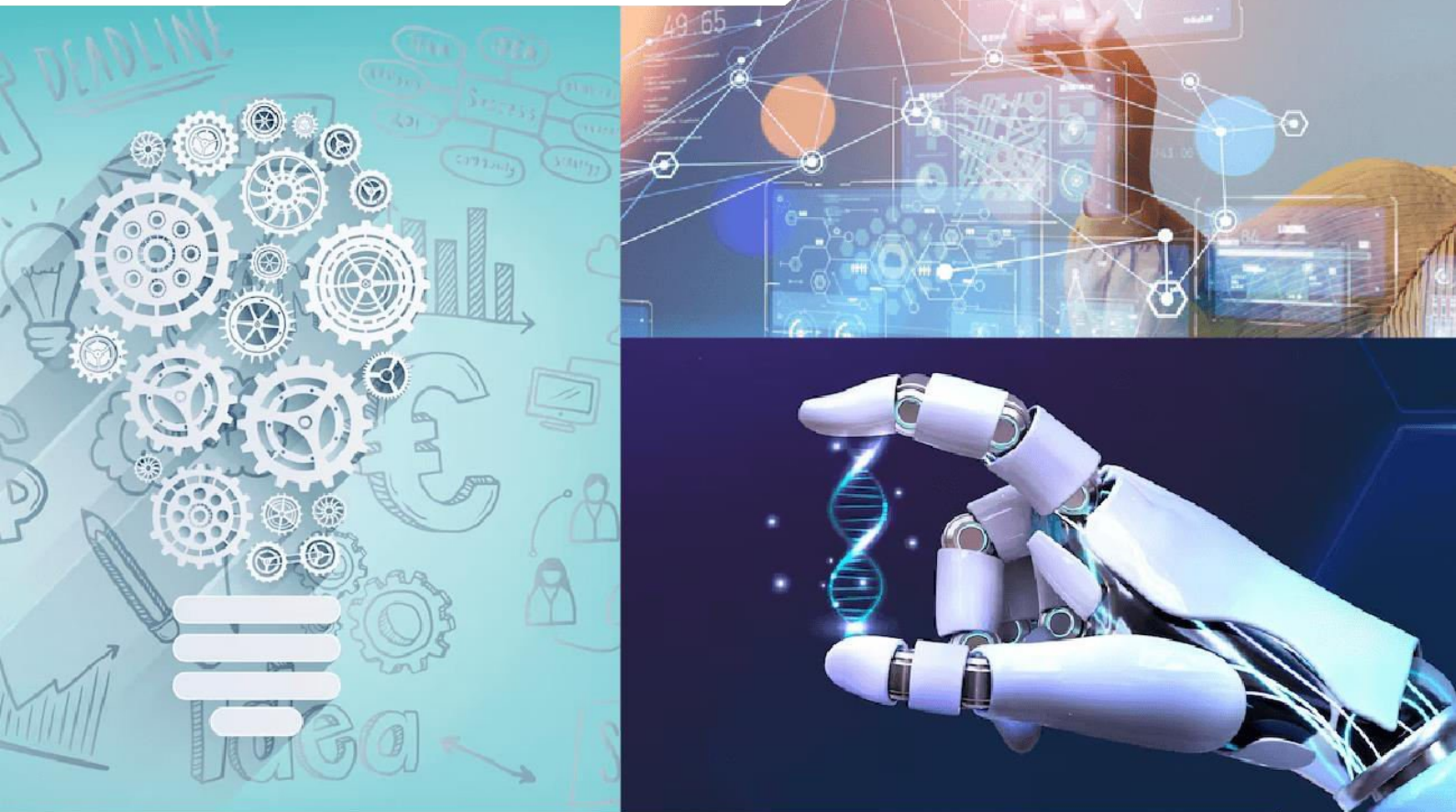




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CareerForge AI – An AI-Powered Career Assistant

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ABSTRACT: With an increasingly competitive job market, clear and personalized career guidance matters more than ever. When searching for new roles or transitioning careers, knowing how to present one's skills can be unclear—especially for recent graduates or those without access to professional counseling. Without proper feedback, job seekers often struggle to highlight their true potential. This paper presents CareerForge AI – an AI-Powered Career Assistant, a web-based decision-support system designed to assist job seekers in evaluating and optimizing their professional profiles in real time. A new tool reads written resumes and career goals by applying natural language understanding methods. Instead of just checking formatting, it weighs the relevance of skills and experiences to provide targeted suggestions. This helps tailor applications to specific job requirements. When critical gaps in a resume appear, preset checks jump in to highlight areas for improvement automatically. Dynamic interview preparation scenarios are also generated based on the user's target role, thanks to live integrations with Large Language Models. The setup uses modern web frameworks and a secure serverless architecture to keep things running smoothly at scale. Real-world tests show it provides constructive feedback reliably while fast-tracking resume refinement.

KEYWORDS: Artificial Intelligence, Natural Language Processing, Large Language Models, Generative AI, Career Development, Resume Optimization

I. INTRODUCTION

Now more people are entering the highly competitive job market, so needing clear career advice rises too. Securing a fulfilling role weighs heavy on those starting their professional journeys. Trouble starts because standard templates don't always fit individual skills or experiences. Spotting resume weaknesses early becomes tough without expert guidance. Knowing what to highlight matters most—project details, technical skills, leadership roles—all these hint at a candidate's true potential.

When professional career counselors are unavailable or too expensive, getting immediate advice isn't always possible. Because of this, job seekers often look up answers on the web first. Digital sources deliver fast replies, yet their tips tend to be broad, missing how specific skills might align with particular job descriptions.

Without clear direction, candidates either worry too much or send out unoptimized applications when first impressions matter most. Recent advancements in Artificial Intelligence (AI) and Natural Language Processing (NLP) have enabled the development of intelligent systems capable of analyzing textual inputs [9], [10].

In professional development applications, Large Language Models are increasingly used for text generation and content optimization [4], [9]. However, truly integrated AI systems that process free-text resumes to provide holistic career guidance remain limited.

This study introduces CareerForge AI—an AI-driven tool for career support, built as a web platform that judges the strength of a user's professional profile through natural language processing and generative AI. Using the Gemini API to analyze textual data, it provides targeted feedback on resumes, generates cover letters, and simulates interview questions. When critical missing skills or formatting errors appear, predefined rules step in to shift the user's attention toward improvement, adding a layer of trust and reliability.

II. LITERATURE REVIEW

The integration of Artificial Intelligence in text analysis has significantly advanced automated review, content generation, and decision-support systems. Numerous studies have explored machine learning techniques for resume

parsing and skill extraction [4], [9]. In human resources applications, AI-driven systems have demonstrated promising accuracy in analyzing textual descriptions to predict candidate suitability.

Traditional text processing approaches such as rule-based parsing and keyword matching have been widely applied in document analysis [4], [5]. Researchers have shown that extraction algorithms combined with linear classifiers provide baseline performance for sorting tasks [1], [4]. These models are particularly suitable for basic systems where speed is critical.

Recent advancements in deep learning, including transformer-based language models like BERT and modern Large Language Models (LLMs), have further improved contextual understanding of professional text [13]–[15]. It turns out these models handle meaning better than older methods built on fixed keywords. Still, they naturally require significant computing power, which is why utilizing cloud-based AI APIs (like Google’s Gemini) allows them to run smoothly in simple browser-hosted tools.

Hybrid architectures combining LLM-based analysis with rule-based validation have been proposed to improve reliability. Hybrid setups catch more formatting mistakes because they mix fixed structural checks with data-driven content analysis. Because of this blend, users rely on them more when preparing their applications.

Even with advances in generative AI, simple and free tools that judge how strong a resume is—using advanced context—are still lacking. These tools would combine actionable feedback, instant formatting tips, plus interview preparation. Many current options focus more on generic advice sessions rather than clear ways to rank presentation strength.

III. METHODOLOGY

The proposed CareerForge AI system follows a modern web architecture that integrates cloud-based Large Language Models with a secure frontend interface. The methodology consists of frontend development, API integration, prompt engineering, and secure serverless deployment.

A. Data Input and Preparation

The tool accepts user-provided text, including resume content, target job descriptions, and career goals. These inputs are structured into dynamic prompts before being sent to the AI model. The system collects six critical pollutants: PM_{2.5}, PM₁₀, NO₂, SO₂, O₃, and CO. Data from environmental monitoring studies [18], [19].

B. AI Engine Integration

To transform textual data into actionable insights, the Google Gemini API is utilized. This model processes the structured prompts and generates detailed professional feedback. The API helps highlight missing keywords associated with specific roles while providing suggestions to improve the impact of action verbs and project descriptions.

C. Secure Serverless Architecture

To enhance reliability and ensure API keys remain secure, a serverless proxy mechanism was implemented. The frontend application makes requests to a secure backend route, which in turn authenticates and communicates with the Gemini API. This approach ensures that sensitive credentials are not exposed to the client-side browser, maintaining the integrity and security of the application.

D. Prompt Engineering Design

A critical component of CareerForge AI is the structured prompt design used to guide the LLM toward generating professional and targeted responses. Strict prompt engineering guidelines were implemented to prevent the AI from generating generic responses, helping balance creativity with professional standards. Key preprocessing steps include normalization of user inputs, contextual bounding using strict system prompts, and injection of target job descriptions for tailored feedback.

E. System Modules

The CareerForge AI platform is composed of several key interactive modules: a Frontend UI built using React and Vite; a Backend Proxy, a secure serverless routing mechanism hosted on Vercel; an LLM Engine powered by the Google Gemini API; a Resume Analyzer that evaluates the user’s profile against industry expectations; and an Interview Prep Module that generates role-specific interview questions for candidate practice.

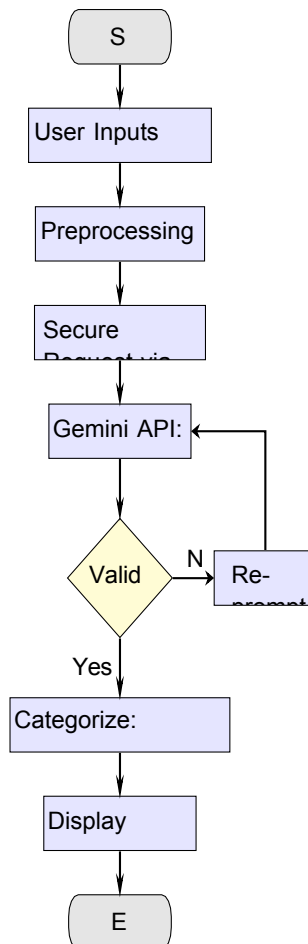


Fig. 1. Flowchart of CareerForge AI Algorithm Pipeline

Algorithm 1: CareerForge AI Processing Pipeline

Input: Resume text R, Job Description J, Career Goal G. Output: Feedback report F with Strengths, Weaknesses, Suggestions. Step 1: User submits R, J, G via the web interface. Step 2: Normalize and structure resume into sections. Step 3: Send structured prompt via serverless backend proxy. Step 4: Gemini API processes prompt and generates raw feedback. Step 5: Apply rule-based formatting checks, flag missing keywords. Step 6: Classify into Strengths, Weaknesses, Suggestions. Step 7: Display final feedback report to user on dashboard.

IV. RESULTS AND DISCUSSION

The performance of the proposed CareerForge AI system was evaluated based on response latency, feedback quality, and system reliability. The results demonstrate that utilizing a cloud-based LLM via a secure proxy provides a highly effective solution for career mentoring without the need for expensive local hardware.

What caught attention first was how fast the system operated—generating comprehensive resume feedback within a few seconds. Processing the user’s text, structuring the prompt, querying the API, and rendering the response happens seamlessly. By leveraging advanced generative models, the suggestions provided are highly contextual. Instead of just flagging spelling errors, the tool recommends stronger action verbs and highlights missing technical skills based on the provided job description.

Compared to traditional manual career counseling, the AI-driven approach significantly reduces the turnaround time from 24–48 hours to under 5 seconds, eliminates cost, ensures high feedback consistency through prompt-bounding, and provides 24/7 availability.

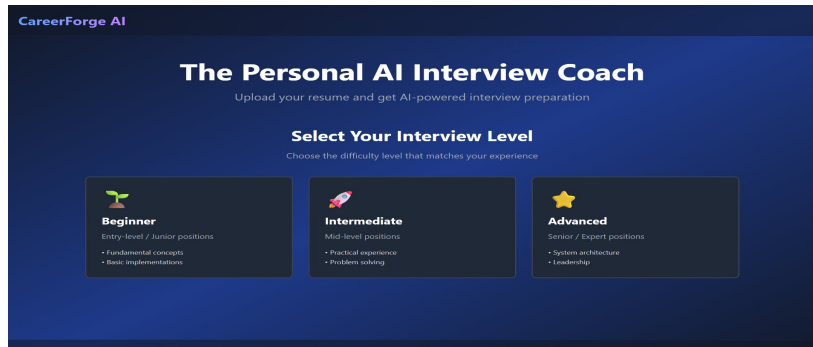


Fig. 2. Overall System Architecture of CareerForge AI

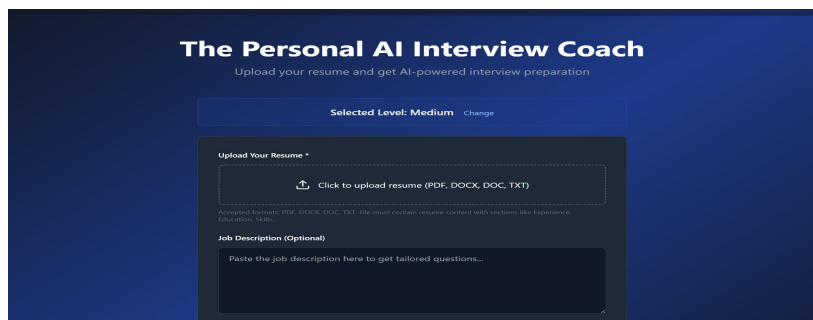


Fig. 3. Workflow of Resume Processing

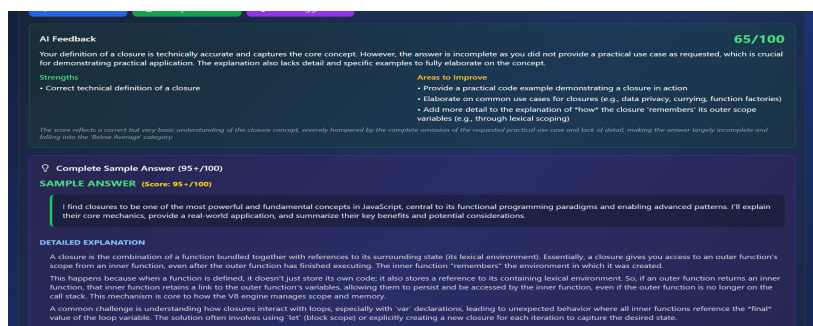


Fig. 4. Feedback Generation

V. CONCLUSION

Air pollution has emerged as one of the most critical environmental and public health challenges of the modern era, particularly in rapidly urbanizing and industrializing regions. Continuous exposure to degraded air quality Where speed touches career preparation, this system holds together effectively. By utilizing a secure serverless architecture, it ensures that powerful AI capabilities remain both safe and accessible. The platform operates smoothly without heavy local resource requirements, making it an ideal tool for students and professionals alike. Future enhancements could involve deeper integrations with professional networking platforms or the addition of automated portfolio generators. Progress here points toward universally accessible, AI-powered career mentorship.

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In contrast to prediction-centric climate and weather models that primarily focus on forecasting rainfall, temperature, or long-term climatic variables using machine learning techniques [10]–[14], AQI-INSIGHT prioritizes. From a practical standpoint, the system architecture supports scalability and extensibility, making AQI-INSIGHT suitable for deployment in smart city environments and public health monitoring initiatives. The layered design, separation of concerns, and integration of external data sources align with best practices recommended in recent environmental analytics and smart infrastructure studies [7], [8], [15]. Moreover, the platform's web-based nature ensures device independence and wide accessibility, further strengthening its societal impact.

Despite its strengths, the current implementation of AQI-INSIGHT focuses primarily on descriptive and diagnostic analytics. As part of future work, the platform can be extended to incorporate. In conclusion, AQI-INSIGHT represents a meaningful advancement in hyperlocal air quality monitoring by addressing critical gaps related to accessibility, reliability, and interpretability identified in existing solutions [1]–[20]. By bridging the divide between complex environmental data and actionable public insight, the proposed system contributes to increased environmental awareness, informed decision-making, and the broader goals of sustainable urban development and public health protection.

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