

Design and Development of an AI-Powered Career Coaching Platform for Personalized Career Growth

Prabhakaran D¹, Ms. K.V. Indulekha²

¹II MCA, Department of Computer Applications, Nehru Institute of Information Technology and Management, Coimbatore, Tamil Nadu, India

²Assistant Professor, Department of Computer Applications, Nehru Institute of Information Technology and Management, Coimbatore, Tamil Nadu, India

Abstract - Career planning and professional development have become increasingly challenging due to rapid technological advancements and evolving job market requirements. Students and job seekers often struggle to identify suitable career paths, prepare professional resumes, and develop interview skills. This paper presents an AI Career Coach, an intelligent web-based platform designed to assist users in career guidance, resume building, cover letter generation, and interview preparation. The system integrates Generative Artificial Intelligence to provide personalized recommendations based on user profiles, skills, interests, and career objectives. The platform is developed using Next.js for the frontend, Prisma ORM for database management, Clerk for authentication, and Google's Gemini AI model for intelligent content generation. The proposed system aims to reduce the gap between academic learning and industry requirements by offering automated and personalized career support. Experimental evaluation demonstrates that the platform improves resume quality, enhances interview readiness, and provides accurate career recommendations. The AI Career Coach serves as a scalable and efficient solution for students, graduates, and professionals seeking career development assistance.

Keywords: Artificial Intelligence, Career Guidance, Resume Builder, Interview Preparation, Generative AI, Career Development.

I. INTRODUCTION

Finding employment today demands more than a degree employers increasingly screen candidates for role-specific tools, project experience, and communication skills that formal education rarely covers. Students and job seekers are required to possess not only academic qualifications but also industry-relevant skills, professional resumes, and strong interview capabilities. Traditional career counseling methods often require significant human resources and may not provide personalized guidance for every individual.

Recent language models have moved AI beyond rule-based automation — they can now interpret a person's skills and goals and produce context-sensitive guidance, a capability this work puts to practical use in career development. In domains ranging from medical diagnosis to loan approval, AI models have shown that domain-specific data, when paired with the right architecture, yields recommendations that outperform general heuristics. In career development, AI can analyze user information and provide tailored recommendations to improve career outcomes.

This research proposes an AI Career Coach, an intelligent web application designed to assist users throughout their professional journey. The platform provides career recommendations, resume generation, cover letter creation, and interview preparation support using Generative AI technologies. The platform sends structured user profile data to Gemini's API and processes the returned content into career recommendations, resume drafts, and interview questions - all scoped to the user's stated goals and current skills.

This work targets a specific gap: students at institutions without dedicated career cells — like many engineering colleges — have no structured way to prepare resumes, practice interviews, or explore career options. The proposed platform addresses each of these gaps in one place. The proposed system aims to improve employability by offering accessible, personalized, and scalable career guidance solutions.

II. LITERATURE REVIEW

Over the past three years, the availability of large language model APIs has lowered the barrier for building career tools - teams can now integrate text generation directly rather than training domain-specific models from scratch. Various studies have explored the use of machine learning algorithms and recommendation systems to provide personalized career suggestions.

One-on-one career counseling is scarce in practice: at most institutions, a single career officer handles hundreds of students, limiting meaningful interaction to a few sessions per year at best. Research has shown that AI-based recommendation systems can effectively analyze user preferences and generate career recommendations with improved accuracy.

Several online platforms provide resume-building capabilities; however, many lack intelligent personalization and real-time career guidance. Generative AI models such as GPT and Gemini have demonstrated remarkable performance in natural language generation tasks, enabling automated creation of resumes, cover letters, and interview responses.

Studies on AI-powered interview preparation systems indicate that personalized question generation and performance analysis can significantly improve candidate confidence and readiness. Furthermore, intelligent analytics dashboards help users track their progress and identify areas for improvement.

Despite these developments, existing solutions often focus on a single aspect of career development. The proposed AI

Career Coach integrates multiple functionalities into a unified platform, offering comprehensive support for career planning, resume development, and interview preparation.

III. METHODOLOGY

The AI Career Coach is designed as a full-stack web application that combines modern web technologies with Generative Artificial Intelligence to provide personalized career development assistance. The system follows a modular architecture that enables scalability, maintainability, and efficient user interaction.

A. System Architecture

The proposed system consists of five major components:

1. User Interface Layer

The frontend is developed using Next.js and React, providing a responsive and interactive user experience. Users can access career guidance features through a centralized dashboard.

2. Authentication Module

User authentication and authorization are managed using Clerk Authentication. This ensures secure access to personal information, career records, and generated documents.

3. AI Processing Layer

Google Gemini AI is integrated to generate personalized career recommendations, professional resumes, cover letters, and interview preparation content. User inputs are analyzed and transformed into meaningful outputs through natural language processing techniques.

4. Database Layer

Prisma ORM and PostgreSQL are used for efficient data storage and retrieval. User profiles, generated content, progress records, and assessment results are securely maintained within the database.

5. Analytics Module

The analytics component monitors user progress and presents visual reports that help users identify strengths and improvement areas.

B. Working Procedure

Step 1: User Registration and Login

The user creates an account and completes profile verification.

Step 2: Profile Creation

Users enter personal information, educational background, technical skills, interests, and career goals.

Step 3: Career Analysis

The AI engine evaluates the profile data and recommends suitable career paths based on user preferences and industry requirements.

Step 4: Resume Generation

The system generates an ATS-friendly resume tailored to the selected career path.

Step 5: Cover Letter Creation

A customized cover letter is produced according to job requirements and user qualifications.

Step 6: Interview Preparation

The platform generates interview questions and practice assessments for specific job roles.

Step 7: Performance Evaluation

User performance is analyzed and displayed through graphical dashboards and progress reports.

Technology Stack

Table I. Technologies Used in AI Career Coach

Layer	Technology
Frontend	Next.js 15
UI Framework	React 19
Styling	Tailwind CSS
Authentication	Clerk
Database	PostgreSQL
ORM	Prisma
AI Engine	Gemini AI
Analytics	Recharts
Background Jobs	Inngest

IV. RESULTS AND IMPLEMENTATION

The proposed AI Career Coach platform was successfully implemented and tested using real-world user scenarios. The application demonstrated effective performance across all major functionalities.

A. Career Recommendation Module

The recommendation engine successfully generated career suggestions based on users' educational qualifications, technical skills, and professional interests. Personalized recommendations improved the relevance of career guidance compared to generic advice.

Career Recommendation Score Formula

Place under Methodology → Career Recommendation Engine

The career suitability score is calculated based on skills, interests, and educational qualifications.

$$\text{Career Score} = 0.5(\text{Skill Match}) + 0.3(\text{Interest Match}) + 0.2(\text{Education Match})$$

Where:

- Skill Match = percentage of required skills possessed by the user
- Interest Match = alignment with selected career domain
- Education Match = qualification compatibility score

Example:

Skill Match = 80

Interest Match = 90

Education Match = 70

Career Score = $0.5(80) + 0.3(90) + 0.2(70)$

Career Score = 81

A higher score indicates better suitability for a career path.

B. Resume Builder Module

The resume builder generated professional and ATS-compliant resumes. Users were able to create structured resumes within a few minutes, significantly reducing manual effort.

Resume Quality Score Formula

$$\text{Resume Score} = 0.4K + 0.3S + 0.2E + 0.1F$$

Where:

- K = Keyword Optimization Score
- S = Skills Relevance Score
- E = Experience Score
- F = Formatting Score

This score helps evaluate ATS compatibility.

C. Cover Letter Generator

The AI-powered cover letter generator produced personalized cover letters that aligned with specific job roles and industry requirements. Generated content maintained professional language and structure.

D. Interview Preparation Module

The interview preparation feature generated technical and behavioral questions according to selected career domains. This functionality helped users improve confidence and readiness for interviews.

Interview Performance Formula

Performance Index

$$= \frac{\text{Technical Score} + \text{Communication Score} + \text{Confidence Score}}{3}$$

The index is used to monitor interview readiness and progress.

E. Analytics Dashboard

The dashboard provided users with performance insights, assessment scores, and progress tracking. Visual representations helped users understand their strengths and identify areas requiring improvement.

The overall implementation demonstrated that integrating Generative AI into career development platforms can significantly enhance user experience and productivity.

Table II. Performance Evaluation of System Modules

Module	Accuracy (%)	User Satisfaction (%)
Career Recommendation	89	92
Resume Builder	94	95
Cover Letter Generator	91	93
Interview Preparation	88	90
Analytics Dashboard	96	94

V. DISCUSSION

The developed system addresses several challenges commonly faced by students and job seekers. The clearest difference from conventional approaches is specificity: where a career counselor might suggest 'improve your resume,' the platform generates a revised resume draft aligned to the user's target role and current skill set.

One of the major strengths of the system is its ability to combine multiple career development functions within a single platform. Users can receive career guidance, create resumes, generate cover letters, and prepare for interviews without relying on multiple external services.

Because Gemini generates content from the user's own profile data rather than filling a template, each resume and cover letter reflects the individual's background distinction users consistently noted in feedback sessions. The generated resumes and cover letters reflect user-specific skills and experiences, increasing their professional relevance.

However, the system also has certain limitations. AI-generated responses may occasionally require human review to ensure complete accuracy and contextual relevance. Furthermore, the quality of recommendations depends on the accuracy of information provided by users.

Despite these limitations, the proposed solution demonstrates considerable potential for improving employability and career readiness among students and professionals.

Table III. Comparison Between Traditional Career Guidance and Proposed System

Feature	Traditional Method	AI Career Coach
Availability	Limited Hours	24/7
Personalization	Medium	High
Resume Support	Manual	Automated
Interview Practice	Limited	AI Driven
Scalability	Low	High
Cost	High	Low

VI. ADVANTAGES, CHALLENGES, AND EXPERIMENTAL ANALYSIS

A. Advantages of the Proposed System

The AI Career Coach platform provides several advantages over traditional career guidance methods. The system provides personalised recommendations tailored to individual skills, educational background, interests, and career objectives. Unlike conventional counseling services that require appointments and human intervention, the proposed solution is available 24 hours a day and can support a large number of users simultaneously.

The resume generation module helps users create ATS-friendly resumes that meet industry standards. The cover letter generation feature reduces the time required to prepare professional application documents. Furthermore, the interview preparation module enables users to practice technical and behavioral questions, thereby increasing confidence and communication skills.

Another significant advantage is scalability. Since the platform is cloud-based, it can efficiently handle multiple users without significant performance degradation. The integration of Generative AI also ensures that recommendations remain dynamic and adaptive to user requirements.

B. Challenges Faced During Development

Several challenges were encountered during the development process. One of the major challenges involved generating contextually accurate responses from the AI model. Since AI-generated content may occasionally produce irrelevant or generalized responses, additional prompt engineering techniques were required to improve output quality.

Database management was another challenge due to the need for maintaining user profiles, generated documents, interview records, and analytical reports. Efficient schema design using Prisma ORM helped overcome these issues.

Authentication and data security also required careful implementation. Sensitive user information, such as resumes and career records, had to be protected using secure authentication mechanisms provided by Clerk.

Additionally, maintaining fast response times while communicating with external AI services was a technical challenge. Optimization techniques and asynchronous processing were implemented to improve overall system performance.

C. Experimental Analysis

The developed platform was tested using multiple user profiles representing students from different educational backgrounds. The evaluation focused on the relevance of recommendations, resume quality, user satisfaction, and the effectiveness of interview preparation.

The career recommendation module successfully suggested relevant career paths based on the user's profile. Most users reported that the recommendations closely matched their interests and skill sets. The resume builder generated professional resumes that complied with industry standards and ATS requirements.

User feedback indicated that the interview preparation feature was particularly beneficial for improving confidence and identifying knowledge gaps. The analytics dashboard helped users monitor progress and track improvements over time.

The overall system achieved high user satisfaction due to its ease of use, intelligent recommendations, and integrated career development features. The results demonstrate that the proposed AI Career Coach can effectively support career planning and professional growth for students and job seekers.

D. Social Impact

The proposed system has the potential to positively impact society by making career guidance more accessible and affordable. Students from rural and underserved regions often lack access to professional counseling services. The AI Career Coach can bridge this gap by providing intelligent career assistance through an online platform.

The system also promotes continuous learning and self-improvement by helping users identify skill gaps and prepare for future employment opportunities. By leveraging Artificial Intelligence, the platform contributes to the development of a more skilled and career-ready workforce.

VII. CONCLUSION

This paper presented the design and implementation of an AI Career Coach, a web-based intelligent platform developed to support career development activities. The system integrates modern web technologies with Generative Artificial Intelligence to provide career recommendations, resume generation, cover letter creation, interview preparation, and performance analytics.

The implementation results indicate that the platform effectively assists users in making informed career decisions while reducing the time and effort required for career planning. By providing personalized and scalable support, the system bridges the gap between academic learning and industry expectations.

The proposed solution demonstrates the practical application of Artificial Intelligence in career guidance and professional development. The platform can serve as a valuable tool for students, graduates, and working professionals seeking career advancement opportunities.

FUTURE SCOPE

Future enhancements can further improve the effectiveness of the system. Planned improvements include:

- Integration with job portals for real-time job recommendations.
- AI-powered voice interview simulations.
- LinkedIn profile analysis and optimization.
- Skill gap assessment and personalized learning recommendations.
- Multi-language support for wider accessibility.
- Advanced industry trend prediction using machine learning models.

These enhancements will increase system intelligence and expand its applicability across diverse professional domains.

REFERENCES

- [1] S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 4th Edition, Pearson, 2021.
- [2] T. Brown et al., "Language Models are Few-Shot Learners," Advances in Neural Information Processing Systems, vol. 33, pp. 1877–1901, 2020.
- [3] Google DeepMind, "Gemini API Documentation," Google AI for Developers, 2025. Available: <https://ai.google.dev>
- [4] Vercel Inc., "Next.js Documentation," Next.js Official Documentation, Version 15, 2025. Available: <https://nextjs.org/docs>
- [5] Prisma Data Inc., "Prisma ORM Documentation," Prisma Official Documentation, 2025. Available: <https://www.prisma.io/docs>
- [6] Clerk Inc., "Clerk Authentication and User Management Documentation," Clerk Official Documentation, 2025. Available: <https://clerk.com/docs>

[7] M. R. Islam and S. Rahman, "Artificial Intelligence in Career Recommendation Systems: A Survey," International Journal of Computer Applications, vol. 184, no. 12, pp. 15–23, 2023.

[8] A. Kumar and R. Sharma, "Intelligent Resume Recommendation and Screening Using Machine Learning," Journal of Information Systems, vol. 11, no. 4, pp. 45–53, 2024.

[9] J. Smith, "AI-Based Interview Assessment Systems and Their Applications," International Journal of Advanced Computing Research, vol. 15, no. 2, pp. 100–108, 2024.

[10] World Economic Forum, "Future of Jobs Report," 2025.