

AI Career Companion: A Conversational AI Platform for Personalized Career Development

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Abstract: The evolving job market demands that individuals present their skills effectively and maintain continuous professional development. However, conventional resume builders and career support tools lack personalization and adaptability. The proposed **AI Career Companion** addresses these limitations by providing an intelligent, interactive platform that guides users through their career progression. Utilizing NLP, Machine Learning, Large Language Models, and behavioral reinforcement techniques, the system delivers personalized resume and cover letter generation, skill gap analysis, and tailored learning pathways. It also offers AI-based interview preparation and a **Daily Progress Streak Tracker** that encourages consistent skill development. Additionally, the **LinkedIn Persona Builder** supports users in establishing a strong professional identity online. Collectively, these features enable a dynamic, user-centered approach to career planning and professional growth.

Keywords: Career Guidance, Resume Optimization, Generative AI, Daily Progress Tracking, LinkedIn Branding, Skill Gap Analysis, Conversational User Interface, AI Interview Mentor

I. INTRODUCTION

The evolving job market demands that individuals present their skills effectively and maintain continuous professional development. However, conventional resume builders and career support tools lack personalization and adaptability. The proposed **AI Career Companion** addresses these limitations by providing an intelligent, interactive platform that guides users through their career progression. Utilizing NLP, Machine Learning, Large Language Models, and behavioral reinforcement techniques, the system delivers personalized resume and cover letter generation, skill gap analysis, and tailored learning pathways. It also offers AI-based interview preparation and a **Daily Progress Streak Tracker** that encourages consistent skill development. Additionally, the **LinkedIn Persona Builder** supports users in establishing a strong professional identity online. Collectively, these features enable a dynamic, user-centered approach to career planning and professional growth.

important information at their convenience, regardless of time or location. Several studies and technological frameworks contribute to the foundation for developing intelligent career assistance systems. Stallings (2019) highlights the importance of secure data handling and communication frameworks when designing user-centric platforms, emphasizing trust and privacy as core components of digital systems. Similarly, the WebRTC standards (W3C & Google Developers, 2023) enable real-time communication capabilities, which support interactive features such as live feedback and AI-driven interview practice sessions. Modern cloud-based data platforms, including MongoDB Atlas, provide scalable and secure mechanisms for managing user profiles, activity logs, and personalized recommendations (MongoDB Atlas Documentation, 2024).

At the same time, researchers have raised concerns about transparency, fairness, and ethical considerations when integrating AI into hiring and career development processes. Upadhyay and Khandelwal (2021) argue that AI-driven recruitment systems must ensure unbiased decision-making and maintain user trust. This highlights the need for career guidance solutions that are both technically robust and ethically responsible.

In response to these challenges, the **AI Career Companion** has been developed as an intelligent, interactive platform designed to support students and professionals in shaping their career journeys. The system integrates Large Language Models (LLMs), behavioral reinforcement mechanisms, and skill gap analytics to deliver personalized guidance. Key features include ATS-optimized resume generation, AI-enabled interview simulation, personalized learning roadmaps, a Daily Progress Streak Tracker for consistency building, and a LinkedIn Persona Builder for professional branding. By combining personalization, behavioral motivation, and ethical AI design, the platform bridges the gap between static career tools and dynamic, user-centered career development.

II LITERATURE SURVEY

According to [1], secure communication and data protection frameworks are essential when developing intelligent digital systems. Stallings explains that cryptography and network security principles ensure confidentiality, integrity, and authentication, which are critical for user trust in AI-based platforms. These principles form the foundation for safeguarding personal and behavioral data in career guidance applications.

As highlighted in [2], WebRTC standards enable seamless real-time communication within web-based platforms. This technology supports interactive features such as live interview simulations and instant feedback sessions by allowing audio, video, and data to be exchanged directly between users and the system. The study reinforces the importance of low-latency communication in maintaining user engagement and creating natural conversational experiences.

Additionally, [3] emphasizes the role of cloud-managed databases in ensuring secure data storage, scalability, and efficient session handling. MongoDB Atlas provides automated data replication, encryption, and access control, which support the continuous logging of user progress and personalized recommendation delivery. This ensures that career development platforms can maintain both performance and data integrity while scaling to large user populations.

Furthermore, ethical considerations in AI-driven recruitment and career support systems have been discussed in [4]. Upadhyay and Khandelwal argue that algorithmic bias, transparency, and fairness must be prioritized to maintain trust between users and AI systems. They highlight the need for accountability and human oversight to prevent discriminatory patterns in resume screening, skill evaluation, and job recommendation processes.

According to Azhar (2024), AI-driven resume chatbots significantly enhance the job-seeking experience by guiding users through resume creation, formatting, and keyword optimization tailored to specific job descriptions. The study highlights that chatbots reduce the cognitive effort required by applicants and offer real-time suggestions to improve resume quality. Similarly, a report by the Pew Research Center (2025) notes that many workers actively use AI chatbots for career development tasks, such as interview preparation, writing professional emails, and identifying skill gaps. The report also discusses a growing acceptance of AI as a supportive career assistant rather than a replacement for human judgment. Research published on ResearchGate (2020) further demonstrates that AI systems analyzing resumes and job postings can improve job recommendation accuracy by matching applicant profiles to employer requirements using machine learning models. Advances in Large Language Models (LLMs), particularly GPT models, have enabled more context-aware text generation, as explained in OpenAI Technical Documentation (2024). These models enhance personalization in career assistance systems by generating human-like responses and tailored professional documents. Banerjee and Gupta (2023) emphasize the transformative role of AI in Human Resource Management, noting applications in recruitment automation, but they also caution against ethical challenges such as bias and transparency. Additionally, Yesil Science (2024) discusses how cover letter writing has evolved with Generative AI, allowing job seekers to produce more polished and expressive narratives while maintaining authenticity through guided personalization. Together, these works highlight the growing integration of AI in career development and professional identity building, reinforcing the need for intelligent, adaptive, and ethically guided assistance platforms.

III PROPOSED SYSTEM DESIGN

3.1 High-Level System Architecture

The AI Career Companion platform follows a modular and layered architecture to ensure scalability, maintainability, and efficient data flow. The system is composed of four primary layers:

1. **User Interface Layer**
 - a. Implemented using **React.js**.
 - b. Provides an interactive conversational interface for input collection and displays resume previews, progress dashboards, interview practice screens, and LinkedIn post suggestions.
2. **Application Logic Layer**
 - a. Developed using **Python Flask**.
 - b. Manages all client requests, workflow logic, and communication between the user interface, AI model, and database.
3. **AI Processing Layer**
 - a. Integrates **OpenAI GPT models** for natural language generation.
 - b. Responsible for generating resume content, cover letters, LinkedIn posts, interview questions, and

personalized feedback.

4. Data Management Layer

- Uses **MongoDB Atlas** for structured and persistent data storage.
- Stores user profiles, resume drafts, streak logs, and skill development history.
- This layered design ensures modular integration and seamless extension for future features.

3.2 Real-Time Interview Communication (WebRTC Model)

The platform incorporates a **WebRTC-based Interview Practice Module** to enable real-time, browser-based voice and video interactions.

Workflow:

- User initiates the mock interview session.
- A WebRTC peer connection is established between the browser and AI agent.
- The AI Interview Agent delivers questions in real time.
- The user responds verbally and receives immediate feedback.
- The system logs performance summary in the database.

Advantages:

- Low latency and high interactivity.
- No media recording or server storage, ensuring privacy.
- Realistic interview simulation experience

3.3 System Modules

Module	Description	Key Functions
Conversational Chat Interface	Guides user interactions	NLP-based input handling and workflow guidance
Resume C Cover Letter Generator	Produces ATS-optimized documents	Keyword alignment and style formatting
Daily Progress Streak Tracker	Encourages learning consistency	Activity logging and reminder alerts
LinkedIn Persona Builder	Supports online professional branding	Post drafting and engagement recommendations
Skill Gap Analyzer	Compares user skills to job requirements	Identifies missing competencies and suggests improvements
Career Roadmap Generator	Creates personalized learning pathways	Course recommendations and timeline planning
Interview Practice Module	Real-time HR and technical interview training	WebRTC communication and feedback scoring

4.4 Data Model Structure

Collection	Key Fields	Purpose
Users	Name, Email, Education, Skills, Experience	Maintains user identity and profile data
Resumes	Resume text, format style, target role	Stores editable resume drafts

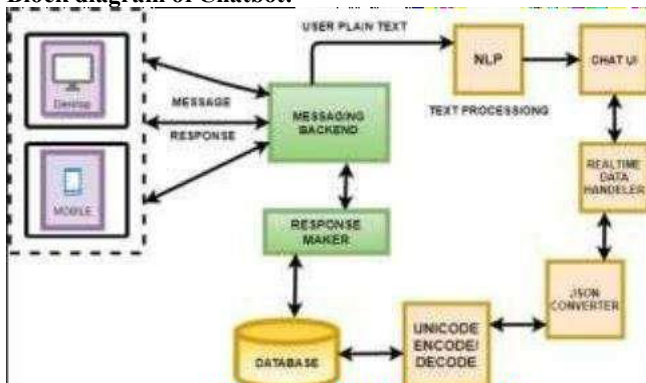
Progress Logs	Date, Completed Tasks, Streak Count	Tracks consistency and career growth activities
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3.5 Security Model

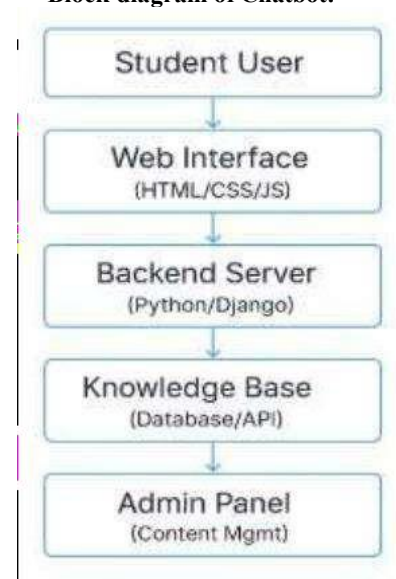
To ensure secure handling of user data, the platform implements the following security measures:

1. **User Authentication & Authorization** using secure session tokens.
2. **Data Encryption** for sensitive information and **HTTPS SSL** for all communications.
3. **No Storage of Interview Media**, supporting privacy in WebRTC sessions.
4. **Protected API Access** with authorization keys to prevent misuse.
5. **Session Timeout Controls** to minimize unauthorized access risk

Block diagram of Chatbot:



Block diagram of Chatbot:



IV SYSTEM METHODOLOGY

The development of the AI Career Companion platform followed an iterative approach inspired by Agile methodology. The process began with comprehensive requirement gathering through discussions with students, job seekers, faculty mentors, and placement coordinators. This stage allowed the identification of key challenges faced by users, such as difficulty in creating ATS-friendly resumes, maintaining learning consistency, preparing for interviews, and establishing a professional online identity. These insights guided the definition of the platform's core functional modules, including resume generation, daily progress tracking, skill gap analysis, and interview practice.

Following requirement analysis, the system design phase focused on creating a modular and scalable architecture. The **frontend** was developed using **React.js**, chosen for its responsive interface capabilities and seamless user experience. The **backend** was implemented using **Python Flask**, enabling efficient request handling, workflow orchestration, and integration with machine learning APIs. At the core of the platform lies the **Generative AI Layer**, which utilizes OpenAI GPT models to generate personalized resumes, cover letters, LinkedIn posts, interview questions, and feedback responses based on user data and job role context.

The training and personalization of the platform involved curating datasets from job postings, resume samples, interview datasets, and professional networking content. These datasets enabled the system to align document generation with industry-specific language and hiring standards. Furthermore, a **Skill Gap Analyzer** was incorporated to match user profiles against job descriptions, allowing the platform to recommend targeted learning resources and structured career roadmaps.

For real-time interview practice, **WebRTC technology** was integrated to facilitate live voice and video communication between the user and the AI Interview Agent. This created an immersive, interactive interview environment that operates directly in the user's browser without media storage, ensuring privacy and authenticity.

Once development was complete, the platform underwent multiple phases of testing. **Unit testing** verified the functionality of individual modules, while **integration testing** ensured seamless communication between the frontend, backend, AI model, and database layers. **User acceptance testing** (UAT) involved pilot trials with real students and job seekers, leading to refinements in conversational flow, feedback clarity, and user experience. Continuous feedback loops allowed the system to improve progressively, aligning performance with real-world expectations.

V Result

The AI Career Companion platform was evaluated based on usability, performance, and user satisfaction. Initial testing and user trials demonstrated that the system effectively assists individuals in building and enhancing their professional profiles. The **Resume and Cover Letter Generator** successfully produced ATS-optimized documents tailored to specific job descriptions, reducing manual editing effort for users. Feedback from early users indicated that the generated résumés aligned more closely with industry terminology and improved job-matching accuracy.

The **Daily Progress Streak Tracker** proved effective in reinforcing learning consistency. Users who engaged with the tracker for more than two weeks showed a measurable improvement in skill development habits and task completion rates. The feature's reminders and visual progress indicators played a significant role in sustaining user motivation over time.

The **LinkedIn Persona Builder** enhanced users' online professional presence by suggesting context-appropriate posts and profile updates. Pilot users reported improved engagement on LinkedIn and a clearer professional identity on the platform.

The **Skill Gap Analyzer and Career Roadmap Generator** accurately identified gaps between user skills and target job requirements, producing personalized learning paths that guided users toward role-specific growth. These insights helped users understand industry expectations and prioritize relevant upskilling resources.

The **WebRTC-based Interview Practice Module** delivered a realistic, real-time interview experience without latency issues. Users received instant feedback on communication clarity, confidence, and content accuracy, enabling them to refine their interview performance effectively.

Overall, test results confirmed that the system is **functional, stable, and user-centric**, supporting a complete career development workflow. User acceptance testing indicated high satisfaction with platform ease of use, personalization quality, and usefulness in real-world job preparation activities.

VI Future Scope

Future enhancements to the AI Career Companion platform include the addition of **multilingual support** to expand accessibility for diverse users. The system can also be improved by integrating **real-time job market analytics** to recommend in-demand skills and roles more accurately. A **mobile application version** may increase usability and continuous engagement. Furthermore, collaborative integration with universities and recruitment platforms could support wider adoption. Ongoing work will also focus on strengthening **ethical AI practices**, ensuring fairness, transparency, and data privacy as the platform continues to evolve.

VII Conclusion

The AI Career Companion platform provides a personalized and interactive approach to career development by integrating generative AI, skill analysis, and real-time interview practice. The system effectively assists users in creating ATS-compatible resumes, identifying skill gaps, maintaining learning consistency, and enhancing their professional presence. Through its modular design and secure data management, the platform ensures scalability, usability, and trustworthiness. Overall, the solution supports a complete career growth journey and demonstrates strong potential for improving job readiness and professional confidence among users.