**Our Journey**

A Journey from Concept to Implementation

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**Introduction**

Career planning is a long road filled with crossroads, overwhelming choices and a lot of questions that we never fail to ask ourselves like: What should I pursue? What courses would make it worthwhile? How can I make sure I am always on the right track during and after my university years? That’s when it hit us, the feeling of being lost in the vast landscape of career options, skill-building courses and professional opportunities. These questions led us to envision a way out of this maze and that is having a career advisor that is always there to assist us, guiding us through every step of the ladder and helping us make decisions that are tailored to our individual goals, interests and achievements.

That was the spark that ignited our project: an AI-Powered Career Advisor. Now imagine a digital advisor that can understand your profile, personal goals and your professional journey so far. By the click of a button, you upload your CV and you let the magic do its job. This advisor will examine your skill set, interests, achievements and using that information, it will be able to recommend a custom-fit career path and beyond by identifying skill gaps, recommending specific courses, proposing relevant projects and digging the road that aligns with your personal growth.

Probably the coolest thing about our advisor is that it’s dynamic in nature. Our AI-Powered Career Advisor is designed to grow alongside you so as you move ahead by completing a new project, gaining a skill, or developing an interest, the advisor seamlessly integrates these changes into its guidance making it personalized and your long-term companion.

The potential this advisor has and its influence on career decision making is immense. We’ll take you through this journey by going from conceptualization to the technical implementations. We will talk about our data retrieval methods, model selection, training and deployment without forgetting every challenge we faced along the way. We are hoping that we show and emphasize on how AI can not just guide you but even empower you and other individuals in taking control over their careers.

**Section 1**

**Problem Definition and Project Scope**

**Identifying the Problem**

The choice of career has now been a daunting task for most, especially students and young professionals just entering the workplace. Traditional resources include career counseling services, online job boards, and self-diagnostic quizzes, but most of these tools are inadequate in terms of personalized dynamic advice. Their suggestions are generally too general and do not provide the personalization needed for the unique background, skill, and career aspirations of each individual. Additionally, classic career resources rarely adapt as a person's interests evolve or achievements grow, especially in today's modern job market where new and emerging roles also bring new and emerging skills.

This gap showed that the solution needed to be more responsive and tailored to the needs of an individual-a career adviser that would be able to provide personalized advice and would also learn and evolve in the process as every user moves on with personal and professional growth. We propose an AI-Powered Career Advisor that is able to build actionable career recommendations based on a user's profile, experience, and goals.

**Project Goals and Objectives**

The goal of this project is to create an advisor that is a continuous personalized guide. By analyzing user’s uploaded CVs the advisor will do the following:

* Suggest a career path that aligns with the skills, interests and background of the user.
* Identify specific jobs, courses and projects.
* Update its recommendations dynamically as our users continue to grow and achieve new milestones

**Target Audience and Use Cases**

Our AI-Powered Career Advisor targets the following:

* University Students: Those students who are trying to work out what courses they should take or which internships to pursue.
* Early-career professionals: Those looking to hone their career choices, learn new skills, or perhaps change their field entirely.
* Career changers who seek a career transition and would like to get some advice on how to proceed and with which skills.

For example, if a student who is interested in the field of data science uploaded his or her CV, a customized set of courses he or she may want to take to acquire relevant skills would be included, together with several suggested projects for hands-on experience and entry-level positions in the field. For a career changer, on the other hand, this will suggest recommendations that are aimed at developing transferable skills, identification of bridge roles, and experience in field-specific work through online certification.

**Project Scope and Limitations**

Our AI-powered Career Advisor will be able to offer users personalized advice in real time, which will be directed at the profile, achievement, and evolving interests of each user. The scope of this project would relate to the following:

* Real-time job recommendations. By tapping into the real-time sources of job listings, the advisor will be in a position to propose updated job opportunities that come in line with the skills, experience, and aspirations of each individual. In this way, it will ensure that the users receive actionable and relevant job recommendations with regard to their career goals.
* Dynamic Course Recommendations: Our advisor gives course recommendations through links to learning platforms like Coursera in real time. The user gets to view the most current and relevant learning resources for their set of skills and desired career path, making them efficient in upskilling.
* Continuous Profile Updates: The advisor dynamically adjusts its recommendations with the building set of new skills, courses completed, or other shifts in interest by users over time, ensuring the guidance remains relevant in each user's growth and trajectory into a career.
* Flexibility in Profile Input: To make this tool available to a wider group of people, especially those who have never written a formal CV, this tool will allow the linking of one's Linkedin profile or create their own using our Build Your CV feature. This will afford users the opportunity to customize their CV to capture their skills, experience, and career objectives for accurate recommendations by the advisor.

These features enable our career advisor to be more comprehensive and flexible, thus offering users fresh updated data-driven suggestions that will enable them to make informed choices and decisions on their choice of career.

**Limitations**

While the scope is comprehensive, the following are some of the limitations:

* Data Dependency: Recommendations are only as good as the data they are based on. A user who links an incomplete LinkedIn profile or creates a minimalist CV will get less customized advice.
* Complexity of Career Transitions: The advisor does make recommendations on career switches, but highly specialized transitions or highly niche areas require more context than can be captured in a CV or a LinkedIn profile.

This AI-powered advisor aims to become indispensable to its users at every stage of their career, integrating real-time job and course data, offering flexible profile input options, and adapting to users' paths in their unique manner of making informed and impactful decisions.

**Success Criteria and Impact**

Success of this project will be measured by the following:

* Recommendation accuracy: Measured on the basis of the efficiency of the adviser in assigning users to career paths, courses, and projects that match their skills and aspirations.
* User Satisfaction: Positive feedback from users about the guidance they get on relevance and usefulness.
* Adaptability-How well the tool adjusts itself to the changing achievements and interests of the users by always ensuring updated advice and relevance.

In the long term, the AI-Powered Career Advisor will eventually lead people to take ownership of their career pathways and make the search for a good fit easier, the acquisition of the appropriate skill set easier, and adjustment to changes in goals and interests easier. This indeed can emerge as a trusted buddy in career choices, filling the lacuna in conventional guidance on career choices and guiding the user during every milestone in professional life.

**Section 2**

**Data Collection and Preprocessing**

**Initial Exploration: Linkedin Data and Privacy Challenges**

Our journey began with the idea of utilizing real-world career trajectories to guide our recommendations. We initially envisioned using LinkedIn data to gain insights from professionals' real-life experiences, tracking their career paths to identify effective strategies and suggest relevant steps to users. However, our search for a suitable LinkedIn API soon hit a roadblock due to privacy concerns and the limitations on LinkedIn’s API access to personal data. This prevented us from accessing the information required to tailor recommendations based on real-life journeys.

**Exploring Alternatives: Scraping Attempts and Kaggle Datasets**

To overcome the LinkedIn API limitations, we attempted to gather data through web scraping. Unfortunately, this approach proved inefficient as it required extensive manual effort, was time-consuming, and lacked scalability. Realizing the need for another solution, we turned to tech profile datasets available on platforms like Kaggle. While we found a dataset containing around 60,000 profiles, we recognized that static datasets would not meet our goal for real-time recommendations and continuously updated guidance, as these datasets quickly become outdated.

**Redefining the Project Scope with Real-Time APIs**

After consulting with our professor, we redefined our approach to prioritize real-time data sources over static datasets. We identified APIs that could provide dynamic information relevant to our users' career paths, including:

* Adzuna API for real-time job listings,
* Coursera API for course recommendations,
* GitHub API for project insights.

With this shift, we focused on combining user input data (from CVs and questionnaires) with real-time information from these APIs to generate a dynamic, relevant, and interactive experience.

**Data Preprocessing and CV Parsing** To streamline user data collection, we implemented a PDF reader that extracts structured information from users' CVs. This data serves as the foundation for our recommendations. We then used OpenAI prompts to create a personalized questionnaire based on each user’s CV, enabling a deeper understanding of their current interests and career aspirations. This interactive approach allows us to gain insights into the user’s current goals and mindsets, enabling more accurate recommendations that align with their specific career interests and objectives.

**Section 3**

**Model Selection and Improvements**

**Leveraging OpenAI for Language Understanding and Recommendation Generation** Given the complexity of generating personalized career advice, we decided to leverage OpenAI’s Large Language Model (LLM) for its advanced language processing and contextual understanding capabilities. The LLM allows us to:

* **Generate Recommendations**: By analyzing CVs, user responses to questionnaires, and contextual data from APIs, the LLM can suggest career paths composed of job roles, courses, and projects.
* **Create Interactive Conversations**: The LLM facilitates dynamic engagement with the user, responding to inputs and guiding them through relevant career insights, ultimately creating a highly interactive and personalized experience.

**Integrating APIs for Real-Time Data Retrieval** Our model connects with the Adzuna, Coursera, and GitHub APIs, each providing a specific layer of value:

* Adzuna API: Supplies real-time job listings relevant to the user’s skill level and industry, allowing us to provide up-to-date job suggestions.
* Coursera API: Recommends relevant courses aligned with the user’s current skills and target career, ensuring they have access to learning opportunities that are current and career-enhancing.
* GitHub API: Offers project recommendations that help users gain hands-on experience in specific domains, encouraging skill application and portfolio development.

**User-Level Detection and Personalized Prompts** To further refine recommendations, we implemented user-level detection. By assessing the user’s experience level (e.g., beginner, intermediate, advanced), we adjust the language model’s prompts and tailor suggestions to suit the user’s current stage. This level-based customization improves the relevance of our recommendations, ensuring that each user receives appropriate guidance.

**Section 4**

**Model Training and Evaluation**

**Evaluation Through User Feedback and Testing** Since our model heavily relies on OpenAI’s pretrained LLM, we focus more on prompt engineering and less on traditional model training. To evaluate the effectiveness of our career recommendations, we conducted iterative testing and gathered feedback from users at each development phase. Key metrics for success include:

* Relevance of Recommendations: Ensuring job, course, and project suggestions align closely with the user’s career goals and experience level.
* User Engagement and Satisfaction: Collecting user feedback on the value, accuracy, and helpfulness of the recommendations provided.

Through these feedback loops, we continually refine our prompts, improve recommendation quality, and ensure a personalized, adaptive experience for each user.

**Section 5**

**Deployment and Integration**

**Frontend Development: Moving from Gradio to Django** Our initial frontend exploration was with Gradio, a low-code interface framework. While Gradio was helpful for early prototyping, we required a more robust and scalable solution. We ultimately chose Django for our frontend due to its flexibility, security, and ability to support user authentication and database integration. Django allows us to build a professional-grade user interface that supports seamless, interactive engagement with the AI advisor.

**Backend Infrastructure and User Authentication** We are in the process of implementing a user authentication system, which will enable each user to have a unique profile with secure login credentials. This system allows users to save their career progress, track their recommendations, and update their profiles over time. Integrating a database with Django also enables efficient storage of user data, including CVs, questionnaires, and recommendation histories, for personalized follow-up guidance.

**Building the “Create Your CV” Feature** Recognizing that some users may not have an existing CV, we implemented a “Build Your CV” feature. This allows users to answer a series of questions about their skills, experiences, and career objectives. Their responses are stored in a JSON file and automatically converted into a professional CV in PDF format. Additionally, we use OpenAI to generate a professional profile description based on these answers, providing users with a polished starting point for their career journey.

**Planned Enhancements: Retrieval-Augmented Generation (RAG) and Website Deployment** To further enhance recommendation quality and performance, we are exploring the use of Retrieval-Augmented Generation (RAG) with OpenAI. This approach could help our system retrieve relevant information from large datasets, improving response accuracy and relevance. Once the AI advisor is fully optimized, we plan to deploy it as a standalone website, making it accessible to a broader audience beyond our initial user base.

**Section 6**

**Results and Insights**

**Section 7**

**Challenges, Learnings and Future Improvements**

**Conclusion**