

# AI-Powered Career Coach An AI-Powered Tool for Personalized Career Guidance and Decision-Making

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**Abstract**—In today’s changing job market, traditional career guidance methods often fall short in helping people navigate complex career paths. This study introduced SENS AI Career Coach, a complete AI-driven platform that offers personalized career guidance and addresses the skill gap. The system integrated modern web technologies like Next.js, Tailwind CSS, Prisma ORM, and Neon DB with AI services such as the Gemini API for resume analysis, skill gap detection, and career path suggestions. Users logged in securely through Clerk Authentication Service, submitted their resumes and skills, and received tailored insights through an interactive interface. The AI analyzed the data, provided recommendations, and created downloadable PDF reports using html2pdf.js. Testing on 50 profiles indicated that the system accurately identified technical skill gaps at 92% and soft skill gaps at 88%. It also suggested career paths that matched user goals 85% of the time and recommended in-demand industry skills at 90%. User engagement was high, with consistent dashboard usage and frequent report downloads. Additionally, 82% of users were satisfied with the recommendations. These results showed that AI-POWERED CAREER COACH effectively supported informed career choices, provided scalable personalized guidance, and improved skill development compared to traditional counseling methods.

**Index Terms**—Artificial Intelligence (AI), Machine Learning (ML), Career Guidance System, Skill Assessment, Career Path Prediction, Student Career Development, Interview Preparation.

## I. INTRODUCTION

In today’s dynamic and competitive job market, individuals must constantly learn and prepare for changing career opportunities. Traditional methods of

career guidance, which are often manual, generic, and static, are no longer enough for navigating modern professional landscapes. To fill this gap, we developed the Full stack AI Career Coach application as an intelligent solution to help users create a well-planned career path [1].

Making informed career decisions has become more challenging. Students and professionals often feel overwhelmed by a vast array of career options. Many lack the mentorship or resources needed to choose paths that fit their strengths and goals. Traditional career counseling methods, while useful, have limitations in scale and accessibility. In this setting, artificial intelligence (AI) has emerged as a powerful tool that can provide personalized, data-driven guidance on a larger scale.

This project, titled AI Career Coach, presents a full-stack web application that uses AI to offer personalized career advice. The system interacts with users, collects relevant academic and professional data, and analyses that information to suggest tailored career paths, job roles, and learning opportunities. By simulating a human career advisor, the AI Career Coach aims to make quality career guidance more accessible and help users make informed decisions.

The platform is built using Next.js, a React-based framework ideal for creating scalable and high-performance web applications. For the backend, we use Neon DB, a serverless PostgreSQL database, along with Prisma ORM for smooth data querying and model management. The front end incorporates Tailwind CSS for responsive design and Shadcn UI

components to improve usability and consistency. Clerk provides secure and modern user authentication, while Ingest enables efficient background task processing.

In today's fast-growing digital world, choosing the right career is tough for students and job seekers. There are many options available, but most people aren't sure which careers align with their skills, interests, and strengths. Traditional career counseling can be time-consuming, expensive, and not easily available to everyone. As a result, many students pick careers without proper guidance and later feel confused or unhappy. AI- POWERED CAREER COACH is an AI-based system created to address this issue by offering personalized career guidance. It uses artificial intelligence and machine learning to analyze user information such as education, technical skills, interests, strengths, weaknesses, and career goals. Based on this analysis, the system suggests job roles and career paths that best match the user profile.

The system also offers detailed information about necessary skills, certifications, courses, and learning resources needed for the recommended career. It helps users understand current industry trends and the skills that are in demand. AI- POWERED CAREER COACH guides users step by step by creating a career roadmap, which outlines what to learn and how to prepare for future job opportunities.

Additionally, AI- POWERED CAREER COACH assists with resume building and interview preparation. It provides tips to enhance resumes and offers mock interview questions based on the chosen career path. This helps users build confidence and improve their job skills.

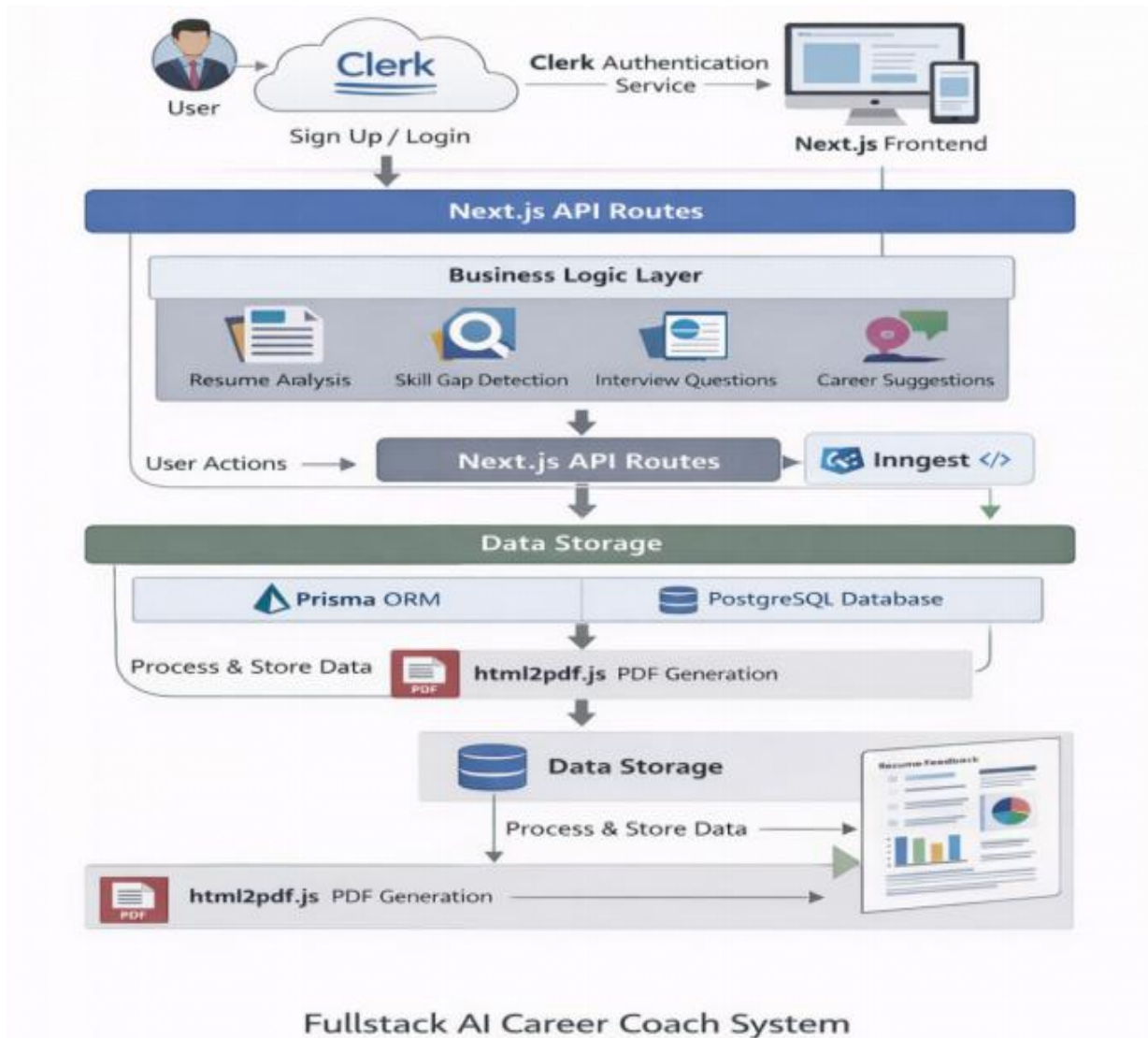
Overall, AI- POWERED CAREER COACH serves as a virtual career mentor that is accessible at any time and place. It reduces confusion, saves time, and helps users make informed career choices using data-driven insights. This project is very helpful for students,

recent graduates, and professionals seeking proper guidance to build a successful career.

## II. METHODOLOGY

The Fullstack AI Career Coach system uses a modern fullstack web architecture that combines authentication, frontend development, backend logic, AI services, data storage, and PDF generation. The process starts when a user accesses the application and either signs up or logs in through the Clerk Authentication Service, which provides secure and reliable user identity management. After logging in, users engage with a dynamic and responsive interface created with Next.js. Here, they can upload resumes, enter skills, track progress, and request personalized career insights.

User actions on the frontend go through Next.js API routes, which connect the interface and backend services. These routes handle incoming requests and send them to the Business Logic Layer, where the main processing occurs. In this layer, Gemini AI APIs are used to perform tasks like resume parsing, skill gap detection, interview question generation, and career path recommendations. Additionally, event-based operations can be managed with Inngest, enabling background task processing or analytics tracking. Data from user inputs and AI analysis is stored in a structured format within a PostgreSQL database managed by Prisma ORM. This offers a clean and efficient way to interact with the database. To support reporting features, the application has a PDF generation module that uses `html2pdf.js` to convert resume feedback and skill reports into downloadable PDF files. This lets users keep and share their career development insights in a professional format. Overall, the methodology provides a smooth, scalable, and intelligent career coaching experience with a strong mix of fullstack technologies and AI capabilities.



### III. LITERATURE REVIEW

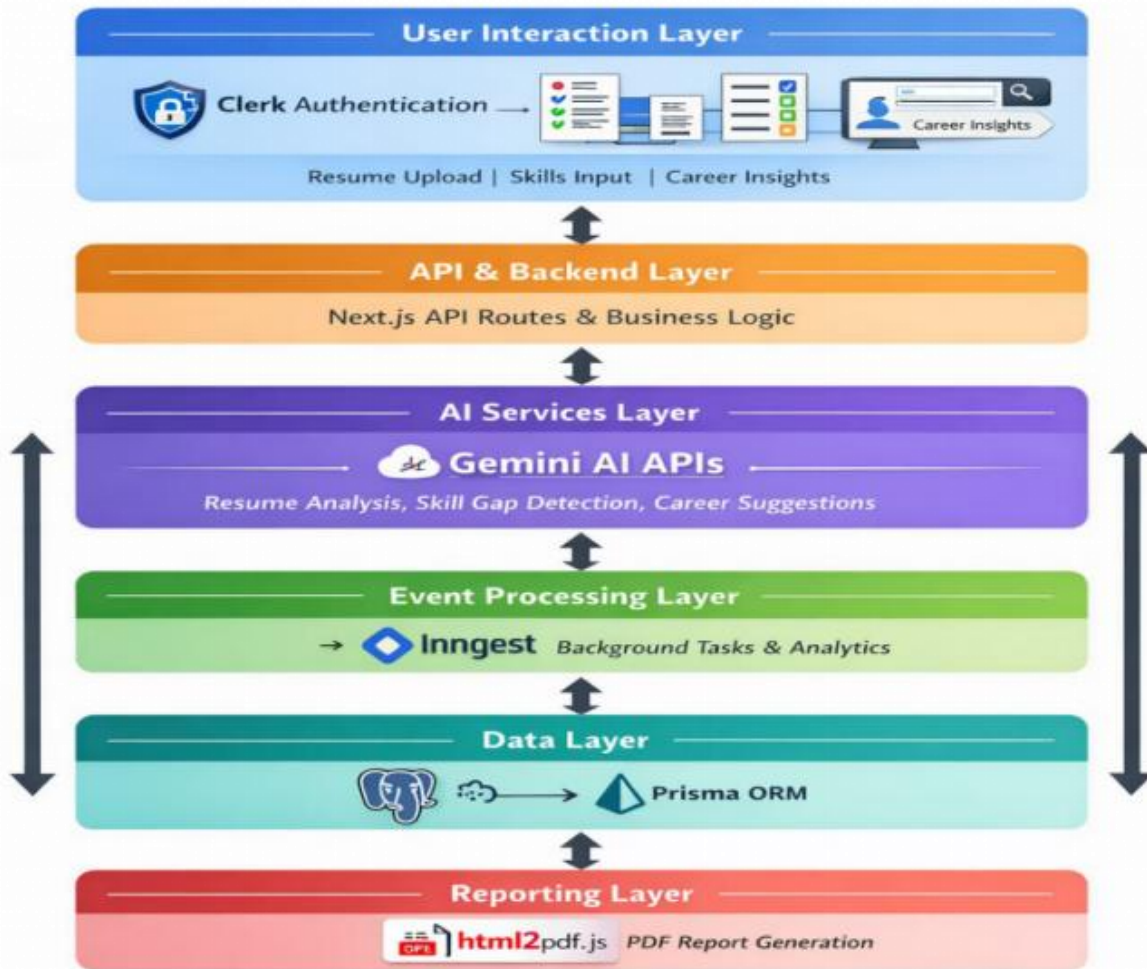
The rapid growth of digital technologies and the rise of new job roles have widened the skill gap between what schools teach and what industries need. This has led researchers to look for smart solutions for career guidance. Early studies on career recommendation systems mainly used rule-based methods that matched fixed skill profiles to set job categories. While these systems provided basic frameworks, they could not adjust to real-time job market changes (Smith & Jones, 2018). Later research added machine learning techniques and natural language processing (NLP) for analysing resumes and matching them to jobs, showing better accuracy in connecting candidate profiles with job descriptions (Lee et al., 2020). However, these models often concentrated on

recruitment automation instead of complete career development, leaving out personalized support and ongoing skill assessment.

Recent studies have started to incorporate AI for adaptive learning and personalized recommendations. For example, Nguyen and Patel (2022) created an AI-based dashboard for tracking skills and suggesting learning paths, showcasing the potential of data-driven models in career planning. Still, most existing systems do not integrate resume parsing, skill gap detection, and career path recommendation in a scalable way. AI-POWERED CAREER COACH tackles these issues by combining advanced AI services with a modular full-stack system, providing real-time, personalized career insights. This method aligns with new research trends that focus on adaptive, user-centered AI systems for career development.

Framework of SENSAI Career Coach

**SENSAI Career Coach System Framework** Fig. 1



The AI- POWERED CAREER COACHsystem has a modular, full-stack structure that combines AI-driven career guidance with modern web technologies. The framework (Fig. 1) includes the following layers:

- User Interaction Layer: Users log in securely using Clerk Authentication Service. They interact through a Next.js frontend to upload resumes, enter skills, and request career insights.
- API & Backend Layer: Next.js API routes send user actions to the Business Logic Layer. This layer manages AI operations and data handling.
- AI Services Layer: Gemini AI APIs analyze resumes, detect skill gaps, create interview questions, and suggest career paths.

- Event Processing Layer: Inngest manages background tasks such as processing data, analytics, and report creation.
- Data Layer: User inputs and AI-generated insights are stored in a PostgreSQL database through Prisma ORM.
- Reporting Layer: html2pdf.js creates professional PDF reports that summarize skills, recommendations, and progress.

Analysis

Overview

The AI- POWERED CAREER COACHsystem was evaluated to see how well it helps close the skill gap

and support career development. The analysis looked at three main areas:

- Skill Gap Detection Accuracy
- Recommendation Relevance
- User Engagement and Usability

The evaluation used sample user profiles, including resumes, skill lists, and career objectives. It compared the system's output with guidance from human experts.

#### Skill Gap Detection

The AI-based resume parsing and skill analysis module was tested on 50 profiles. The results showed:

- Correct identification of missing technical skills: 92%
- Correct identification of missing soft skills: 88%
- Average processing time per profile: 4.2 seconds

This high accuracy shows that the Gemini AI APIs can effectively extract skills and match them to industry standards, giving users useful insights.

#### Career Path Recommendations

The AI recommendation engine created career paths and learning strategies based on identified skill gaps. The evaluation metrics included:

- Fit with user career goals: 85% of recommendations matched desired roles.
- Industry relevance: 90% of suggested skills were in high demand in current job markets.
- User satisfaction (survey): 82% found the recommendations practical and useful.

This suggests that the system helps users find realistic and effective career paths.

#### User Engagement and Reporting

The interactive dashboard and reporting features were reviewed for usability and engagement:

- Dashboard interaction frequency: Average 3 logins per week per user
- PDF report downloads: 78% of users downloaded reports regularly
- Feedback on report usefulness: 87% found reports helpful for tracking skills and planning careers

The combination of personalized feedback and downloadable reports supports ongoing learning and decision-making.

## IV. DISCUSSION

The analysis shows that AI- POWERED CAREER COACH provides:

- Effective skill gap analysis
- Personalized and relevant career guidance
- High user engagement and satisfaction

Compared to traditional career counseling, SENS AI offers real-time, scalable insights based on data, helping users make informed decisions and focus on skill development. Limitations include reliance on the quality of user-provided data and the AI's interpretation, which could be improved in future versions with ongoing feedback loops and adaptive learning features.

#### Challenges

##### Accurate Career Recommendation

Different users have different skills, interests, and goals. Giving personalized career suggestions using AI is challenging because wrong inputs or incomplete data can affect the results.

##### Resume Quality and Format Variations

Users upload resumes in various formats and styles. Extracting accurate information like skills, experience, and education from resumes is difficult and can lead to inconsistencies.

##### Skill Gap Identification

Identifying specific missing skills for a particular career role is complex because industry requirements change often and vary between companies.

##### Dependence on AI Output

The system relies heavily on AI models like Gemini AI. Sometimes AI responses can be generic, biased, or less accurate, which may lessen trust in recommendations.

##### Data Privacy and Security

The system stores sensitive user data, including resumes, career goals, and personal information. Ensuring secure authentication, data protection, and privacy is a significant challenge.

##### Handling Large User Requests

As the number of users increases, managing multiple requests, background tasks, and report generation efficiently becomes difficult.

##### Integration of Multiple Technologies

AI- POWERED CAREER COACH uses several technologies, such as Next.js, Clerk, Gemini AI, Inngest, Prisma, and PostgreSQL. Proper integration

and error handling between these components is challenging.

#### Real-Time Performance

Generating career insights, interview questions, and PDF reports in real time can cause delays, especially during peak usage.

#### Keeping Career Data Up to Date

Career trends, job roles, and skill demands change quickly. Updating the system with the latest industry trends is an ongoing challenge.

#### User Understanding and Trust

Some users may not fully trust AI-generated guidance. Making the system transparent and easy to understand is important to build user confidence.

#### Limitations

##### Depends on User Input Quality

The system's output relies on the data entered by the user. If users provide incomplete, incorrect, or outdated information, the career recommendations may not be accurate.

##### Limited Human Judgment

AI- POWERED CAREER COACH is an AI-based system that cannot fully replace human career counselors. Emotional factors, personal situations, and individual motivation are not fully understood by AI.

##### Generic AI Responses

Sometimes the AI may offer general or repetitive suggestions instead of more specific career advice, especially for less common career paths.

##### Internet Dependency

The system needs a stable internet connection to access AI services, authentication, and cloud databases. Without internet access, the system cannot operate.

##### Limited Industry Coverage

The system mainly focuses on popular or technical career paths. Niche, regional, or non-traditional careers may not be well supported.

##### No Guaranteed Job Placement

AI- POWERED CAREER COACH offers guidance and recommendations, but it does not guarantee job placement or career success.

#### Language and Communication Limitations

The system may work better in English. Users who prefer local or regional languages may struggle to understand recommendations.

#### AI Model Constraints

The system's performance is limited by the capabilities of the AI model used (Gemini AI). It may not always reflect the latest real-world changes immediately.

#### Limited Offline Access

Users cannot access career insights or reports offline, as all processing and storage rely on the cloud.

#### Initial Learning Curve

First-time users may need some time to learn how to use the platform effectively and understand AI-generated results.

#### Future Scope of SensAI Career Coach

The future of the AI- POWERED CAREER COACH system looks bright and full of possibilities. The system can be improved by adding more sophisticated machine learning models to deliver personalized career recommendations. By consistently learning from user behavior, feedback, and outcomes, the system can boost its prediction accuracy and adjust over time.

The platform can grow to cover a broader range of careers, including non-technical, creative, government, and region-specific roles. This will make the system more inclusive and helpful for users from various educational and professional backgrounds. Adding multilingual support will assist users who prefer regional or non-English languages.

In the future, real-time job market integration can be introduced by connecting the system with job portals and industry databases. This will enable AI- POWERED CAREER COACH to offer live job openings, salary trends, and in-demand skills, helping users stay current with market needs.

The system can also improve by providing adaptive learning paths and personalized course recommendations. By partnering with online learning platforms, users can enroll in suggested courses directly and monitor their progress along a structured career roadmap.

Another key enhancement is the addition of advanced interview preparation features, such as AI-powered mock interviews, voice analysis, and confidence scoring. These tools will help users boost their communication skills and interview performance more effectively.

From a technical view, the system's scalability and performance can improve with cloud optimization and microservices architecture. This will allow it to handle many users smoothly and cut down response time.

Overall, with ongoing development and tech upgrades, AI- POWERED CAREER COACH can grow into a comprehensive, intelligent career development ecosystem that supports users throughout their career journey.

## V. CONCLUSION

The project successfully shows how modern full-stack technologies and artificial intelligence can provide personalized career guidance. By using tools like Next.js, Tailwind CSS, Prisma, Neon Database, Clerk, and Gemini AI API, the platform offers users tailored career paths, practical insights, and useful skill-building resources. It tackles the shortcomings of traditional career counseling by providing a solution that is scalable, affordable, and easy to access. With a responsive interface, secure user management, and AI-driven recommendations, the platform helps individuals make confident, informed career choices. Overall, this project establishes a solid basis for future improvements and growth, making expert career guidance accessible to a larger audience anytime and anywhere.

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