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Career Link: AI for Resumes, Interviews, and Career Advice

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Abstract: ***Career Link is an AI-powered career guidance platform that integrates multiple intelligent tools to assist users in every step of their professional journey. The application offers an AI advisor for personalized career insights, an AI-powered resume builder, a roadmap generator, and a mock interview simulator, providing a holistic user experience. Career Link's architecture leverages advanced language models such as Mistral and Google's Gemini to deliver context-aware career recommendations, generate resume content, and simulate real-world interview scenarios. The system collects user inputs from psychometric personality tests, educational background, and professional interests, then applies clustering techniques and prompt engineering to generate detailed, tailored guidance. A case study involving a final-year student demonstrates how Career Link generates a career fit report, an optimized resume, and adaptive interview questions, significantly improving the user's preparedness and self-awareness. This paper outlines the system's design, AI integration, and the real-world impact of combining psychometrics with large language models for scalable, personalized career guidance.***

Keywords: Career guidance, Large language models, Generative AI, Resume generation, Interview simulation, Psychometrics, Career recommendation.

I. INTRODUCTION

Choosing a suitable career path can be overwhelming, particularly for students and early-stage professionals who often lack access to personalized guidance. Traditional career counseling methods are frequently limited by high costs, time constraints, and narrow applicability, rendering them inaccessible to many. With the emergence of artificial intelligence (AI) and large language models (LLMs), the landscape of career guidance is evolving—intelligent systems can now interpret user preferences, analyze contextual data, and deliver personalized, actionable advice. Generative AI models have shown remarkable proficiency in natural language processing, contextual understanding, and dynamic content generation, making them well-suited for delivering adaptive and real-time career support.

Career Link was developed in this context as a comprehensive AI-powered career guidance platform. It integrates a suite of tools designed to assist users throughout their career journey, including an AI Career Advisor, Resume Builder, Roadmap Generator, and an Interview Simulator. These modules are powered by advanced LLMs—Mistral is used for interactive advisory conversations, while Gemini supports resume content generation and mock interview simulations. By fusing psychometric inputs with AI-driven analysis, Career Link delivers tailored career recommendations, helps users build effective resumes, and facilitates interview practice aligned with each individual's skills, interests, and goals.

This paper presents the architectural and methodological foundation of Career Link, with a focus on its backend logic, AI integrations, and personalized guidance workflow. Section II details the overall system architecture and the role of generative AI in each component. Section III introduces a representative user scenario that demonstrates the platform's functionality, including career recommendation, resume generation, and interview feedback. Section IV concludes with a discussion on system impact, current limitations, and potential directions for future enhancement.

II. METHODOLOGY

System Architecture: The Career Link platform is organized into three main layers: a user input layer for collecting career-related data, an AI processing layer for generating responses, and a storage layer for managing persistent data and interactions. Figure 1 illustrates the high-level system architecture of Career Link.

When a user begins using the platform, they are prompted to sign in via Clerk and provide essential information such as their current role, skills, experience, goals, and aspirations. Depending on the module selected (Career Advisor, Interview Bot, Resume Builder, or Roadmap Explorer), relevant structured inputs are collected—e.g., desired job roles for mock interviews or past experiences for resume generation.

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This information is securely stored in a MongoDB database and passed to the respective AI engine depending on the use case. The AI processing layer consists of two large language models—Mistral for career advising and Gemini for mock interviews and resume generation. The data flow is handled via prompt engineering and context-aware chat sessions that ensure a dynamic, responsive interaction with the user.

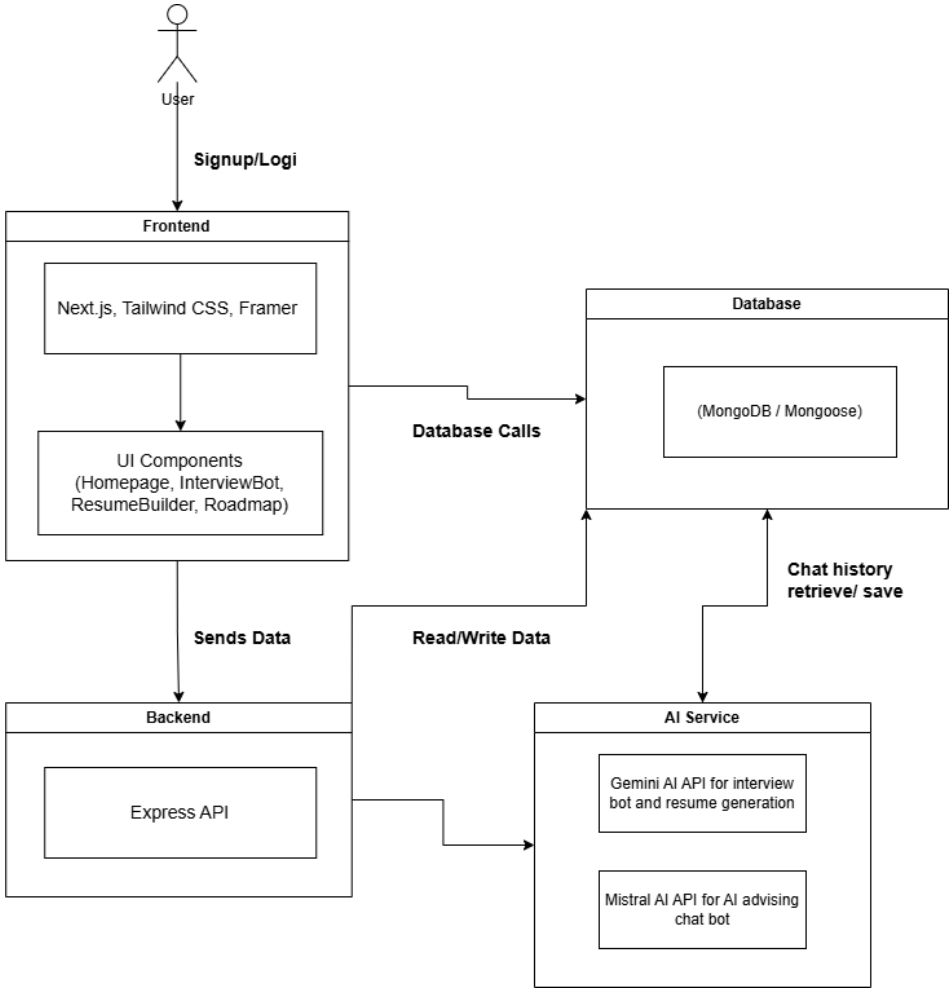


Fig.1

Figure 1: High-level system architecture of the Career Link platform. (The system includes a user data input module, AI processing engines powered by Mistral and Gemini, and a database layer managing user profiles and chat histories. The user's session data is funneled into structured prompts for the AI models to generate personalized career outputs.)

AI-Driven Advisory Engine: At the core of Career Link are its modular, AI-powered engines that simulate human-like career counseling, interview experiences, and resume drafting. Each engine is backed by either Mistral or Gemini and uses prompt engineering techniques to transform structured user input into highly personalized outputs.

A. AI Career Advisor (Powered by Mistral)

This module initiates a chat-based career counseling session. The system prompts the user to describe their background and career goals. Once this data is received, it is formatted into a well-structured prompt and passed to the Mistral model. The prompt typically includes:

- Background details: Current job title, domain, years of experience.
- Aspirations: Target roles, preferred industries, or learning interests.
- Constraints and preferences: Location flexibility, upskilling interest, work-life priorities.

Based on this input, Mistral generates personalized career guidance, which includes:

- Skill Gap Analysis: Identification of missing competencies for desired roles.
- Learning Roadmap: Suggested tools, courses, and timelines to bridge the gap.
- Domain-Specific Advice: Tailored tips for specific career paths (e.g., transitioning into product management from software development).
- Encouraging Tone: The model's narrative is carefully designed to be supportive, motivational, and clear.

B. Interview Simulation (Powered by Gemini)

This module provides a mock interview experience. The user specifies a job title and role (e.g., "Front-End Developer at a startup"), and Gemini dynamically generates interview questions. The conversation is ongoing and adapts based on the user's answers.

Each question is based on industry standards and past hiring practices. Gemini ensures:

- Question Variety: Includes behavioral, technical, and situational questions.
- Follow-ups: Asks deeper questions if initial answers are generic or need clarification.
- Tone Calibration: Maintains a professional, yet conversational, tone to ease user anxiety.
- Feedback Integration (planned for future versions): The system may later include AI-generated feedback for responses.

All sessions are stored in MongoDB for later review by the user.

Resume Builder (Powered by Gemini)

In this module, users input structured resume data (role, tasks, outcomes, metrics). Gemini is prompted with this data to generate bullet points that are concise, impactful, and tailored to the role.

Prompts include:

- Achievements and Metrics: For quantifiable impact.
- Action-Oriented Language: To align with recruiter expectations.
- Keyword Optimization: Based on the intended role and industry.

The output follows standard resume writing conventions and is reviewed instantly by the user.

Roadmap Explorer

The Roadmap Explorer is a non-AI module that provides curated, static roadmaps for various domains such as Data Science, Cybersecurity, or DevOps. Users can browse these guides, which are created manually and stored in the database for fast access. No AI inference is performed in this module.

Personalization: Personalization is achieved through real-time prompt customization. Each AI interaction is shaped by the user's current data—stored in MongoDB—and the module they're using. For example:

- A junior software engineer seeking to move into AI gets advice focused on foundational ML skills and project-based learning.
- A senior marketer may be guided towards leadership training or exploring roles like product marketing.

Each user receives distinct, relevant outputs due to the dynamic prompt construction behind each AI module. Additionally, domain-specific rules and best practices are embedded into the prompt templates. For instance, resume generation ensures verbs like "Led," "Optimized," and "Delivered" are prioritized, while mock interviews automatically escalate question complexity based on user experience level.Notably, Career Link avoids making assumptions about UI or user platform. While it is built with a clean, responsive frontend (using Next.js, Tailwind CSS, and Framer Motion), this paper's scope is limited to its system architecture and AI logic.Crucially, the methodology avoids any user interface-specific assumptions. While Kuber has a user-friendly UI (with dashboards for expenses, charts, etc.), the scope of this paper is on the system's analytical structure and AI advisory process, not the UI design. In summary, the methodology combines financial computations with a generative AI model to create a hybrid solution: the computations ensure quantitative accuracy, and the AI ensures qualitative, personalized advice delivery. This approach results in a rich, customized financial plan for the user, which we evaluate in the next section through an example scenario.

III. MODELING AND ANALYSIS

At the core of Career Link's intelligence lies a prompt-engineering strategy that leverages the strengths of two advanced language models: Mistral and Google Gemini. These models are embedded within distinct modules of the platform — Mistral powers the real-time career advisor chatbot, while Gemini handles structured content generation for resume building and AI-powered interview simulation. Unlike traditional rule-based career platforms, Career Link uses domain-specific prompting and minimal programmatic scaffolding to guide the behavior of the AI models. Each AI interaction is carefully structured through natural language prompts that establish the model's role, tone, constraints, and content expectations.

Advisor Logic – Mistral

In the career advisor module, Mistral is provided with a predefined system prompt that sets its identity ("You are CareerLink—your go-to senior for career advice") and strictly bounds its response space to career-centric queries. The prompt emphasizes:

- A casual and encouraging tone, suitable for students and young professionals.
- Clear and practical responses in simple English.
- A hard rejection of off-topic questions (e.g., general knowledge or abstract philosophy).

This setup ensures that Career Link's AI advisor behaves more like a reliable senior mentor than a generic chatbot, keeping the conversation focused on actionable guidance such as job searching, skill development, or career transitions.

Interview Simulator – Gemini

The interview module takes advantage of Gemini's structured reasoning capabilities. When a user initiates a mock interview, the system injects:

- The job role and job description.
- The complete conversation history up to that point.
- A template-style instruction, requesting feedback followed by a new, non-repetitive question.

This prompt acts as both a stateful interviewer and a real-time feedback engine. The model evaluates the candidate's answers, surfaces constructive criticism ("mention strengths and areas for improvement"), and generates a relevant follow-up question, simulating a realistic interview progression.

Prompt Structuring Insights: From early testing, Career Link's team found that explicit format instructions (e.g., "Feedback: … Next Question: …") significantly improved the coherence of the AI responses. The AI was less likely to produce free-form text and more likely to return structured, digestible outputs. Similarly, by including full chat logs, the model retained context over long conversations — an essential feature for simulating an interviewer who remembers earlier answers.

Domain Guardrails and Tone Control: While Career Link doesn't yet integrate numerical consistency checks or formal validations, it ensures quality by constraining the model's tone and topical boundaries through prompt engineering. This approach prevents speculative or off-topic responses and maintains clarity, especially for users unfamiliar with professional jargon.For example, the advisor prompt discourages identity claims or abstract debates, and instructs the model to "be chill, clear, and practical." Similarly, interview feedback is expected to remain constructive and balanced, guiding users to self-improvement without overwhelming them.

Hybrid Human-AI Design: In essence, Career Link's approach reflects a hybrid design philosophy: while no heavy rule-based computation is applied pre- or post-AI, the prompts themselves encode rules about structure, tone, and scope. This prompt-driven logic acts as a lightweight yet powerful modeling layer, making the system highly flexible, responsive, and human-like.

In the next section, we evaluate this modeling approach through a detailed user scenario, showcasing how CareerLink adapts to individual user needs across different modules.

IV. RESULTS AND DISCUSSION

To demonstrate Career Link's capabilities, we discuss the results for a representative user profile and how the system's advice addresses various aspects of career development. The example user is a 19-year-old CSE (Computer Science and Engineering) student and part-time freelancer with minimal industry experience and specific career uncertainties and goals (drawn from a real-case scenario in our testing). Key inputs from the user's profile are: interest in Backend Development and Data Science, experience with Python and SQL, a GitHub profile with a few personal projects, and goals of securing internships, clarifying their direction, and improving resume and interview skills. Given this information, Career Link generates a comprehensive career guidance plan. We break down the results into subcomponents for clarity.

A. Career Advice and Role Fit Recommendation:

After inputting their background and goals, the user interacts with the AI Career Advisor. Career Link analyzes their academic standing, current skill set, and stated interests. The advisor determines that the user's experience and interest in Python and data tools align well with roles in Backend Development or Data Engineering. The advisor also takes into account the user's freelance work and project involvement, suggesting that they are ready to target internship roles actively. The AI responds with practical, motivating feedback in plain English.

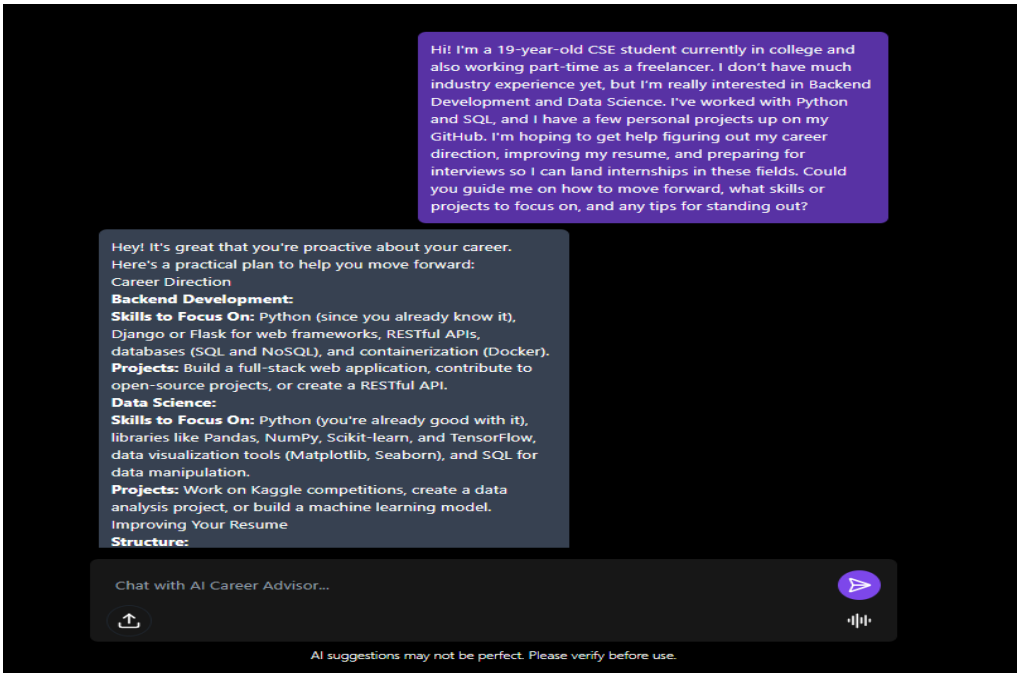


Fig.2

Figure 2: Snapshot of Career Advisor Chat Output

This figure shows the AI's breakdown of the user's path. Based on Python and SQL familiarity, the advisor recommends focusing on Backend Development initially, while leaving open a transition to Data Engineering later. It outlines short-term and mid-term goals like learning Flask/Django, understanding API development, and contributing to open-source. The advisor encourages building a solid portfolio and provides a monthly roadmap. It also prompts the user to complete small projects for hands-on experience, reinforcing a step-by-step, growth-oriented approach. Career Link's tone is informal and helpful, increasing user comfort and trust.

B. Resume Generation and Enhancement:

Given the user's goal of internship applications, Career Link's Resume Builder module activates next. The user inputs academic details, project descriptions, freelance work, and skills. The system processes this data and outputs concise, action-oriented bullet points optimized for ATS (Applicant Tracking Systems). The output is structured using role-specific language suitable for technical resumes.

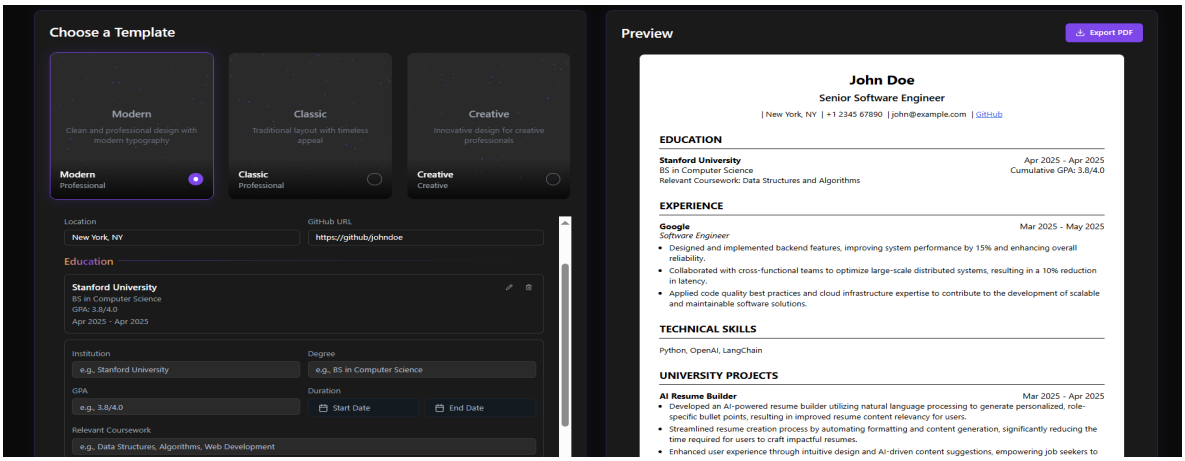


Fig.3

Figure 3: Resume Output Generated for Backend Developer Intern

This figure shows the AI-generated resume sections. Example bullets include:

- "Designed and implemented backend features, improving system performance by 15% and enhancing overall reliability."
- "Structured database models and routes for user authentication and task management, ensuring modularity and scalability."

Career Link highlights user impact, ensures clear formatting, and offers suggestions to improve descriptions. The user receives a downloadable PDF ready for job and internship applications, helping bridge the gap between raw experience and a professional presentation.

C. Interview Practice and Feedback Loop:

To prepare for upcoming technical rounds, the user tries the Interview Bot. They select "Backend Developer Intern" as the target role. The system begins a structured mock interview session, drawing from a job description and adapting dynamically to the user's responses.

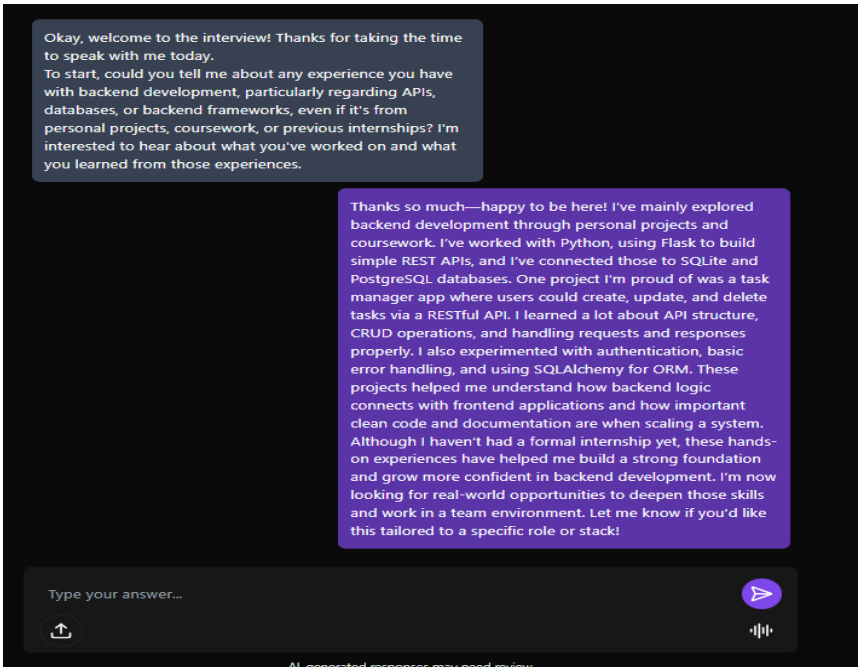


Fig.4

Figure 4: Interview Bot Session Output

This figure continues the simulated interview session with Career Link's AI-powered Interview Bot.

Q: "Okay, welcome to the interview! Thanks for taking the time to speak with me today. To start, could you tell me about any experience you have with backend development, particularly regarding APIs, databases, or backend frameworks, even if it's from personal projects, coursework, or previous internships? I'm interested to hear about what you've worked on and what you learned from those experiences."

User's Answer:

Describes experience using Python and Flask to build REST APIs, SQLite for data storage, and SQLAlchemy for ORM. Highlights a task manager app with CRUD operations, basic authentication, and integration of backend logic with frontend features.

AI Feedback:

"This is a good response! You highlighted relevant skills and projects, showing your initiative and understanding of backend concepts. It would be even stronger if you could quantify the scale or impact of your project (e.g., 'handling X number of users' or 'reduced processing time by Y%'). Also, briefly mentioning any challenges you faced and how you overcame them would showcase problem-solving skills."

Next Question:

"Can you describe a specific technical challenge you encountered while building your task manager app, and how you approached solving it?"

Career Link's Interview Bot uses contextual continuity to deliver relevant, personalized questions. By offering precise, growth-oriented feedback, the system encourages deeper reflection and skill articulation—an essential practice for real-world technical interviews.

V. CONCLUSION

In this paper, we introduced Career Link, an AI-powered career guidance platform designed to support students and early professionals in navigating the complex world of career planning. By leveraging advanced large language models—Mistral for real-time advisory and Gemini for structured content generation—Career Link provides personalized support across key domains: career planning, resume development, and interview readiness. The system showcases the power of AI to deliver actionable insights tailored to a user's profile, while maintaining a tone that is both supportive and motivational.

The case study of a CSE student with limited industry experience demonstrated Career Link's effectiveness in mapping user skills to suitable career paths, optimizing resume content for internships, and simulating real-world interview interactions. The AI provided domain-relevant recommendations, generated professional resume outputs, and engaged the user in dynamic mock interviews with personalized feedback. These results underscore Career Link's potential as a virtual career mentor—delivering high-quality, scalable, and affordable guidance traditionally reserved for one-on-one human counseling.

Career Link's approach—centered on prompt engineering, modular AI engines, and structured personalization—highlights the feasibility of combining psychometrics with generative AI for impactful decision support. It avoids complex pre-processing pipelines in favor of lightweight, context-aware prompting, offering a flexible foundation for future development.

Looking ahead, several enhancements are possible. Future work may include real-time integration with professional platforms like LinkedIn or GitHub to autofill user data, the addition of AI-generated feedback summaries post-interview, and broader testing across user demographics to evaluate longitudinal impact on career success. Equally important will be ensuring ethical AI use, data privacy, and transparency as the system scales.

In conclusion**,** Career Link represents a significant step toward democratizing personalized career development. By marrying state-of-the-art generative AI with pragmatic career-building strategies, it empowers users to navigate their professional journey with greater clarity, confidence, and preparedness. The promising results from our initial deployment suggest that AI-powered advisory can bridge critical gaps in access, quality, and relevance—helping more individuals unlock their career potential.

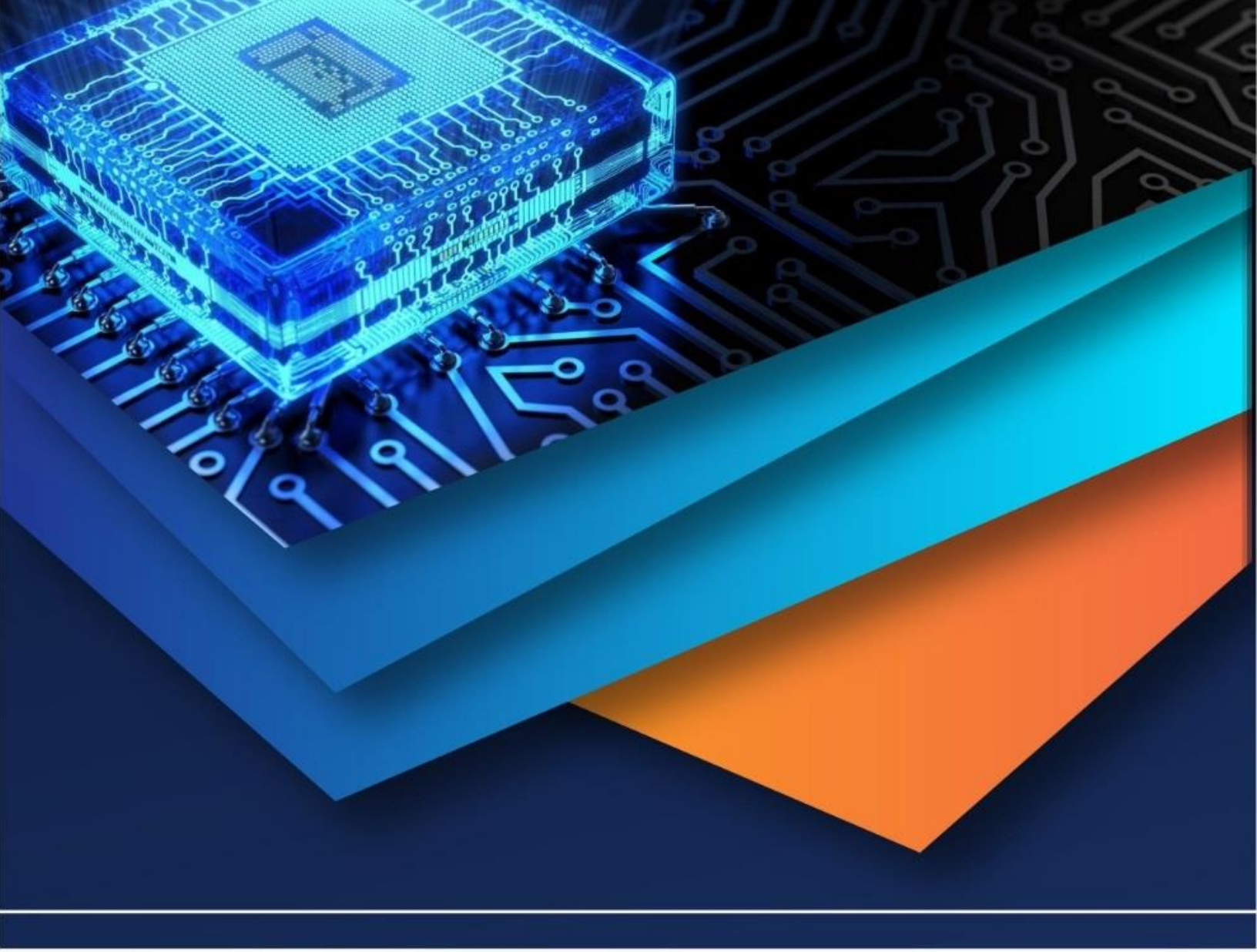
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