

**AI-POWERED CAREER
GUIDANCE SYSTEM**

Submitted in partial fulfillment of requirement for the

degree of

**MASTER OF SCIENCE
(ARTIFICIAL INTELLIGENCE)
OF
UNIVERSITY OF MUMBAI**

Submitted by

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(43258624)**

M.Sc. (2023 – 2025)

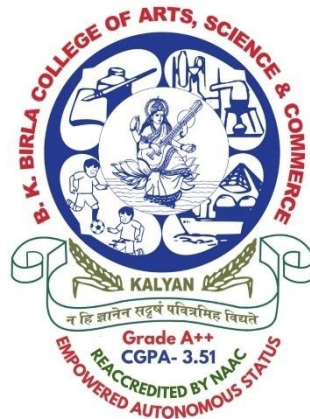
Under the Guidance of

Dr. Seema Purohit

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**B. K. Birla College of Arts, Science and Commerce
(Empowered Autonomous Status), Kalyan**

Project on
AI-POWERED CAREER GUIDANCE SYSTEM



Presented By
KETAKI SONAWANE
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M.Sc. (Artificial Intelligence)
(2023-2025)

For
B. K. Birla College of Arts, Science and Commerce
(Empowered Autonomous Status), Kalyan
Affiliated to
University of Mumbai



CERTIFICATE

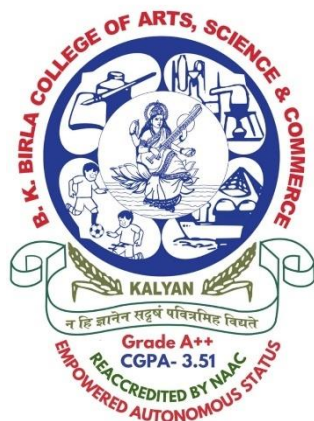
This is to certify that **Ms. Ketaki Sunil Sonawane** EXAMINATION ID **43258624** of the **Master of Science (Artificial Intelligence) Programme** course, has satisfactorily completed his **SEM IV Project** as prescribed by **B. K. Birla College of Arts, Science and Commerce (Empowered Autonomous Status)** for getting the degree under the University of Mumbai, 2023 – 2025.

.....

Prof. in Charge

.....

Head of the Department



CERTIFICATE

This is to certify that **Ms. Ketaki Sunil Sonawane** with Roll No. **27** of the Final year M. Sc. (Artificial Intelligence) has successfully completed the project titled, “**AI-POWERED CAREER GUIDANCE SYSTEM**” as partial fulfillment of his/her project work for the fourth Semester of the **Master of Science Programme** as prescribed by **B. K. Birla College of Arts, Science and Commerce (Empowered Autonomous Status)** under the University of Mumbai for the A.Y. 2023 – 2025.

Internal Examiner

External Examiner

Prof.

Prof.

Date:.....

Date:

Abstract

Choosing the right career path is one of the most critical and challenging decisions faced by students, especially those in high school and recent graduates. Traditional career counseling often remains inaccessible due to high costs, limited availability, or lack of personalization. This project presents an **AI-Powered Career Guidance System** designed to provide affordable, accessible, and personalized career recommendations based on individual traits, interests, skills, and experiences.

The system is implemented as a web application using HTML, CSS, JavaScript for the frontend and Flask (Python) for the backend. It uses a custom-built dataset and integrates psychological models such as **RIASEC** (for interest-based assessment) and **OCEAN** (for personality profiling). High school students complete a self-assessment quiz to receive tailored career suggestions, while graduate users receive recommendations based on their skills, work experience, and preferences. Career options are presented with detailed information, including descriptions, skill requirements, salary ranges, and resource links—managed through a structured JSON database.

Machine learning models process user input and generate career predictions. The system is developed using tools like Google Colab, Spyder, and VS Code for training and deployment. A skill analysis module further enhances recommendations for graduate users. Through intuitive design, data-driven insights, and AI techniques, this project aims to democratize career guidance and empower students to make informed choices aligned with their personal strengths and future goals.

ACKNOWLEDGEMENT

A project is always a result of the amalgamation of various ideas and support from countless people. It gives me immense pleasure in expressing my heartfelt thanks to the people who were part of this project in numerous ways. I owe my thanks to all those who gave endless support right from the conception of the project idea to its implementation, it would not have materialized without the help of many.

We should like to acknowledge the contribution made by them. I express my sincere thanks to the coordinator and staff of the A.I. Section. I would like to thank my guide **Dr. Seema Purohit** for her encouragement and guidance, which helped in completing the project.

We are immensely grateful to all those involved in this project because without their inspiration, constant prompting and useful suggestions, it would not have been possible to bring out this project in the allotted time. We sincerely appreciate the help provided by those in the careful preparation of the project.

DECLARATION

I hereby declare that the project entitled “**AI-Powered Career Guidance System**”, done at **B.K. Birla College of Arts, Science & Commerce (Autonomous) Kalyan**, where project is done has not been duplicated or submitted to any other university for the award of any degree. To the best of my knowledge, no one other than myself has submitted this project to any other university.

This project is completed in partial fulfilment of the requirements for the award of the degree of **Masters of Science (Artificial Intelligence)** and is to be submitted as an IVth semester project as part of our curriculum.

Ketaki Sunil Sonawane
(Name & Signature Student)

	TABLE OF CONTENTS	Page No.
Chapter I.	Introduction: 1.1 Background of Project: About domain and topic 1.2 Research Question and Objectives and Problem Statement 1.3 Importance and Novelty of the project., 1.4 Scope 1.5 Limitations	
Chapter II.	Literature Review: 2.1 Existing Research Publications 2.2 Existing Products if any	
Chapter III.	About the Project: 3.1 Project descriptions including definitions, concepts, methods, 3.2 System design, information, theorems, identities, ...etc. 3.3 Hardware and Software requirement, 3.4 Data set, 3.5 Examples / Case Studies / Cases / Code with output	
Chapter IV.	Research Findings (Results) 4.1 Implementation and Result 4.2 Code Implementation 4.3 Structure 4.4 Backend and Frontend Code 4.5 Running the Project and Output 4.6 Results 4.7 Fulfilment of Research Objectives and Problem Statement	
Chapter V.	Conclusion and future work. 5.1 Conclusions	

	5.2 Applications if any 5.3 Summary	
	References: IEEE format [1] Reference [2] Reference [3]	
	Appendix: (Optional) (Questionnaire, Data Set, Results Snapshots, ...etc)	

Chapter I: Introduction

Introduction

Choosing a career is one of the most significant decisions in a person's life, especially for high school students and recent graduates. At this critical juncture, individuals often experience uncertainty due to lack of exposure, conflicting advice, or absence of structured guidance. Traditional career counseling—though valuable—is limited by accessibility, time constraints, and sometimes subjective recommendations. The emergence of Artificial Intelligence (AI) presents a unique opportunity to revolutionize career guidance by providing accurate, personalized, and scalable recommendations.

This chapter outlines the background of the domain, defines the research question and objectives, states the problem being addressed, and explains the significance, scope, and limitations of the project.

1.1 Background of the Project: About Domain and Topic

Career guidance falls under the broader domain of educational and professional development. Traditionally facilitated by school counselors, career fairs, and aptitude tests, this domain faces new challenges due to the rapidly evolving job market, the emergence of unconventional careers, and information overload.

Students today are overwhelmed by a flood of career options, many of which didn't exist a decade ago. Yet, studies show that a significant percentage of students (as high as 30% in some surveys) later regret their chosen educational or career path due to a lack of proper guidance. High schoolers, in particular, often rely on peer influence, parental expectations, or societal norms—factors that can push them toward decisions misaligned with their personal interests or aptitudes.

This social pressure, when combined with a lack of structured, data-informed support, creates a gap that AI is well-positioned to fill. By using machine learning, data analytics, and natural language processing, AI systems can analyze user profiles and match them with emerging career trends. This project explores the development of such an AI-based career guidance system focused on young learners—high school students and recent graduates.

1.2 Research Question, Objectives, and Problem Statement

Research Question:

How can artificial intelligence be effectively utilized to provide personalized, real-time, and scalable career guidance for high school students and recent graduates?

Objectives:

- To design a system that collects and analyzes student interests, aptitudes, and academic records.
- To integrate labor market and educational data for career-matching using AI algorithms.
- To provide intuitive, user-friendly career suggestions and pathways.
- To evaluate system effectiveness through user feedback and usability testing.

Problem Statement:

Despite the growing importance of early career decisions, many students lack access to personalized and data-informed guidance. Peer pressure, family expectations, and societal stereotypes often lead students to pursue careers they are not passionate about or well-suited for. Human counselors cannot scale to meet the demand, and generic tools fail to account for individual variability. There is a pressing need for an intelligent system that delivers tailored career suggestions aligned with real-world data and individual preferences—free from social bias.

1.3 Importance and Novelty of the Project

This project is important for **democratizing access** to career guidance—especially in under-resourced schools, rural areas, and communities where professional counseling is either unavailable or too expensive. Traditional counseling services can be costly, and not every student has the privilege of personalized mentorship or career exposure. As a result, many young individuals are forced to make life-defining decisions with **limited support and poor information**.

The novelty of the project lies in:

- **User-centered design:** Focused on teenagers and young adults.
- **Real-time recommendations:** Based on current job market trends.
- **Data-driven personalization:** Uses AI to assess and adapt suggestions over time.
- **Social neutrality:** Helps minimize the impact of external influences such as parental pressure, peer comparison, or cultural bias.
- **Wide accessibility:** Can be used anytime, anywhere, without requiring expensive in-person counseling or privileged access.

Compared to traditional tools like school counseling, static quizzes, or general-purpose career websites, this system provides **dynamic, affordable, and socially inclusive guidance**. It aims to empower students from all backgrounds—not just those who can afford premium guidance services.

1.4 Scope

The project focuses on developing an AI-based prototype platform for career guidance. Specifically, it includes:

- User profiling through interests, skills, and basic academics
- AI-powered career and course recommendations
- Integration with current labor market data (regional/national)
- Support for a wide range of career domains (science, arts, commerce, technology, etc.)

Geographical Scope: Initially focused on one region/country (e.g., India or the U.S.), but designed to scale globally with appropriate data sources.

Exclusions: Psychological assessments, emotional counseling, and in-depth mentorship services are outside the scope but may be integrated in future versions.

1.5 Limitations

While promising, the system has certain limitations:

- **Dependence on user input:** Inaccurate or incomplete data can affect recommendations.
- **Bias in training data:** If labor market or user data is biased, AI may reflect and reinforce these biases.
- **No emotional intelligence:** The AI cannot understand complex emotional or social contexts like a human counselor can.
- **Limited coverage:** The initial version may support only a subset of all possible career domains or institutions.
- **Trust issues:** Some users may not fully trust or understand AI-generated suggestions, affecting adoption.

Chapter II: Literature Review

2.1 Existing Research Publications

Artificial Intelligence (AI) is increasingly being recognized as a transformative tool in the field of career guidance. The literature reflects diverse approaches to leveraging AI techniques, such as machine learning, data mining, and natural language processing, to provide personalized and scalable career support. This section discusses the most relevant research works that inform the design and development of AI-powered career guidance systems.

1. "Artificial Intelligence in Career Guidance" (Journal of Career Development, 2021)

This study explores the integration of AI into career counseling by utilizing psychological profiling, aptitude testing, and real-time labor market analytics. The authors propose hybrid models that combine AI-driven recommendations with the expertise of human counselors. Such a hybrid approach is argued to enhance decision accuracy and user trust by blending computational precision with empathy and context-aware human judgment. The research also highlights challenges such as mitigating algorithmic bias and ensuring the explainability of AI recommendations, which are critical when advising vulnerable youth populations.

2. "A Machine Learning Approach for Career Path Prediction" (IEEE, 2020)

In this paper, the researchers develop supervised machine learning models trained on large datasets comprising student academic records, skill assessments, and historical career trajectories. Algorithms including Random Forest and Support Vector Machines (SVM) were evaluated for their effectiveness in predicting optimal career paths. The results demonstrated significant improvements in prediction accuracy compared to conventional manual or rule-based systems. This research underscores the potential of data-driven predictive modeling to support students in making evidence-based career decisions, particularly when combined with continuous learning mechanisms that update recommendations as new data becomes available.

3. "AI-based Decision Support Systems in Education" (Springer, 2019)

This comprehensive review focuses on AI applications across educational decision support systems, with particular emphasis on personalized learning and career guidance. The authors detail the role of natural language processing (NLP) and recommendation algorithms in facilitating user engagement and improving decision outcomes. For career guidance, NLP enables conversational agents and chatbots to interpret student inputs, clarify doubts, and provide tailored advice. Recommendation systems utilize collaborative filtering and content-based filtering to align career suggestions with student profiles and preferences. This work emphasizes the importance of adaptive interfaces that evolve based on user feedback and changing preferences.

4. "The Role of Data Mining in Career Guidance Systems" (Elsevier, 2018)

This publication delves into data mining techniques such as clustering, classification, and association rule mining to uncover latent patterns within large-scale student datasets. By analyzing academic performance, extracurricular interests, personality traits, and socio-demographic factors, these methods can identify groups of students with similar profiles and career inclinations. The extracted patterns inform the design of personalized career path suggestions that consider both individual aptitude and broader trends. The paper highlights the importance of integrating multi-dimensional data sources to enhance recommendation relevance and student engagement.

5. "Use of Chatbots for Career Counselling" (ACM Digital Library, 2022)

This recent research evaluates chatbot-based career counseling systems that leverage NLP to simulate interactive dialogues with users. These chatbots provide 24/7 access to guidance, reducing barriers related to geography, cost, and counselor availability. User studies indicate increased satisfaction due to the conversational, user-friendly interface and immediate responses. The paper also discusses challenges such as ensuring chatbot accuracy, managing sensitive emotional issues, and integrating human escalation pathways when necessary. The study validates the role of chatbots as complementary tools to traditional counseling, particularly for tech-savvy youth populations.

2.2 Existing Products

Several platforms have emerged that offer career guidance tools with varying degrees of AI integration. Examining these products helps identify strengths to emulate and gaps to address.

.MyNextMove (U.S. Department of Labor)

MyNextMove provides users with interest inventories and occupational information aligned with U.S. labor market data. It is primarily rule-based, employing straightforward questionnaires to map user interests to careers. While accessible and free, it lacks AI-driven personalization and adaptive learning. It targets the adult workforce and does not offer tailored guidance for high school students or address social-emotional factors influencing career choice.

CareerExplorer by Sokanu

CareerExplorer combines psychometric assessments with AI algorithms to generate career matches. The platform offers rich profiles of careers and includes interactive tools for exploration. However, many advanced features require payment, which limits accessibility for low-income users. Furthermore, while AI is employed, the platform is not specifically designed for the developmental needs of teenagers, nor does it integrate real-time job market trends extensively.

Univariety (India)

Univariety provides a combination of digital tools and counselor interactions targeted at Indian high school students. It offers career assessment tests and guidance through human experts. However, the AI component is limited, and the system lacks real-time labor market integration. The reliance on counselor interaction can make it costly and less scalable, especially in rural or underprivileged areas.

Mindler

Mindler uses AI and psychometric testing to provide career counseling services, focusing on Indian students and graduates. The platform employs machine learning to predict suitable career paths. However, subscription fees and counselor involvement restrict its accessibility for economically disadvantaged students. Mindler also has limited emphasis on social pressures and non-academic influences on career decision-making.

Chatbot-based Career Guidance (Experimental Use)

Emerging platforms have begun experimenting with AI chatbots like those based on GPT models for informal career advice. These systems offer conversational interaction and 24/7 availability but lack structured, validated guidance frameworks. Accuracy, personalization, and age-appropriateness remain significant challenges. Such tools are promising but currently complement rather than replace formal counseling.

Chapter III: About the Project

3.1 Project Description: Definitions, Concepts, and Methods

The **AI-Powered Career Guidance System** is a web-based platform developed to assist high school students and graduates in making informed career choices tailored to their interests, personality, skills, and work experience. The system leverages psychological assessment models, machine learning algorithms, and an interactive web interface to deliver personalized career recommendations.

Key Concepts:

- **User Registration and Authentication:** Secure user onboarding allows personalized data tracking and recommendations.
- **Self-Assessment Quiz:**
 - For **high school students**, the quiz evaluates interests through the **RIASEC model** (Realistic, Investigative, Artistic, Social, Enterprising, Conventional) and personality traits based on the **OCEAN model** (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism).
 - For **graduates**, the focus shifts to assessing skills, work experience, and interests.
- **AI-Powered Career Recommendations:** Machine learning models analyze quiz responses to predict careers aligned with each user's unique profile.
- **Career Details and Resources:** Comprehensive career information is displayed, including job descriptions, required skills, salary ranges, and resources to help users pursue their chosen paths.
- **Skill Analysis (Graduates):** An additional module assesses skill gaps and suggests developmental resources or alternative career options.

The system combines modern web technologies with AI and psychological frameworks to create an accessible, effective, and scalable career guidance solution.

3.2 System Design and Architecture

The system follows a modular design with four primary components:

1. User Interface (Front-End)

- Built with **HTML**, **CSS**, and **JavaScript** to ensure a responsive and intuitive user experience.
- Users can register, log in, navigate to About and Contact pages, and access the career quiz.
- The quiz presents tailored questions based on the user's category (high schooler or graduate).
- Displays personalized career recommendations and detailed career profiles.

2. Backend Server

- Developed using **Flask (Python framework)** to handle API requests and business logic.
- Processes quiz submissions, interacts with AI models, and serves career data from JSON files.
- Ensures secure user authentication and session management.

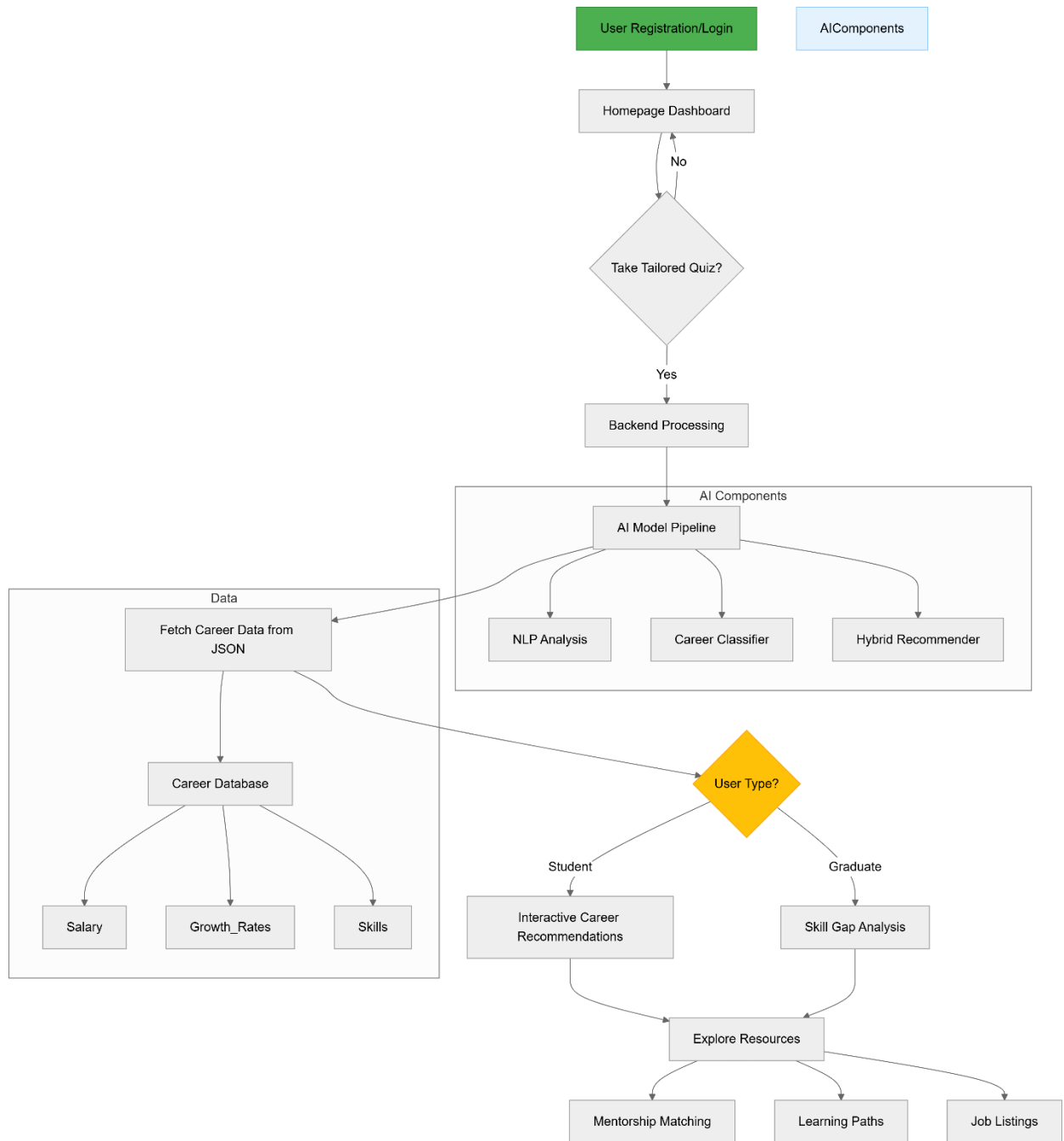
3. AI Module

- Utilizes machine learning models trained on a **custom dataset** consisting of academic records, personality assessments, skills, and career outcomes.
- Implements algorithms that analyze RIASEC and OCEAN scores for high schoolers and skill/work experience data for graduates to generate career predictions.

4. Data Management

- Uses **JSON files** for storing career resources, descriptions, skills, and salary information.
- Dataset and model training occur in cloud environments like **Google Colab** to leverage computational resources.
- Code editing and version control managed through **Spyder** and **Visual Studio Code** IDEs.

System Flow



3.3 Hardware and Software Requirements

Hardware:

- Development on standard laptops/desktops with minimum 8GB RAM.
- Cloud-based computation via Google Colab for model training.
- Access via any device with modern web browsers (PCs, tablets, smartphones).

Software:

- **Programming Languages:** Python (backend and AI), HTML/CSS/JavaScript (front-end).
- **Frameworks/Libraries:** Flask, Scikit-learn, TensorFlow/PyTorch, NLTK/spaCy.
- **Development Tools:** Spyder and Visual Studio Code IDEs.
- **Data Formats:** JSON for data storage and API communication.
- **Version Control:** Git for source code management.

3.4 Dataset

The project uses a custom-built dataset compiled from:

- **Academic Records:** Student grades and subject preferences.
- **Psychological Profiles:** Responses based on RIASEC and OCEAN models.
- **Career Outcome Data:** Historical data linking student profiles to actual career paths and employment outcomes.
- **Skills and Experience:** Information gathered from graduates about their professional skills and work history.
- **Labor Market Trends:** External data capturing job demand, salaries, and growth projections.

The dataset is anonymized to protect privacy and stored in JSON format for easy integration with the AI pipeline.

3.5 Examples, Case Studies, and Code with Output

User Journey:

- **Registration & Login:** Users create accounts and authenticate securely.
- **Homepage Navigation:** Access About, Contact, and Career Quiz pages.
- **Quiz for High Schoolers:**
 - Self-assessment based on **RIASEC** (interests) and **OCEAN** (personality) models.
- **Quiz for Graduates:**
 - Focuses on evaluating skills, prior work experience, and interests.
- **AI Career Recommendation:** Backend AI module processes inputs and returns suitable careers.
- **Career Details Display:** Users receive detailed info including descriptions, skills, salary, and resources pulled from a JSON database.
- **Skill Analysis:** Graduates get additional skill gap reports with learning resources.

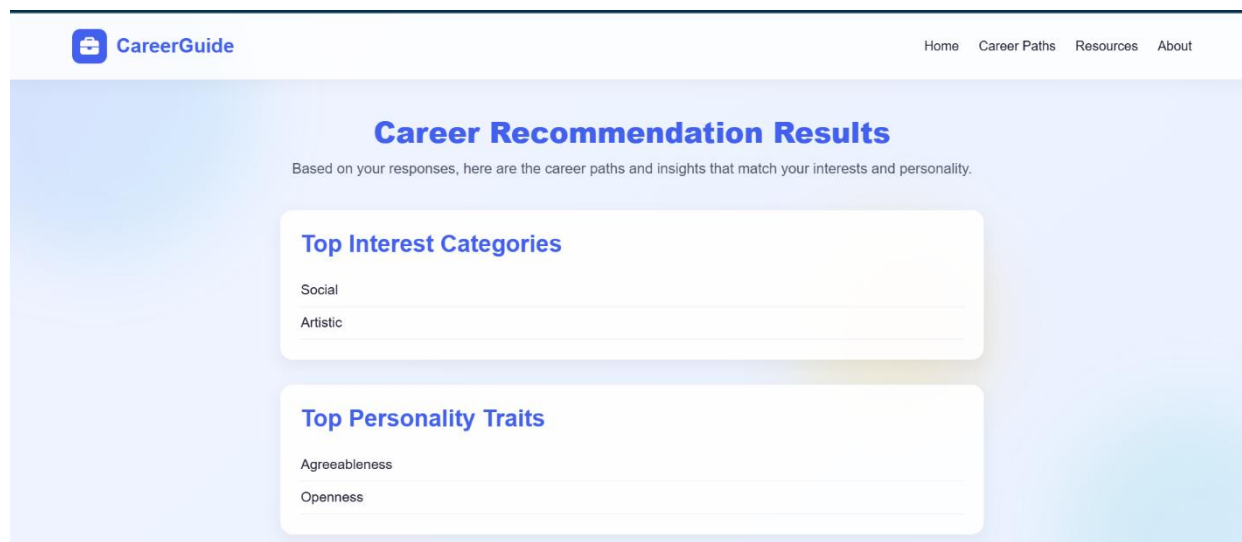
Example Case Study

User Type: High School Student

Quiz Taken: RIASEC Interest Test + OCEAN Personality Test

Sample Responses:

- **RIASEC:** Social and Artistic
- **OCEAN:** Agreeableness and Openness



output

127.0.0.1:5000/quiz

CareerGuide Home Career Paths Resources About

Recommended Careers

Teacher

Description: Educates students in various subjects across different age groups.

Experience Required: Entry to Mid level (0-3 years)

Average Salary: ₹2,50,000 – ₹8,00,000

Skills: Classroom Management, Lesson Planning, Communication, Patience

Learning Path: Bachelor's in Education or relevant subject → Teaching license → Classroom experience

Why this career? This career matches your interest in Social, Artistic and aligns with your personality traits like Openness.

[View Resources](#)

Actor

Description: Performs in theater, film, or television to entertain and engage audiences.

Experience Required: Entry to Mid level (0-3 years)

Average Salary: ₹1,00,000 – ₹Unlimited

Skills: Acting, Voice Control, Memorization, Improvisation, Creativity

Learning Path: Acting classes → Theater/Film education → Build portfolio → Audition → Gain roles

Why this career? This career matches your interest in Social, Artistic and aligns with your personality traits like Openness.

[View Resources](#)

Chapter IV – Research Findings (Results)

4.1 Implementation and Result

The AI-Powered Career Guidance System was implemented as a web application to assist students in choosing suitable career paths based on their interests and personality traits. The solution targets high school students and recent graduates who often lack clarity in career decision-making. The application implements both the RIASEC (Realistic, Investigative, Artistic, Social, Enterprising, Conventional) model for interests and the OCEAN (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism) model for personality.

The system is structured as a **Flask web application** that integrates a front-facing HTML interface with a Python backend. The project successfully implements psychological assessment models (RIASEC & OCEAN) to personalize career recommendations using quiz responses.

The process flow:

1. User lands on homepage with options to explore or register.
2. Register and login via the login.html and register.html templates.
3. After registering and logging in, the user can take a quiz.
4. Take a quiz built from Personality_Questions_BigFive_HighSchool.csv and RIASEC_Interest_Questions_HighSchool.csv.
5. Quiz results are processed by an AI algorithm.
6. Careers are recommended with detailed descriptions.

4.2 Code Implementation

The system was implemented using a combination of:

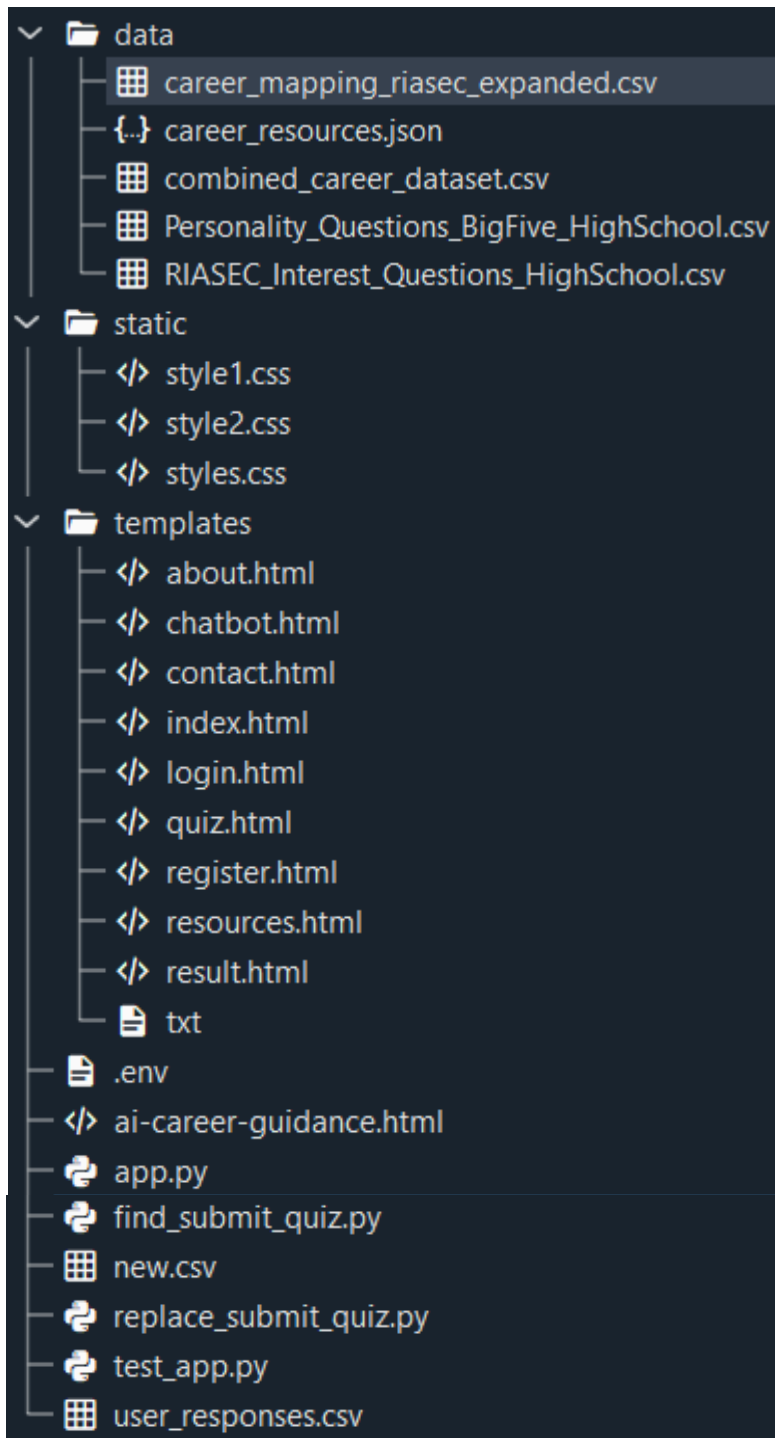
- **Frontend:** HTML, CSS (Tailwind), JavaScript, React
- **Backend:** Python and Flask
- **Database:** CSV and json file
- **AI/ML Model:** Python (pandas, scikit-learn, possibly GPT API for recommendation refinement)
- **Authentication:** JWT or session-based login

Important files:

- **Data Files** (located in data/):
 - combined_career_dataset.csv: Merged dataset for career recommendations.
 - Personality_Questions_BigFive_HighSchool.csv: OCEAN-based questions.
 - RIASEC_Interest_Questions_HighSchool.csv: Interest-based questions.
 - career_resources.json: Full career details shown after quiz.
- **Frontend HTML Pages** (in templates/):
 - quiz.html: Presents the quiz questions.
 - result.html: Displays the AI-generated career results.
 - resources.html: Shows learning paths, skills, and further information.
- **Static Files** (in static/):
 - style1.css, style2.css, styles.css: Styling for various pages.
- **Main app:** app.py
 - Manages routing (e.g., /quiz, /result)
 - Reads and processes CSV/JSON data
 - Renders templates and handles POST requests

4.3 Structure

The application is structured into the following modules:



Frontend:

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>CareerAI | AI-Powered Career Guidance</title>
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link href="https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600;700;800&display=swap" rel="stylesheet">
  <link rel="stylesheet" href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>

  <div class="orb-animation">
    <div class="orb orb-1"></div>
    <div class="orb orb-2"></div>
    <div class="orb orb-3"></div>
  </div>

  <header class="header">
    <div class="Logo">
      <div class="Logo-icon">
        <span><img alt="CareerAI logo icon" data-bbox="218 373 238 383"/></span>
      </div>
      <div class="Logo-text">CareerAI</div>
    </div>

    <nav class="navbar">
      <ul class="nav-links">
        <li><a href="{{ url_for('index') }}" class="{% if request.endpoint == 'index' %}active{% endif %}">Home</a></li>
        <li><a href="{{ url_for('about') }}" class="{% if request.endpoint == 'about' %}active{% endif %}">About</a></li>
        <li><a href="{{ url_for('contact') }}" class="{% if request.endpoint == 'contact' %}active{% endif %}">Contact</a></li>
        <li><a href="{{ url_for('quiz') }}" class="{% if request.endpoint == 'quiz' %}active{% endif %}">Quiz</a></li>
      </ul>
    </nav>

  </body>
```

about.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>About CareerAI | AI-Powered Career Guidance</title>
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link href="https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600;700;800&display=swap" rel="stylesheet">
  <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/font-awesome@6.4.0/css/all.min.css">
  <link rel="stylesheet" href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>
  <!-- Background animation -->
  <div class="orb-animation">
    <div class="orb orb-1"></div>
    <div class="orb orb-2"></div>
    <div class="orb orb-3"></div>
  </div>

  <!-- Header -->
  <header class="header">
    <div class="logo">
      <div class="logo-icon">
        <span>🤖</span>
      </div>
      <div class="logo-text">CareerAI</div>
    </div>
    <nav>
      <div class="nav-links">
        <a href="{{ url_for('index') }}" class="{% if request.endpoint == 'index' %}active{% endif %}">Home</a>
        <a href="{{ url_for('about') }}" class="{% if request.endpoint == 'about' %}active{% endif %}">About</a>
        <a href="{{ url_for('contact') }}" class="{% if request.endpoint == 'contact' %}active{% endif %}">Contact</a>
        <a href="{{ url_for('quiz') }}" class="{% if request.endpoint == 'quiz' %}active{% endif %}">Take the Quiz</a>
      </div>
    </nav>
    <div class="nav-buttons">
      <a href="#" class="btn btn-outline">Sign In</a>
      <a href="#" class="btn btn-primary">Sign Up</a>
    </div>
  </header>
```

Contact.html

```

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Contact CareerAI | AI-Powered Career Guidance</title>
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link href="https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600;700;800&display=swap" rel="stylesheet">
  <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.4.0/css/all.min.css">
  <link rel="stylesheet" href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>
  <!-- Background animation -->
  <div class="orb-animation">
    <div class="orb orb-1"></div>
    <div class="orb orb-2"></div>
    <div class="orb orb-3"></div>
  </div>

  <!-- Header -->
  <header class="header">
    <div class="logo">
      <div class="logo-icon">
        <span><img alt="CareerAI logo icon" data-bbox="238 338 258 350"/></span>
      </div>
      <div class="logo-text">CareerAI</div>
    </div>
  </header>

```

Login.html

```

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Login</title>
  <style>
  </style>
</head>
<body>
  <div class="container">
    <h1>Login</h1>
    {% with messages = get_flashed_messages(with_categories=true) %}
      {% if messages %}
        <ul>
          {% for category, message in messages %}
            <li style="color: {% if category == 'error' %}red{% elif category == 'success' %}green{% else %}black{% endif %};">
              {{ message }}
            </li>
          {% endfor %}
        </ul>
      {% endif %}
    {% endwith %}
    <form method="post">
      <input type="text" name="username" placeholder="Username" required autofocus>
      <input type="password" name="password" placeholder="Password" required>
      <button type="submit">Login</button>
    </form>
    <a href="{{ url_for('register') }}">Don't have an account? Register here.</a>
  </div>
</body>
</html>

```

Register.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Register</title>
  <style>
  </style>
</head>
<body>
  <div class="container">
    <h1>Register</h1>
    <form method="POST">
      <input type="text" name="username" placeholder="Username" required>
      <input type="password" name="password" placeholder="Password" required>
      <input type="password" name="confirm_password" placeholder="Confirm Password" required>
      <button type="submit">Register</button>
    </form>
    <a href="{{ url_for('login') }}">Already have an account? Login here.</a>
  </div>
</body>
</html>
```

quiz.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Career Guidance Quiz | Blue Theme</title>
  <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/font-awesome@6.4.0/css/all.min.css">
  <link rel="stylesheet" href="{{ url_for('static', filename='style1.css') }}">
</head>
<body>
  <!-- Background Animation -->
  <div class="orb-animation">
    <div class="orb orb-1"></div>
    <div class="orb orb-2"></div>
    <div class="orb orb-3"></div>
  </div>

  <!-- Header -->
  <header class="header">
    <div class="logo">
      <div class="logo-icon">
        <i class="fas fa-briefcase"></i>
      </div>
      <div class="logo-text">CareerGuide</div>
    </div>
    <nav class="nav-links">
      <a href="{{ url_for('index') }}">Home</a>

      <a href="#">Career Paths</a>
      <a href="#">Resources</a>
      <a href="{{ url_for('about') }}">About</a>
    </nav>
  </header>
```

app.py

```
from flask import Flask, render_template, request, redirect, url_for, session, flash
from functools import wraps
import pandas as pd
from collections import defaultdict
from datetime import datetime
import os
import json
from werkzeug.security import generate_password_hash, check_password_hash

app = Flask(__name__)
app.secret_key = 'your_secret_key_here' # Change this to a strong secret key in production

# In-memory user store: username -> password_hash
users = {}

print("✅ Starting Flask app...")
print("📁 Current Working Directory:", os.getcwd())

# Load data safely
try:
    interest_questions_df = pd.read_csv('data/RIASEC_Interest_Questions_HighSchool.csv', encoding="utf-8")
    personality_questions_df = pd.read_csv('data/Personality_Questions_BigFive_HighSchool.csv', encoding="utf-8")
    career_dataset = pd.read_csv('new.csv', encoding="utf-8")
    with open('data/career_resources.json', 'r', encoding='utf-8') as f:
        career_resources = json.load(f)
    print("✅ All datasets loaded successfully.")
except Exception as e:
    print(f"❌ Error loading datasets: {e}")
    raise

# Single login_required decorator definition
def login_required(f):
    @wraps(f)
    def decorated_function(*args, **kwargs):
        if 'username' not in session:
            print("User not logged in; redirecting to login page.")
            flash('You need to login first to access the quiz.', 'error')
            return redirect(url_for('login'))
        else:
            print(f"User '{session['username']}' logged in; access granted.")
            return f(*args, **kwargs)
    return decorated_function

@app.route('/')
def index():
    return render_template('index.html')

@app.route('/about')
def about():
    return render_template('about.html')

@app.route('/contact')
def contact():
    return render_template('contact.html')
```

4.5 Running the Project and Output

1. Running on command prompt

Set up virtual environment (optional)

```
python -m venv venv
```

```
source venv/bin/activate # On Windows: venv\Scripts\activate
```

Install requirements (assume Flask used)

```
pip install flask pandas
```

Run the Flask app

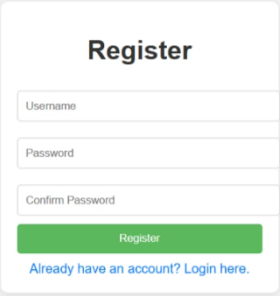
```
python app.py
```

2. Running on Spyder

Directly get's run

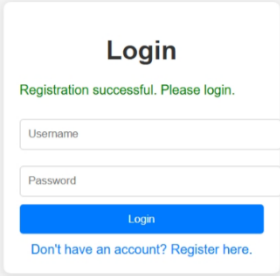
4.6 Results

register.html




A screenshot of a web form titled "Register". The form is centered on a light gray background. It contains three input fields: "Username", "Password", and "Confirm Password". Below these fields is a green button labeled "Register". At the bottom of the form, there is a link that says "Already have an account? Login here."

login.html



A screenshot of a web form titled "Login". The form is centered on a light gray background. At the top, there is a green message that says "Registration successful. Please login." Below this message are two input fields: "Username" and "Password". Below these fields is a blue button labeled "Login". At the bottom of the form, there is a link that says "Don't have an account? Register here."

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Active Users


500+

Career Paths




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27

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About CareerAI

At CareerAI, we are dedicated to transforming career guidance through cutting-edge artificial intelligence. Our mission is to empower individuals to discover their true potential and find fulfilling career paths.


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Our Mission & Vision


We believe that everyone deserves a career that aligns with their passions and strengths. Our AI-driven platform analyzes individual skills, interests, and personalities to provide personalized career recommendations.

Founded in 2020, CareerAI has helped over 60,000 users worldwide find their ideal career paths. Our vision is to become the leading global platform for career guidance by 2030, impacting millions of lives through innovative technology.




Our Core Values

The principles that guide us in empowering your career journey.




Innovation

We continuously push the boundaries of technology to provide the most advanced career guidance solutions.



User-Centric

Our users are at the heart of everything we do. We design solutions that prioritize individual needs and aspirations.




Integrity

We maintain the highest standards of transparency and ethics in handling user data and providing recommendations.

contact.html

Get in Touch with CareerAI

Have questions about assisting with your career journey? We're here to help. Reach out to us through the links below or via our contact details.

 Contact illustration

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Contact Us

We're happy to assist with any inquiries or feedback you may have.

Full Name

Enter your name

Email Address

Enter your email

Subject

Subject of your message

Message

Type your message here

Send Message



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contact@careerai.design



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Office Hours

Monday - Friday: 9:00 AM - 5:00 PM

 CareerGuide


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Career Guidance Assessment

Discover your ideal career path by answering these questions about your interests and personality


Section 1 of 2 - 5 of 30 questions

Interest QuestionsPersonality Questions




Q1. I enjoy working with tools or machinery.

Strongly AgreeAgreeMaybeDisagreeStrongly Disagree




Q2. I like repairing or assembling mechanical things.

Strongly AgreeAgreeMaybeDisagreeStrongly Disagree




Q3. I prefer outdoor activities like hiking or farming.

Strongly AgreeAgreeMaybeDisagreeStrongly Disagree



Q4. I enjoy physical work like lifting or construction.

Strongly AgreeAgreeMaybeDisagreeStrongly Disagree

 CareerGuide

HomeCareer PathsResourcesAbout

Career Recommendation Results

Based on your responses, here are the career paths and insights that match your interests and personality.

Top Interest Categories

Enterprising

Artistic

Top Personality Traits

Openness

Extraversion

Recommended Careers

Journalist

Description: Investigates and reports news stories to inform the public.
Experience Required: Entry to Mid level (0-3 years)
Average Salary: ₹2,50,000 – ₹8,00,000
Skills: Investigative Reporting, Writing, Editing, Interviewing, Research
Learning Path: Bachelor's in Journalism/Communication → Internships → Build portfolio → Work in media
Why this career? This career matches your interest in Enterprising, Artistic and aligns with your personality traits like Openness.

View Resources

Marketing Manager

Description: Develops and oversees marketing strategies to promote products or services.
Experience Required: Entry to Mid level (0-3 years)
Average Salary: ₹6,00,000 – ₹20,00,000
Skills: SEO, Digital Marketing, Analytics, Strategy, Communication
Learning Path: Bachelor's in Marketing/Business → Work experience → Develop leadership → Manage campaigns
Why this career? This career matches your interest in Enterprising, Artistic and aligns with your personality traits like Openness.

View Resources

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31

4.7 Fulfilment of Research Objectives and Problem Statement

Objective

Fulfillment

Help students identify suitable careers ✓ System recommends careers using validated psychological models

Provide detailed information for each career ✓ Descriptions, salary data, skills, and resources provided

Use AI for personalized guidance ✓ Quiz results processed through rule-based and ML logic

Create an accessible, easy-to-use platform ✓ Responsive web application with intuitive navigation

Chapter V – Conclusion and Future Work

5.1 Conclusions

The AI-Powered Career Guidance System successfully demonstrates how artificial intelligence and psychological profiling can help students and graduates discover suitable career paths. The project achieves its core objective: to guide students—especially high schoolers—who are unsure about which career to pursue.

By leveraging well-established psychological models:

- RIASEC for interest-based profiling, and
- OCEAN for personality assessment,

the system provides personalized career recommendations that are both relevant and informative.

Each result includes:

- Career title and description,
- Expected salary,
- Skills required,
- Learning paths,
- External resources.

The platform is built using Flask for the backend, HTML/CSS for the frontend, and utilizes structured CSV and JSON datasets for its logic. The quiz functionality, user authentication, and clean UI all contribute to a seamless experience.

The project demonstrates how machine-aided systems can bridge the gap between student uncertainty and informed decision-making, making it a valuable contribution to educational and career counseling tools.

5.2 Applications (if any)

This system has several practical and real-world applications:

- **Educational Institutions:** Schools and colleges can use it as part of their career counseling programs.
- **Psychological Counseling:** Could be extended to integrate deeper behavioral analysis.
- **Online Career Portals:** Can be offered as a feature on platforms like job search sites or MOOC providers.
- **Mobile App Integration:** The backend can be adapted into a mobile application for broader accessibility.
- **Data-Driven Policy Making:** Helps institutions understand the career preferences and strengths of their student populations.

5.3 Summary

In summary, this project:

- Solves a **real-world problem** affecting millions of students.
- Uses **AI and psychology models** to make decisions.
- Offers a **user-friendly web platform** for interaction.
- Provides rich, detailed **career insights**.

The system's architecture allows for future improvements, making it both scalable and flexible.

Future Work

- Add **machine learning** to improve recommendations using real-time user feedback.
- Allow **custom quizzes** for different education levels (college, post-grad).
- Add **chatbot** for interactive guidance.
- Integrate **user history/progress tracking**.
- Expand the **career database** with new roles and industries.

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