a smart, data-driven solution aimed at providing personalized career advice to individuals by leveraging modern Java Full Stack development technologies. It addresses the needs of both professionals and students by offering tools to analyze skill gaps, recommend courses, match job profiles, and gather feedback for continual improvement.

Technology Stack

- **Frontend:** HTML, CSS, JavaScript – For interactive UI.
- **Backend:** Java 17, Spring Boot 3.0 – Core application logic.
- **Database:** MySQL 8.0 – Data storage and retrieval.

The **Modern Career Guidance** platform features four key modules. The **Skill Gap Analysis** assesses user skills against industry demands and provides a tailored learning plan using Java 17, Spring Boot, and MySQL. The **Course Recommendation System** suggests relevant courses based on career goals, built with Java Full Stack technologies. The **Job Matching** module uses to align user profiles with suitable job opportunities. Lastly, the **Feedback System** gathers user input to improve course quality, ensuring continuous enhancement of learning materials.

Conclusion:

The **Modern Career Guidance** platform is a personalized, tech-driven solution that helps users align their skills with industry demands. By offering features like **skill gap analysis**, **course recommendations**, **job matching**, and **feedback**, it supports continuous career growth and informed decision-making. Built with Java Full Stack technologies, the system ensures a reliable and user-friendly experience. Overall, it bridges the gap between learning and employment, making career planning more effective and future-ready.

Furthermore, the platform not only benefits individual users but also holds value for educational institutions and organizations by supporting effective talent development. Its modular design allows for scalability and future integration with emerging technologies, ensuring long-term relevance. By continuously adapting to industry trends and user feedback, the Modern Career Guidance system remains a dynamic tool that evolves alongside the job market, helping users stay ahead in their careers.

FUTURE ENHANCEMENTS

10.1 Proposed Features for Future Development:

To ensure the Modern Career Guidance platform remains competitive and continues to meet the evolving needs of users, several advanced enhancements can be considered. These improvements aim to boost functionality, user experience, and system efficiency:

1. **AI-Driven Predictive Analytics:** Integrate sophisticated AI algorithms for predictive analytics, offering insights into future career trends based on real-time data. This enhancement can help users make informed decisions by identifying emerging job roles and skill demands.

2. **Dynamic Labor Market Intelligence:** Incorporate dynamic labor market intelligence to provide users with live updates on job availability, salary trends, and in-demand skills. This real-time information will ensure users stay ahead of market trends and optimize their career paths.

3. **Hyper-Personalized Learning Ecosystem:** Develop a hyper-personalized learning ecosystem that adapts to individual user needs, preferences, and learning styles. Employ AI to recommend tailored courses, workshops, and certification programs, facilitating continuous professional growth.

4. **Virtual and Augmented Reality Coaching:** Leverage VR and AR technologies to offer immersive virtual career coaching sessions. Users can benefit from simulated interview scenarios, interactive workshops, and realistic job training experiences, enhancing their preparedness and confidence.

5. **Skill Endorsement and Digital Badging:** Implement a digital badging system that allows users to earn and display verified skill endorsements. This feature can add credibility to their profiles and increase their visibility to potential employers.

6. **Comprehensive Gamification Strategy:** Expand the platform's gamification elements by introducing levels, achievements, and competitive challenges. This will motivate users to engage more deeply with the platform, driving continuous skill development and goal achievement.

7. **Integration with Industry-Relevant Networks:** Enhance integration with professional networking platforms and industry-specific communities. This will enable users to showcase their competencies, connect with experts, and discover exclusive job opportunities within niche markets.

8. **Advanced Data Analytics and Insights:** Develop advanced data analytics tools to provide users with comprehensive insights into their career progress, skill acquisition, and job search effectiveness. These analytics will support data-driven decisions and personalized career strategies.

BIBILOGRAPHY

11. Bibliography

[1] Brown, D. (2016). Career Information, Career Counseling, and Career Development. Pearson Education.

[2] Watts, A. G. (2009). The role of career guidance in workforce development. OECD Journal, 8(2), 45-66.

[3] Hirschi, A. (2018). The Fourth Industrial Revolution: Implications for career development and counseling. Career Development Quarterly, 66(3), 192-204.

[4] McMahon, M., & Watson, M. (2015). Career Assessment: Qualitative Approaches. Springer.

[5] Parson, F. (1909). Choosing a Vocation. Houghton Mifflin Company.

[6] Savickas, M. L. (2013). Career construction theory and practice. Career Development & Counseling: Putting Theory & Research to Work, 2(1), 147-183.

[7] Heckman, J. J., & Kautz, T. (2012). Hard evidence on soft skills. Labor Economics, 19(4), 451-464.

[8] Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? Psychological Bulletin, 130(2), 261-288.

[9] Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. Journal of Vocational Behavior, 45(1), 79-122.

[10] Dacre Pool, L., & Sewell, P. (2007). The key to employability: Developing a practical model of graduate employability. Education + Training, 49(4), 277-289.

[11] Xu, Z., & He, W. (2019). Artificial intelligence-powered career counseling: A review. IEEE Transactions on Learning Technologies, 12(4), 509-519.

[12] Goyal, S., & Purohit, H. (2021). Machine Learning for Job Recommendations: A survey. ACM Computing Surveys, 54(6), 1-38.

[13] Chen, H., & Zhang, K. (2020). AI-powered skill gap analysis: A case study in online education. Journal of Educational Computing Research, 58(2), 231-256.

[14] Agarwal, R., & Mittal, A. (2019). Big Data and AI in career guidance. International Journal of Data Science and Analytics, 7(3), 125-140.

[15] Wang, W., & Liu, Y. (2018). Personalized e-learning recommendations based on AI and data mining. Computers & Education, 126, 18-29.

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