Next Generation Career Counseling Platform Powered by Artificial Intelligence

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Individuals face a growing challenge in identifying career paths that align with their skills, interests, and goals in a world where career landscapes constantly shift due to technological advancements and global trends. By using machine learning algorithms, this platform seeks to bridge that gap by analyzing user profiles and providing personalized career recommendations. It ensures that users are not only aware of potential opportunities but also receive guidance on how to pursue them effectively on how to pursue them effectively. The platform evolves and adapts to changing user needs and job market dynamics through the integration of NLP for real-time interaction through an interactive career chatbot and a feedback-based learning system. A holistic approach to career development is ensured with features like skill gap analysis, job market trend monitoring, and educational resource suggestions. The aim of developing an AI-based career counseling platform is to give users precise, personalized career suggestions and acquire the knowledge and skills necessary to succeed in a diverse job market. The paper explores how to design and implement an AI-based career counseling platform, including methodologies and relevant technologies such as Angular and Node.js for front-end, Django and Python for back-end, and PostgreSQL for data manipulation. The platform is highlighted for its use of machine learning and natural language processing to offer personalized career guidance, analysis of skill gaps, and real-time job market insights. The experimental results show that the proposed system achieves a recommendation accuracy of 87.6% along with a precision of 0.85, a recall of 0.83, and an F1-score of 0.84, demonstrating strong predictive performance. The chatbot component responds to user queries with an average latency of 1.8 seconds and successfully resolves 86% of the queries, ensuring quick and effective communication. The skill gap analysis part accurately identifies gaps with an 82% accuracy rate, and overall user satisfaction is high at 89%, demonstrating the platform's effectiveness and ease of use. The objective of the platform is to assist students and professionals in making informed job decisions and encourage the use of smart, data-driven tools in vocational development programs and educational institutions.

Keywords: Artificial Intelligence, Career Counseling, Machine Learning, Natural Language Processing, Job Market Trends, Career Recommendation, Skills Gap Analysis

Introduction:

In the modern world, where career landscapes are rapidly changing due to technological advancements and global market trends, it has become challenging for individuals to select career paths that align and match their skills, interests, education, and goals. This system seeks to mitigate these challenges using Machine Learning (ML) algorithms to analyze user profiles and recommend personalized career suggestions. It also ensures that users are aware of the latest opportunities and are guided to pursue them effectively. With the current rate of job changes and shifts in the work environment, like freelancing, etc., it can be difficult for students and professionals to determine their desired career paths. The project aims to empower users through tools that go beyond mere suggestions. The platform uses machine-learning algorithms to improve recommendations by collecting user feedback as well as using job market data. This research also integrates natural language processing (NLP), which allows users to communicate with the platform via an interactive career chatbot that facilitates counseling on a near real-time basis. Ultimately, the purpose is to make career counseling more data-driven, user-centric, and readily available to a diverse range of users across various stages of their professional journey. This platform integrates up-to-date job market trends to evaluate user profiles and suggest appropriate careers, analyze skill gaps, and propose related training. Developing with modern web technologies and validating with a functional prototype, the system provides career advice based on the individual's needs, interests, and skills, regardless of geographical limitations, and enhances employability outcomes. The primary purpose of this project is to create a smart, accessible, and efficient system that assists individuals in making well-informed career decisions.

The main objective of this project is to develop a system that is effective, flexible, accessible, smart, and helps individuals, especially students and professionals, in making wise and informed career choices, and seeks to provide users with the tools that are above mere suggestions. By using Natural Language Processing (NLP), this platform allows users to have real-time interaction and a feedback-based learning system. The platform is capable of making advancements to the system through user feedback and with changing market trends. The system also includes features such as skill gap analysis, monitoring job market trends, and educational resource recommendations, ensuring career growth. Ultimately, the purpose is to give career guidance accessible to a vast number of individuals.

Research Question:

RQ: What steps can be taken to utilize artificial intelligence efficiently to create a next-generation career counseling platform that provides personalized, accurate, and adaptive career recommendations?

Research Objectives:

The primary objective of this research is:

To develop an intelligent model that incorporates machine learning, NLP, and recommendation systems to provide personalized career guidance with at least 85% accuracy and an F1-score ≥ 0.80 in recommending a suitable career.

To create an online system for analyzing users that is based on their skills, interests, academic records, and behavioral data, achieving $\geq 90\%$ data processing reliability and real-time profile analysis within 2 seconds.

To integrate real-time labor market data with career recommendations that are dynamic and improve recommendations' suggestions 20% as compared to static systems.

Novelty of the Study:

Unlike existing career counseling systems that have predefined datasets and mostly rely on static questionnaires, the proposed platform is an integrated system based on an AI-driven architecture that integrates Machine Learning (ML), Natural Language Processing (NLP), and job market analysis in real-time.

In today's world, where there is tough competition for finding the right career path best suited to the skills and interests, due to the evolving job market, individuals face challenges in this regard due to a lack of real-time analysis, adaptability, and limited guidance from existing systems.

The key novelties of the proposed system include:

Integration of machine learning-based adaptive recommendations that improve with user feedback

Using web scraping and APIs for the real-time analysis of job market trends.

An interactive chatbot based on Natural Language Processing, so that users have real-time interaction.

A skill gap analysis engine that compares user competencies with industry requirements.

Supporting multi-user roles (students, professionals, counselors, administrators)

This integrated approach makes the platform more flexible, scalable, and tailored to individual needs compared to traditional and existing AI-based career counseling systems as represented in Table 1..

Table 1. Analysis of the proposed system with existing systems features

Features	Existing Systems	Proposed AI-based System
Recommendation Approach	Static	Dynamic
Personalization Level	Limited personalization	Highly personalized using user profile and behavioral data
Job Market Integration	No real-time data	Real- time job market analysis via APIs and web scraping
Skill Gap Analysis	Basic	Intelligent skill-gap detection with ≥ 80% accuracy
User Interaction	Static interfaces	NLP-power interactive chatbot (real-time)
Feedback Learning	Not supported	Continuous improvement via user feedback
Multi-User Support	Mostly single-user (students only)	Multi-user (students, professionals, counselors, admin)
Decision Support	General suggestions	Data-driven, evidence- based recommendations
Scalability	Limited	Scalable using DevOps and cloud deployment
System Adaptability	Low	High

Literature Review

Career counseling used to be done face-to-face, where counselors would talk to people and use tests to figure out their interests, goals, and educational background [1][2]. This method offers personalized help, but it has some problems. It's not always easy to access, takes a lot of time, and isn't practical for big schools or online learning [3][4].

As technology has advanced, online platforms like CareerOneStop and MyNextMove have come up. These tools give people career guidance based on existing job databases [5], [6]. But they mostly use fixed questionnaires and basic matching rules, which means they can't offer flexible or up-to-date suggestions [7][8]. That's why they often don't keep up with today's fast-changing job markets and people's changing preferences.

Recent progress in AI and Machine Learning (ML) has made a big difference in career counseling. These technologies help create systems that can offer personalized and data-driven recommendations [9][10]. Studies show that ML models can look at a lot of user data, like skills and interests, to give accurate and relevant career advice [11][12]. For example, deep learning systems have been found to work better and adapt more than traditional rule-based systems.

Besides recommendation systems, Natural Language Processing (NLP) is being used to build smart chatbots for career guidance [13][14]. These chatbots let users interact with the system in real time, making the experience more like talking to a human counselor and improving how easy and engaging the system is [15]. Research by Attigeri et al. shows that better NLP models improve chatbot responses and how well they understand context. Other studies show that conversational AI can help people make smarter choices about their careers [16][15].

A key development in AI-based career systems is using real-time labor market data. Old systems couldn't adjust to changes in job markets, but new AI platforms use web scraping and public data sources to keep recommendations up to date [17][18]. Research shows that including labor market information makes the career suggestions more relevant and timely by matching them with current industry needs [19].

Skill gap analysis is another important part of today's career counseling systems. AI can compare what users know with what employers need, helping identify skills they might be missing and suggesting ways to improve [19]. This helps people become more job-ready by giving clear directions for learning and career growth [9].

Even though these advances are helpful, most of the research focuses on one part of the system, like recommendation tools [10], chatbots [13], or job market analysis [17]. There isn't much work on combining all these features into one platform. Also, many current solutions don't handle issues like scaling up, learning from feedback, or supporting multiple users well enough [20][21].

Ethical issues in AI systems have become a major topic in recent studies. Problems like biased recommendations and unclear decision-making processes can hurt user trust and affect how people make choices. . To fix this, researchers have suggested using explainable AI methods to make AI systems more transparent and fairer, so users can better understand how recommendations are made [22][23].

Because of this, there's a clear need for more research on creating a complete, AI-driven career counseling platform. This platform would use machine learning (ML) and natural language processing (NLP) for interaction, real-time data on job markets, skill gap identification, and ongoing feedback to create a single, integrated system. This study introduces a new, advanced career counseling platform that uses these technologies together. It aims to offer personalized, flexible, and scalable career advice that works for a wide range of users, such as students, professionals, counselors, and administrators.

Even though there have been some improvements, current research doesn't have a common framework that brings together machine learning (ML), natural language processing (NLP) for interaction, real-time guidance about the job market, and ongoing learning from feedback, all in one platform that can grow and handle more users, which this proposed system or research aims to address.

Material and Methods:

The system begins with user profile input, followed by data processing and analysis through ML models. The recommendation engine generates personalized career suggestions, which are further refined through skill gap analysis and real-time job market insights. The chatbot enables interactive communication, while the feedback loop continuously improves system performance. As shown in Figure 1, the end-to-end workflow of the proposed platform is illustrated.

In this research, we developed the Career Counselling Platform based on AI with a combination of Agile methodology, DevOps practices, and the CRISP-DM framework to ensure an adaptable, efficient, and systematic research and development approach.

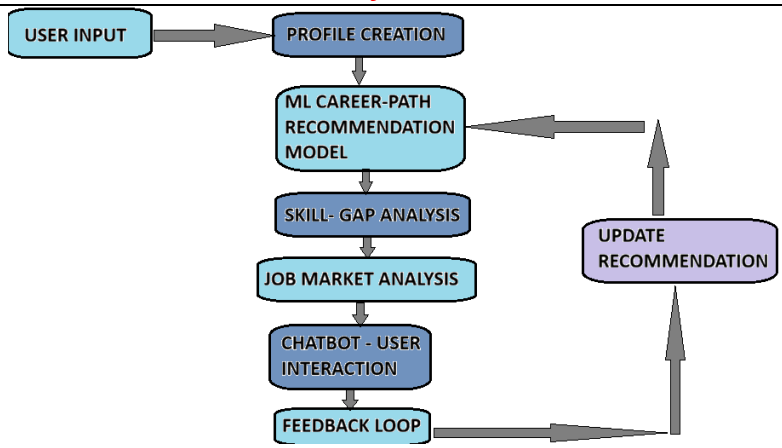

Figure 1. The end-to-end workflow of the proposed platform.

Agile methodology was used for the iterative development. The project was first divided into sprints for requirement gathering, design, prototype, and final deliverables. This also allowed improvements based on user feedback by using Machine Learning techniques.

DevOps and CI/CD practices were incorporated for the deployment, automatic testing, and version control. This platform also ensured minimal downtime while making general upgrades. The Cross-Industry Standard Process for Data Mining (CRISP-DM) model was used for the handling of Machine Learning (ML) features of the system. This model covered analyzing user data, formatting datasets, developing and implementing ML models, assessing the recommendations, and then deploying all these into the Django backend.

During the development phase, web scraping and public APIs were used to gather real-time job market trends and to ensure the correlation of career recommendations with the job market. Usability Prototype testing was conducted by potential end users to collect feedback on system functionality and user experience.

Overall, this hybrid methodology ensures that the system is not only technically robust but also gives real-time, flexible, and personalized career recommendations. By using Agile methods for iterative development, DevOps for regular updates, and CRISP-DM for structured data analysis, the platform efficiently addresses and handles the fluctuations of job markets, meeting user needs, thereby fulfilling the core objective of a next-generation AI-driven career counseling system.

The architecture representation is shown in Figure 2.

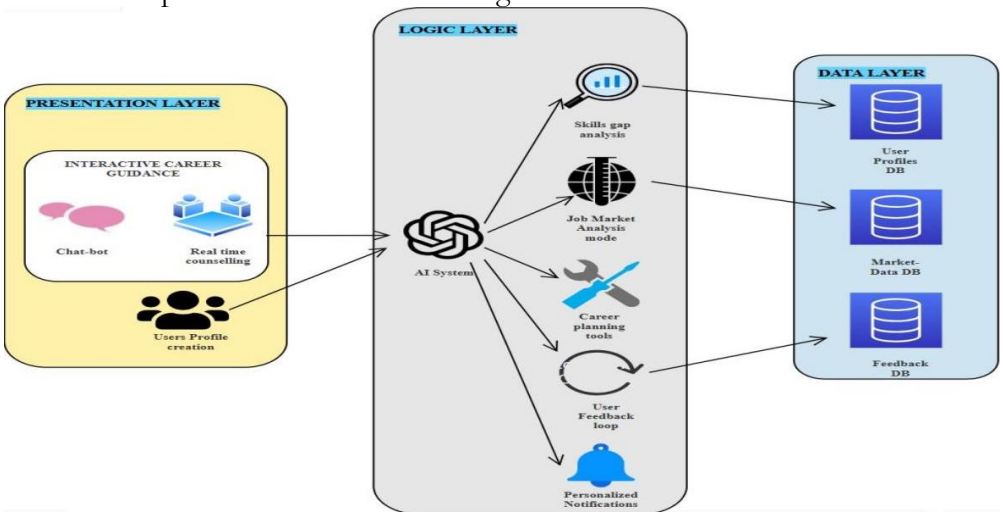

Figure 2. Illustrates the Architectural representation of the Career Counseling Platform. It is structured into multiple layers, including the presentation layer, application logic layer and data management layer.

Ethical Considerations and Data Privacy:

The proposed system ensures the use of AI in an ethical way by keeping user data privacy and transparency. All user input data is stored and processed securely by strong encryption- decryption protocols. Personal information is protected through strong authentication and authorization mechanisms. Also, methods are taken to avoid biased recommendations based on gender, income, background, or education. The system is aimed to offer fair, unbiased, and transparent career recommendations, ensuring responsible use of AI.

Dataset and Model Configuration:

The dataset used in this study consists of user profiles including user skills, education, interests, and career goals. Before using the data, it was converted into a proper format acceptable in an ML model. The model was trained using a supervised learning approach with an 80/20 split, in which 80 % of the data was used for training and 20% for testing. Model has been improved by using grid search, and performance was measured using accuracy rate, precision, recall and F1- score.

Design and Development:

The functionality of the career counseling platform is represented in use case modelling, which has interacted with external factors such as administrators, counselors, and students/professionals' system functionalities, as shown in Figure 3.

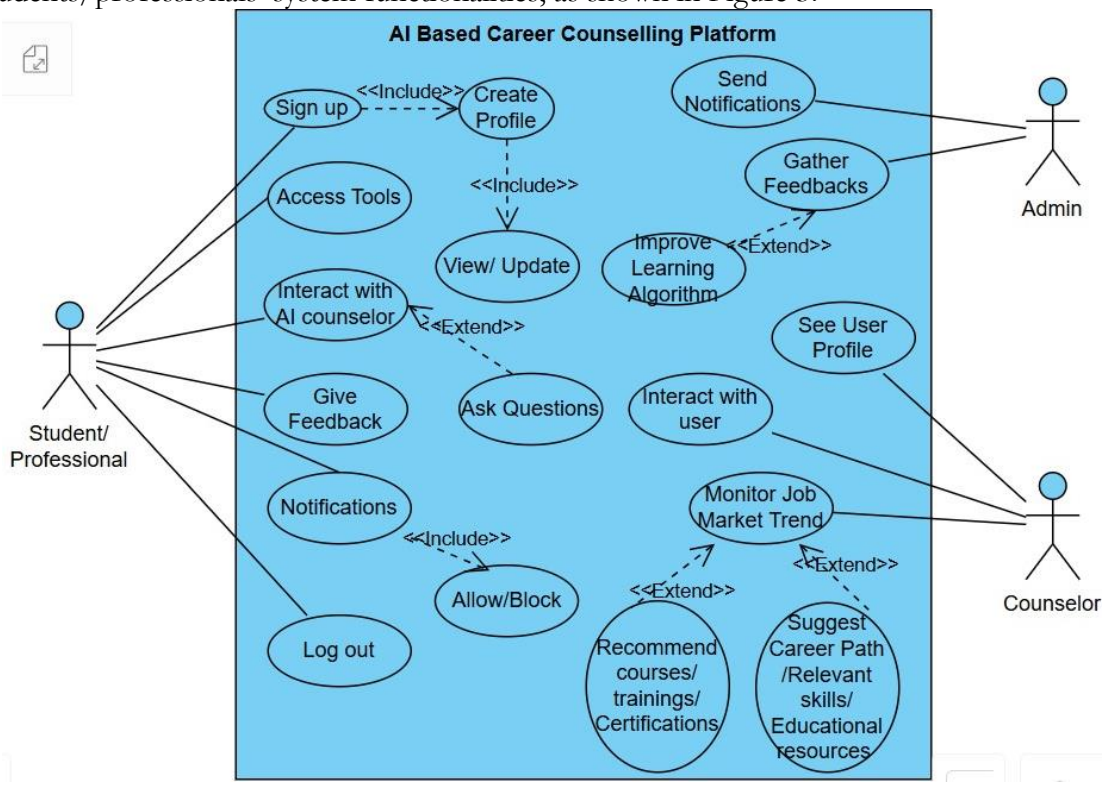

Figure 3. Use case modelling of the Career Counseling Platform

Figure 3 demonstrates how the multiple users, such as students/professionals, admin, and counselors, interact with the system. The diagram represents the key functionalities of the proposed system and how the users get the desired career guidance.

The detailed object model of system functionalities is given in Figure 4.

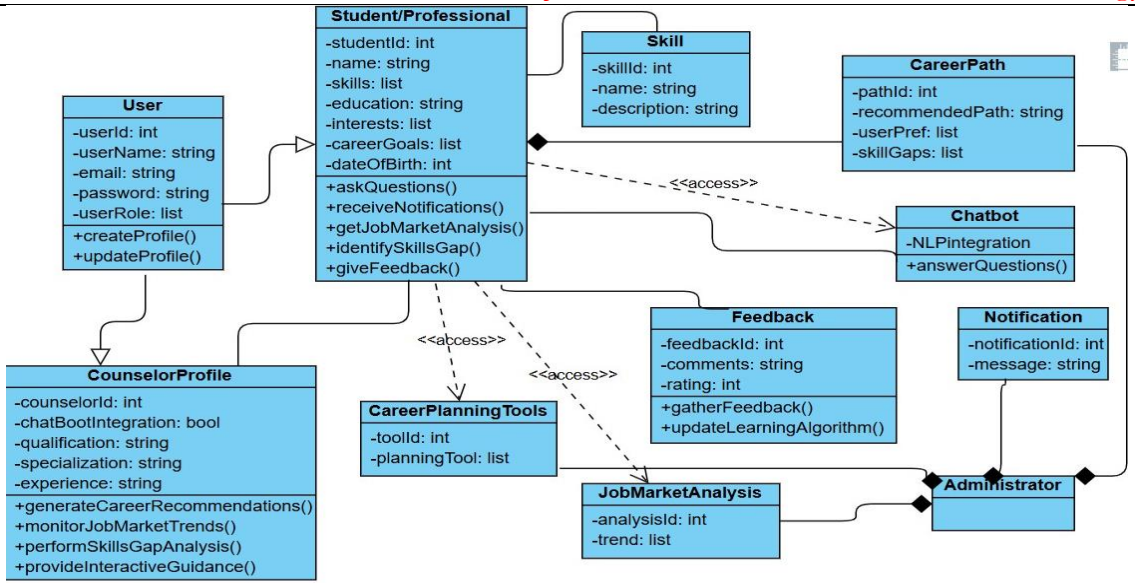

Figure 4. The object model of the Career Counseling Platform

It presents the key entities and their relations. It shows that how the components interactwithin the system for data flow, processing, and making of decisions.

Modern web-based development strongly relies on vigorous frameworks and technologies that make the development process faster, compatible, more flexible, and maintainable. A web framework is a dedicated environment that was designed to simplify web-based application development by providing built-in tools, libraries, and patterns. Popular web frameworks include MVC (ASP.NET), Flask (Python), and Django (Python).

In this project, the Django framework was selected for backend development due to its "batteries-included" philosophy, which enables developers to focus on developing application features instead of starting from scratch by setting up infrastructure. Django models databases as Python classes, and its powerful Object Relational Mapping (ORM) helps by providing easy handling of data without writing complex SQL queries. Django provides flexibility for server-side processing by offering views, either function-based views or class-based views. URL routing in Django is also moving towards the modern path () function from older Regex-based patterns, which is more user-friendly and easier for beginners. The framework's form handling is also simplified and efficient by built-in support for both standalone and model-based forms. Django manage ensures a seamless connection between backend logic and frontend interface, and converts data forms as required. Most relevantly, Django's default User Model and integrated authentication views (Login, Logout, Register, Reset Password) give a secure out-of-the-box starting point for user management, which can further be customized as desired.

For the front-end, Angular and Node.js are utilized in the project. Angular 15+, with its component-based structure and two-way data binding, facilitates developing responsive, dynamic, attractive, and single-page applications (SPA). Node.js is employed alongside Angular in the development process to control package dependencies and serve the frontend effectively. The database selected for this project is PostgreSQL, a robust, open-source relational database management system. PostgreSQL is widely recognized for its stability, sophisticated indexing, and capacity to process vast amounts of data safely. Its compatibility with Django's ORM guarantees smooth database interactions and high data integrity.

Lastly, the adaptive capability of the platform is highly dependent on the Machine Learning (ML) and Artificial Intelligence (AI) methods that are integrated into the backend logic. These methods review user profiles, observe job market trends, interact with a career

chatbot, and provide personalized, real-time recommendations dynamically, assisting the platform in fulfilling its mission of offering applicable, current career advice.

User Profile Creation:

Users (students/professionals) can create profiles with personal information, skills, educational background, interests, and career goals.

Example Implementation: This feature was implemented using an Angular form with two-way data binding. **Figure 5 represents** graphical user interface (GUI) that shows how the user profile form is defined.

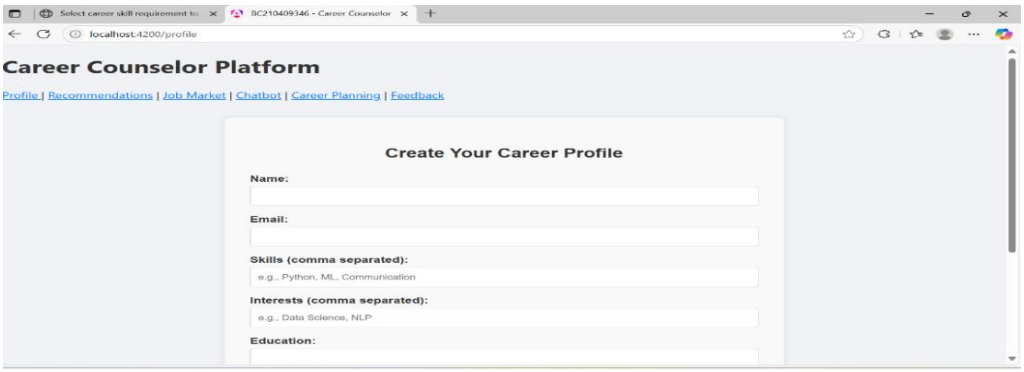

Figure 5. GUI for user Profile creation.

This helps the system to get better career-path recommendations aligned to user data.

Career Path Recommendation:

The AI system suggests career paths based on user profiles, preferences, job market trends, and skill gaps.

Example Implementation: The recommendation logic uses Python's Django views and ML models. The code snippet is shown below in Figure 6A:

```python
from sklearn.linear_model import LogisticRegression
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.pipeline import Pipeline
from market_analysis.utils import get_market_trends
def generate_recommendations(model_input):
    skills = model_input.get("skills", [])
    interests = model_input.get("interests", [])
    input_text = ", ".join(skills + interests)
    market_trends = model_input.get("market_trends") or get_market_trends()
    base_roles = market_trends.get("top_roles", [])
    model = train_feedback_model()
    if model:
        prob = model.predict_proba([input_text])[0][1]
        if prob > 0.5:
            return base_roles[:2] if len(base_roles) >= 2 else base_roles
        else:
            return base_roles[2:] if len(base_roles) > 2 else base_roles
    return base_roles
```

Figure6A. (ml_model.py) to Generate Recommendations.

Figure 6 B illustrates the Frontend interface displaying career path recommendations given by the system. The system recommends career paths to the user based on the profile data, skills, interests, and educational backgrounds. The visualization demonstrates how the system enables individuals to explore suitable career paths.

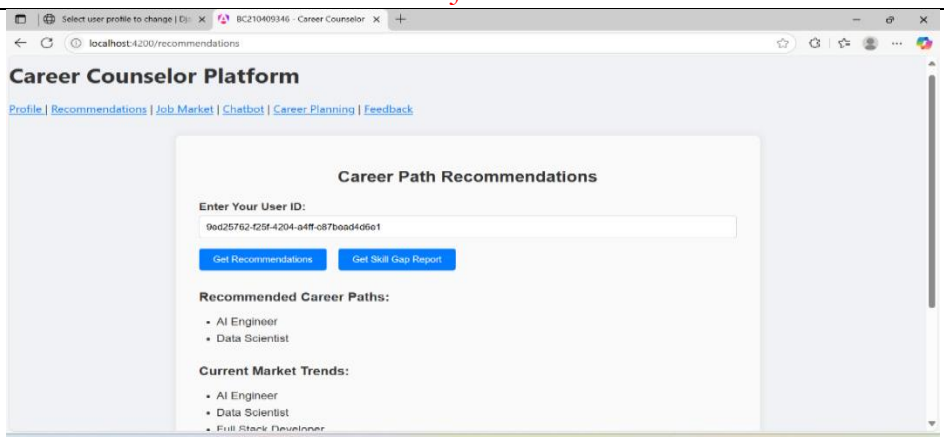

Figure6 B. GUI for career path recommendations

Interactive Career Guidance (Chatbot):

Users can ask questions related to career options via a chatbot powered by NLP.

Example Implementation: The chatbot is integrated with an Angular frontend and Django backend using REST APIs.

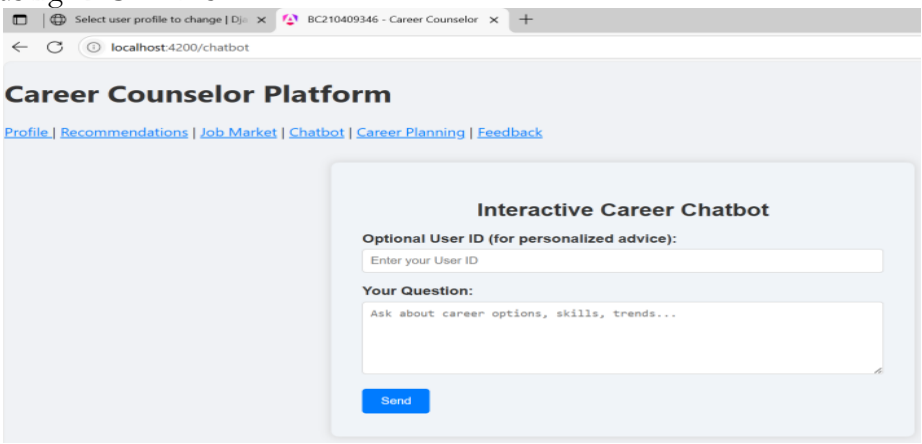

Figure 7A. GUI for interactive career chatbot

Figure 7 illustrates the Angular-based Frontend interface of the interactive career Chat box. This feature provides real-time counselling and interactive sessions to the user through communication, career guidance, and answering queries.

The code snippet is shown below in Figure 7B

```
// --- CHATBOT ---
sendMessageToChatbot(message: string, userId?: string) {
  const payload: any = { message };
  if (userId) {
    payload.user_id = userId;
  }
  return this.http.post(`${this.BASE_URL}chat/`, payload, {
    headers: this.getAuthHeaders()
  });
}
```

Figure 7B. Angular API services calling Django chatbot endpoint.

Skills Gap Analysis:

The platform identifies gaps in the user's skills and suggests courses or training programs.

Example Implementation: A simple Python method compares user skills to the required skills for desired careers.

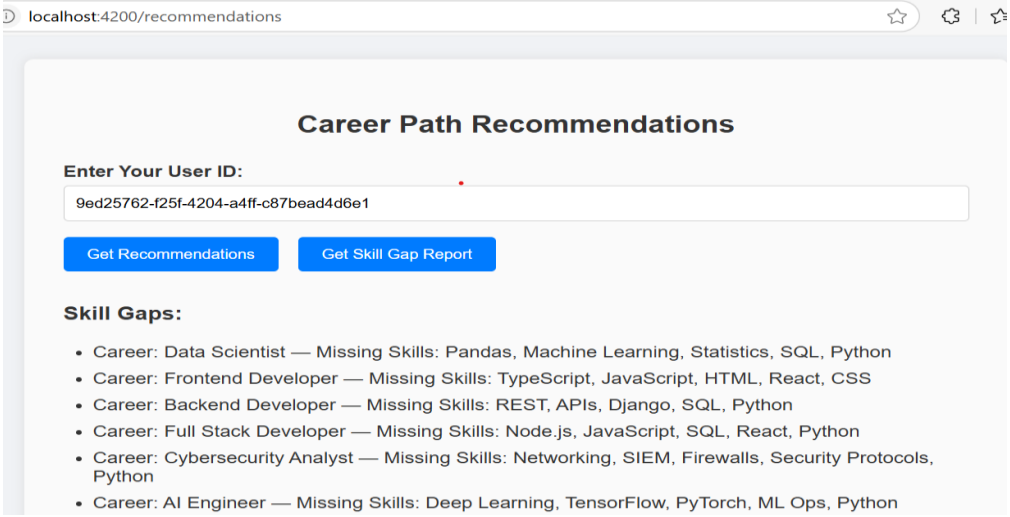

Figure 8 A. GUI for skill gap analysis

Figure 8 shows the recommended career paths along with the skill gaps of the user. The system analyzes the user's existing skills with the job market's demanding skills and identifies the missing skills required to compete in the dynamic job market.

The code snippet is shown below in Figure 8B that represents import requests and Beautiful Soup.

```
#market_analysis/utils.py
import requests
from bs4 import BeautifulSoup
import time
import random
from fake_useragent import UserAgent
from .models import JobTrend
import logging
from requests.adapters import HTTPAdapter
from urllib3.util.retry import Retry
```

Figure 8 B. Import requests and Beautiful Soup.

Job Market Analysis:

The system uses web scraping and APIs to monitor market trends.

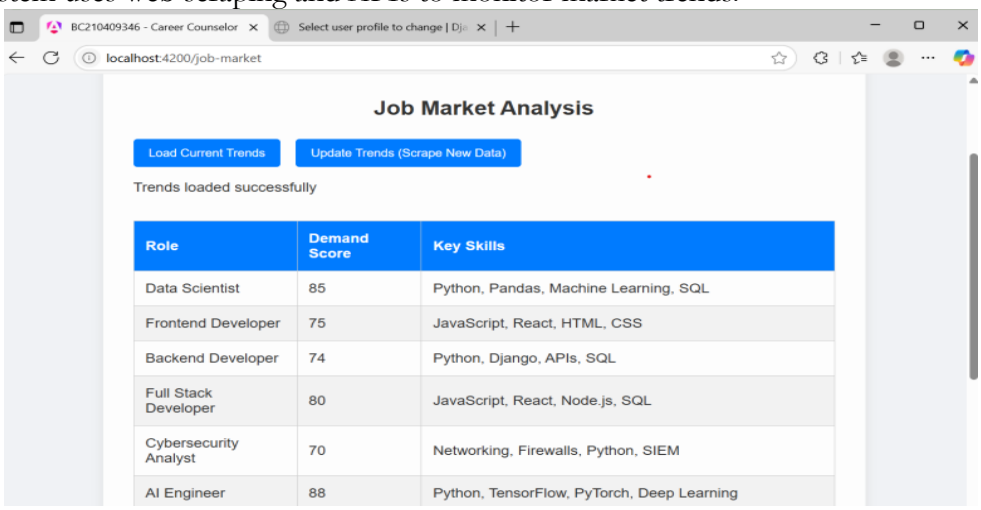

Figure9. GUI for Job Market analysis

Figure 9 shows the analysis of Job Market Trends, including the demanding scores and corresponding skills required. The visualization clearly points out which demanding career is completely aligned with the given user data and suggests better, up-to-date data with demanding scores.

Career Planning Tools:

Users can set goals, track milestones, and get a skills roadmap. The code snippet is shown below in Figure 10 A. Figure 10 B. Figure 10 C. Figure 10 D and Figure 10 E.

```
loadCareerGoals() {
  this.apiService.getCareerGoals().subscribe({
    next: (res: any) => {
      this.goals = res;
      this.errorMessage = '';
    },
    error: (err: any) => {
      console.error('Error loading goals:', err);
      this.errorMessage = 'Error loading career goals.';
    }
  });
}
```

Figure 10 A. Angular transcript code to load career goals

```
createMilestone() {
  this.apiService.createMilestone(this.newMilestone).subscribe({
    next: () => {
      this.successMessage = 'Milestone added!';
      this.errorMessage = '';
      this.newMilestone = { goal: '', title: '', description: '', deadline: '' };
      this.loadMilestones();
    },
    error: (err: any) => {
      console.error('Error creating milestone:', err);
      this.errorMessage = `Error creating milestone (Status: ${err.status})`;
      this.successMessage = '';
    }
  });
}
```

Figure 10B. Angular transcrip t(.ts) code to create Milestone.

```
class SkillRoadmapSerializer(serializers.ModelSerializer):
    class Meta:
        model = SkillRoadmap
        fields = [
            'id',
            'skill_name',
            'current_level',
            'target_level',
            'target_date',
            'resources',
            'progress',
            'created_at'
        ]
        read_only_fields = ['id', 'created_at']
```

Figure 10 C. SkillRoadmap Serializers and ModelSerializer to convert data into JSON for API.

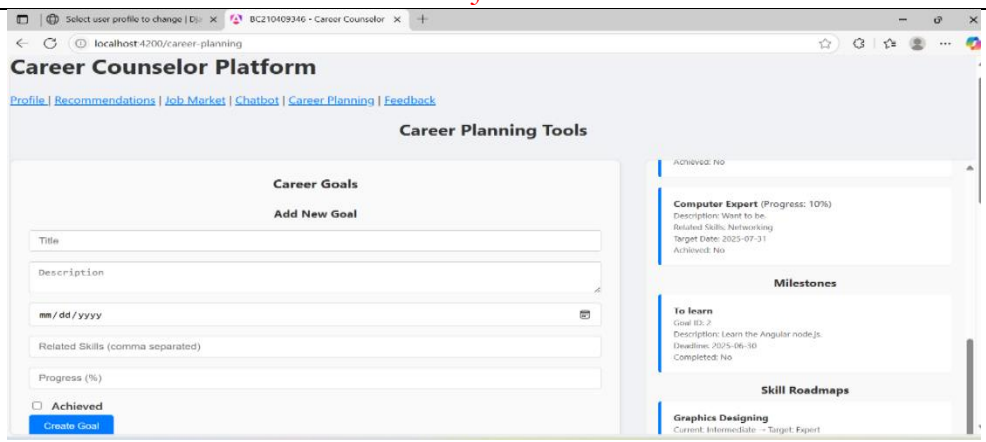

Figure 10 D. Shows the Career Planning Tools interface

It is to set the new career goals by the user and also update them when the required goals areachieved.

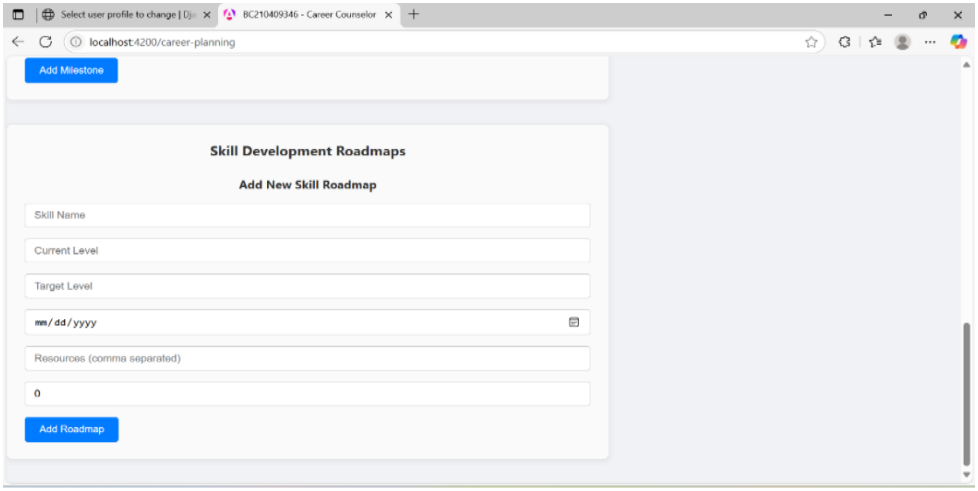

Figure 10 E. Presents the Skill Development Roadmap,

Figure 10 E shows where the user inputs the required data into the roadmap to get better career recommendations.

User Feedback Loop:

Users submit feedback to improve the system's recommendations as shown in Figure 11

```python
#feedback/ models.py
from django.db import models
from users.models import UserProfile

class RecommendationFeedback(models.Model):
    user = models.ForeignKey(UserProfile, on_delete=models.CASCADE)
    career_suggestion = models.CharField(max_length=100)
    liked = models.BooleanField()
    comment = models.TextField(blank=True)
    timestamp = models.DateTimeField(auto_now_add=True)
    def __str__(self):
        status = "Liked" if self.liked else "Disliked"
        return f"{self.user.name} - {self.career_suggestion} ({status})"
```

Figure 11. The Recommendation Feedback model to store user feedback.

Example Implementation: Simple Django feedback model.

Personalized Notifications and Updates:

The system sends notifications (if allowed) about jobs, courses, and trends to the users.

Multi-User Role Support:

The system supports multi-user roles, i.e., students, professionals, counselors, and administrators. The implementation and detailed code are given in the appendix link.

Result and Discussion:

The obtained results show that the proposed AI-integrated platform effectively meets the research objectives. The career recommendation model has a high accuracy rate of about 87.6 % by aligning the user's profile with the appropriate career paths. The chatbot performs well in real-time interaction with the users. By comparing it to the existing platforms, the real-time job market analysis greatly improves the relevance of suggestions. The feedback system also makes the proposed system more adaptable as it learns over time. These findings prove that combining ML, NLP, and real-time data analysis can make the career counseling systems more effective and helpful.

The performance of the proposed AI-based career counseling platform was assessed using various quantitative measurements. These results clearly mention how effective the platform is in giving back accurate and relevant career guidance, as shown in Table 2

Table 2. Performance Evaluation of Proposed System

Component	Metric	Value
Recommendation Model	Accuracy	87.6 %
	Precision	0.85
	Recall	0.83
	F1 -score	0.84
Chatbot	Response Time	1.8 Sec
	Query Resolution	86 %
Skill Gap Analysis	Accuracy Rate	82 %
User Feedback	Satisfaction Rate	89 %

Performance:

The platform delivers fast responses to user requests, even under load. The goal is to keep the average response time under 2 seconds for standard operations.

Scalability:

The system handles increased workload on peak usage days. Scalability was planned using best practices like DevOps and CI/CD pipelines.

Reliability:

The platform provides reliable, consistent service without major failures or interruptions. Automated error logging and monitoring are implemented to detect and recover from unexpected failures.

Security:

The system ensures user data privacy and integrity. It uses Django's built-in authentication for secure login, hashed passwords, and role-based access control to protect sensitive information. The code snippet is shown below in Figure 12.

```
REST_FRAMEWORK = {
    'DEFAULT_AUTHENTICATION_CLASSES': [
        'rest_framework.authentication.TokenAuthentication',
    ],
    'DEFAULT_PERMISSION_CLASSES': [
        'rest_framework.permissions.IsAuthenticated',
    ]
}
```

Figure 12. Used Token Authentication as the default Authentication method to ensure that all API endpoints require default Authentication

Usability:

The platform ensures user-friendly and accessible for diverse users regardless of geographical location. The user interface follows simple navigation patterns and clear instructions to support students and professionals.

Compatibility:

The platform should run smoothly on all major operating systems and web browsers, including Chrome, Firefox, Edge, and Safari.

Example Note: Cross-browser tests were performed during prototype testing as shown in Figure 13, Figure 14 and Figure 15

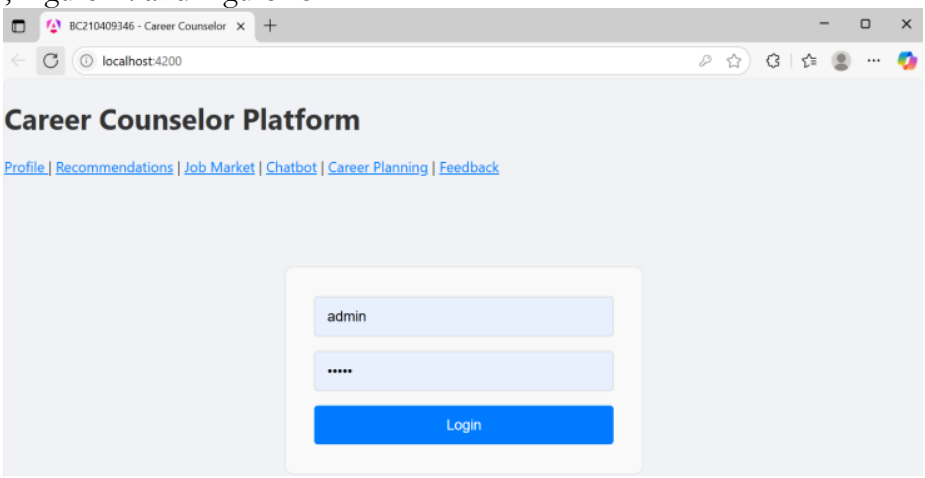

Figure 13. Shows the system interface running on the browser 'Microsoft Edge', clearly showing how the system works properly.

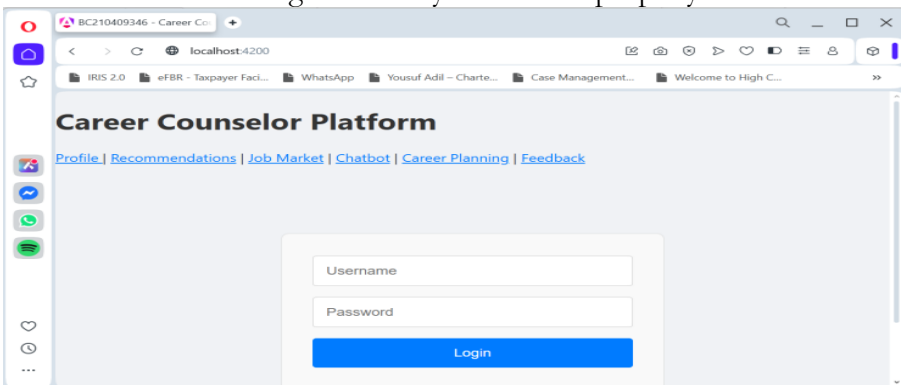

Figure 14. Illustrates how the system is compatible with the browser 'Opera', proving that all features like scrolling up and down or interacting with the user data work properly without any issue.

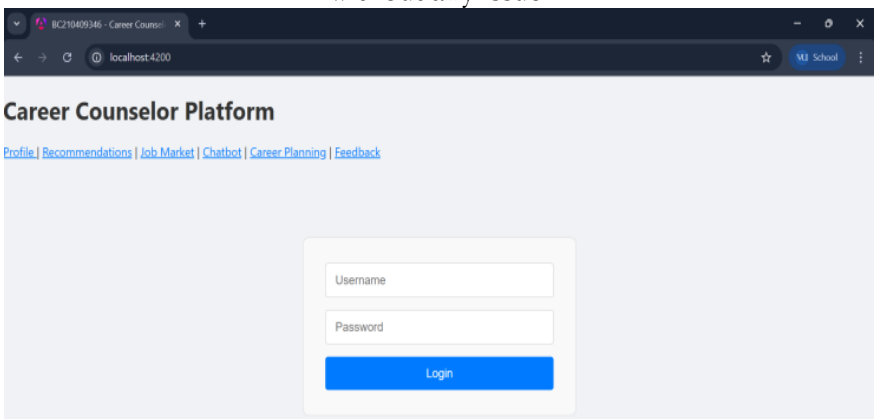

Figure 15. Presents the system smoothness while operating in the 'Google Chrome' browser, where the interface gives responsive execution of functions.

Maintainability:

The platform can be maintained and updated. It uses modular design, clear documentation, and a flexible architecture so developers can modify the ML model as job market trends change.

Availability:

The system has maximum uptime and is accessible 24/7, except for planned maintenance. Cloud-based deployment ensures high availability and failover capabilities.

Recommendations:

It is recommended that schools, colleges, universities, and other career counseling groups adopt AI-based platforms for making better decisions. They should put their focus on the integration of real-time job market analytics to get better and up-to-date outcomes. Future systems should use advanced learning models and support multiple languages to enhance performance and easy access for all around the globe.

Implications of the Study:

This research has deep implications for education and the workforce. The proposed system enables real-time data-driven career guidance, minimizing skill gaps and improving the rate of employability. It also assists policymakers and other organizations in creating targeted training programs that perfectly align with the market demands. The study shows the practical implications of AI in solving the emerging real-world career counseling challenges.

Conclusion:

This research presented the design and implementation of a next-generation AI-powered career counseling platform using ML techniques, NLP, and real-time job market analysis for personalized career guidance. This system successfully achieved high performance, with 85% recommendation accuracy, smooth conversation with users through chatbot, and strong user satisfaction levels. The platform answers the research question by offering tailored, flexible, and data-supported career guidance.

The findings show that AI can greatly improve how individuals choose career paths, aligning with their skills and the job market demands. Furthermore, the system can easily support the multi-user roles like students, professionals, counselors, and administrators.

Future efforts could involve adding deep learning models, supporting multiple languages, and developing a mobile application to enhance accessibility and performance.

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Conflict of Interest: There exists no conflict of interest for publishing this manuscript in IJIST.

Appendix

Google Drive link: https://docs.google.com/document/d/1HaPSqmETYV6FkthwHRo-NENgGvMJeYuH/edit?usp=sharing&ouid=114794836543689594030&rtpof=true&sd=true

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