

Transforming Career Development Through Immersive and Data-Driven Solutions

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Introduction and Motivation

Traditional career counseling methods often lack the flexibility and personalization required by today's dynamic job market, leaving individuals underprepared for informed career decisions and necessary skill development. Emerging technologies such as Extended Reality (XR), Artificial Intelligence (AI), and multilingual digital platforms promise significant improvements over these traditional methods by providing immersive, personalized, and real-time guidance [1, 2]. However, challenges including inclusivity, data accuracy, and multilingual accessibility remain prevalent [3]. This project introduces XR-CareerAssist, a novel platform leveraging XR and AI technologies designed to overcome these limitations by offering highly personalized career insights through immersive virtual reality (VR), intuitive visualizations, and interactive AI-driven experiences

Design and Methodology

The XR-CareerAssist platform is built upon an extensive analysis of over 100,000 anonymized professional CVs collected across diverse industries. This vast dataset supports the creation of comprehensive career maps and visualization tools that illustrate potential career trajectories and industry transitions (see Fig. 1). Users input their professional background and career aspirations, enabling the system to identify similar profiles and present realistic career pathways.

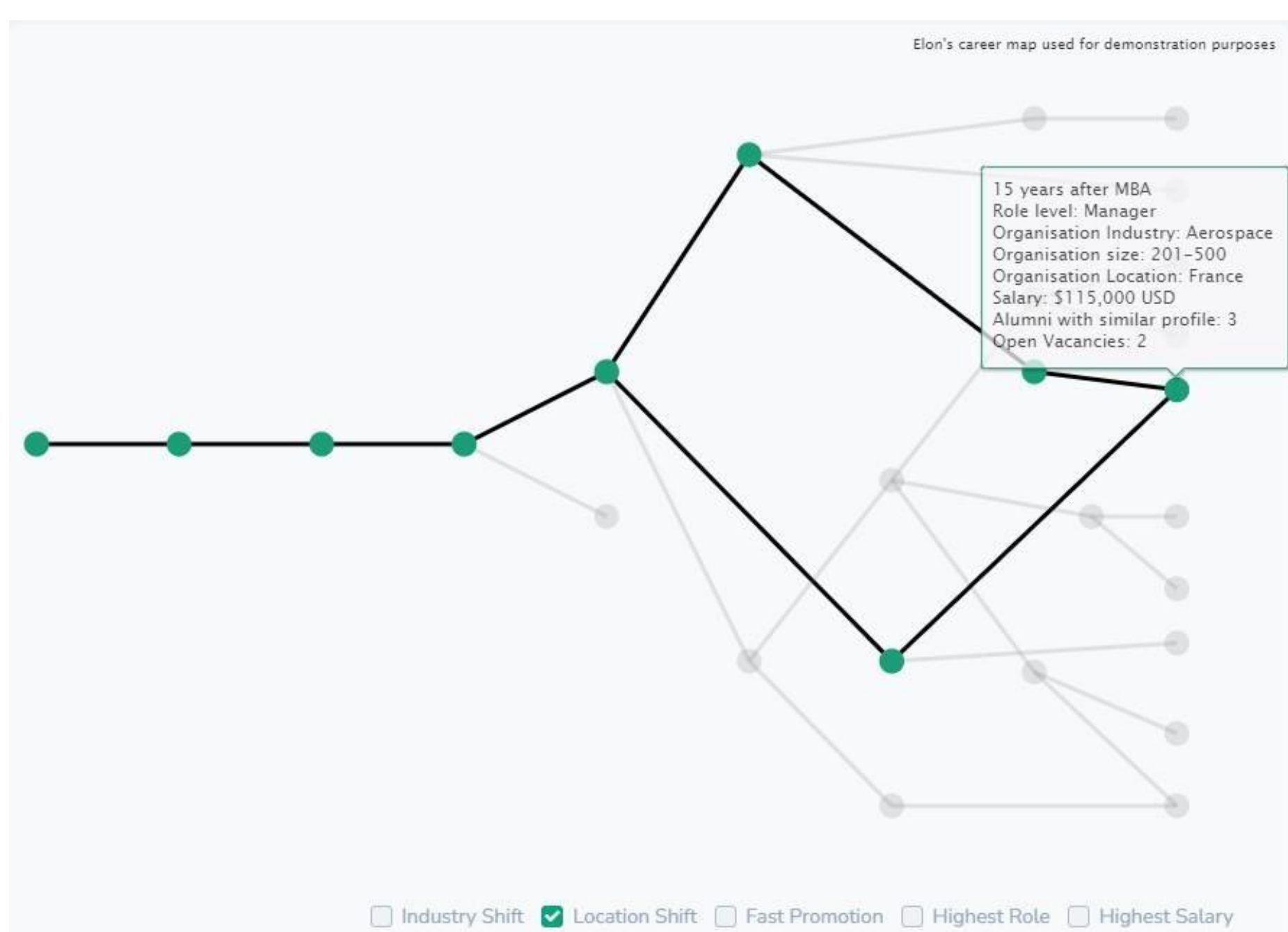


Figure 1: Career Map Concept note showcasing a potential location shift in career progression, illustrating how career transitions are visually represented.

Users provide key data such as current roles, sectors, skills, and targeted future positions (see Fig. 2). The system aggregates these inputs against similar profiles to generate detailed insights, including statistical analyses of role progression timelines, common industry transitions, and demographic distributions.

Figure 2: User Input fields capturing specific parameters (job role, experience, skills) to match and analyze similar professional profiles in the platform.

Immersive Career Visualization

Dynamic Sankey diagrams visually depict potential career progressions over multiple timelines (2, 5, and 10 years), highlighting possible role advancements and industry shifts (see Fig. 3, Fig. 4). These diagrams enable users to explore realistic career scenarios and understand essential skills or experiences required for successful transitions.

Figure 3: Job Role Evolution Career Map illustrating career progression possibilities from a user's current position (manager) to future target roles (e.g., chief officer).

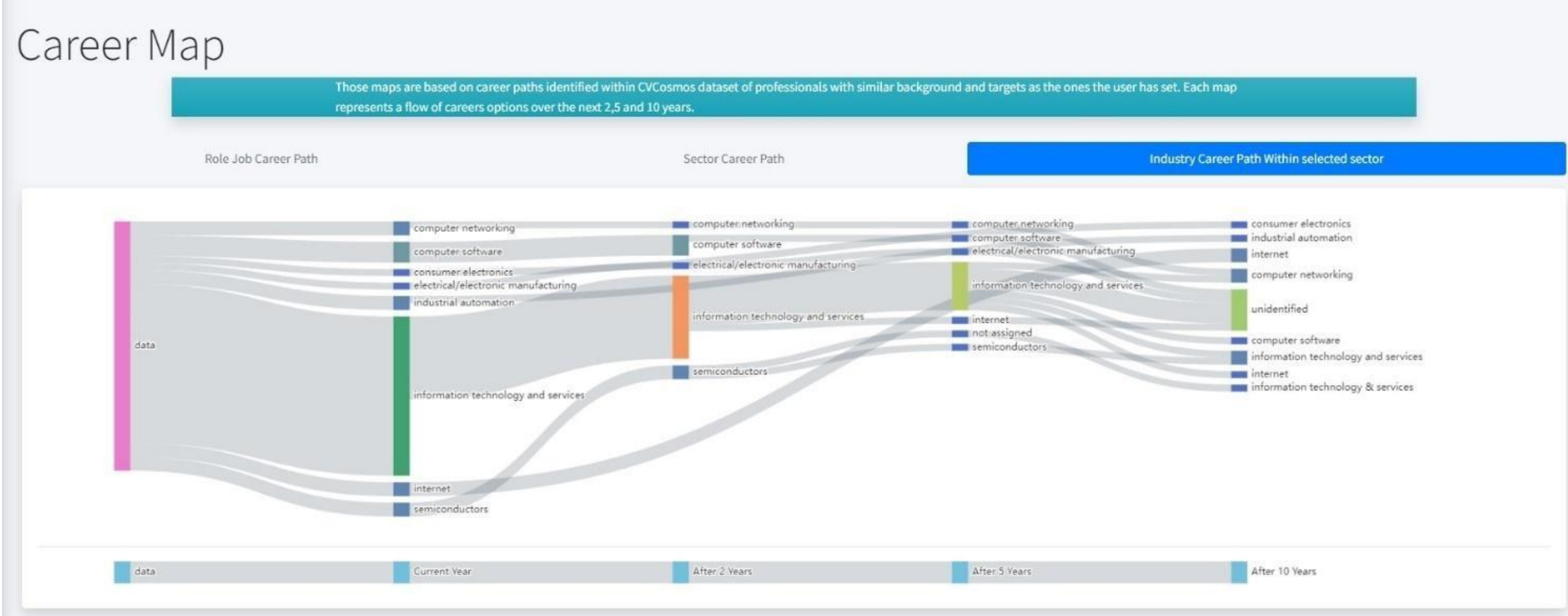


Figure 4: Industry Shift Evolution Sankey diagram visualizing user transitions between different industry sectors over specified time frames.

Integration with AI Technologies

The platform integrates several advanced AI models to enhance user experience and inclusivity. An Automatic Speech Recognition (ASR) model transcribes verbal input into text, enabling intuitive, hands-free interaction [4]. Neural Machine Translation (NMT) ensures robust multilingual support, translating interactions in real-time and addressing accessibility barriers [5]. A Large Language Model-based dialogue system provides personalized, real-time responses, improving user engagement and comprehension [4].

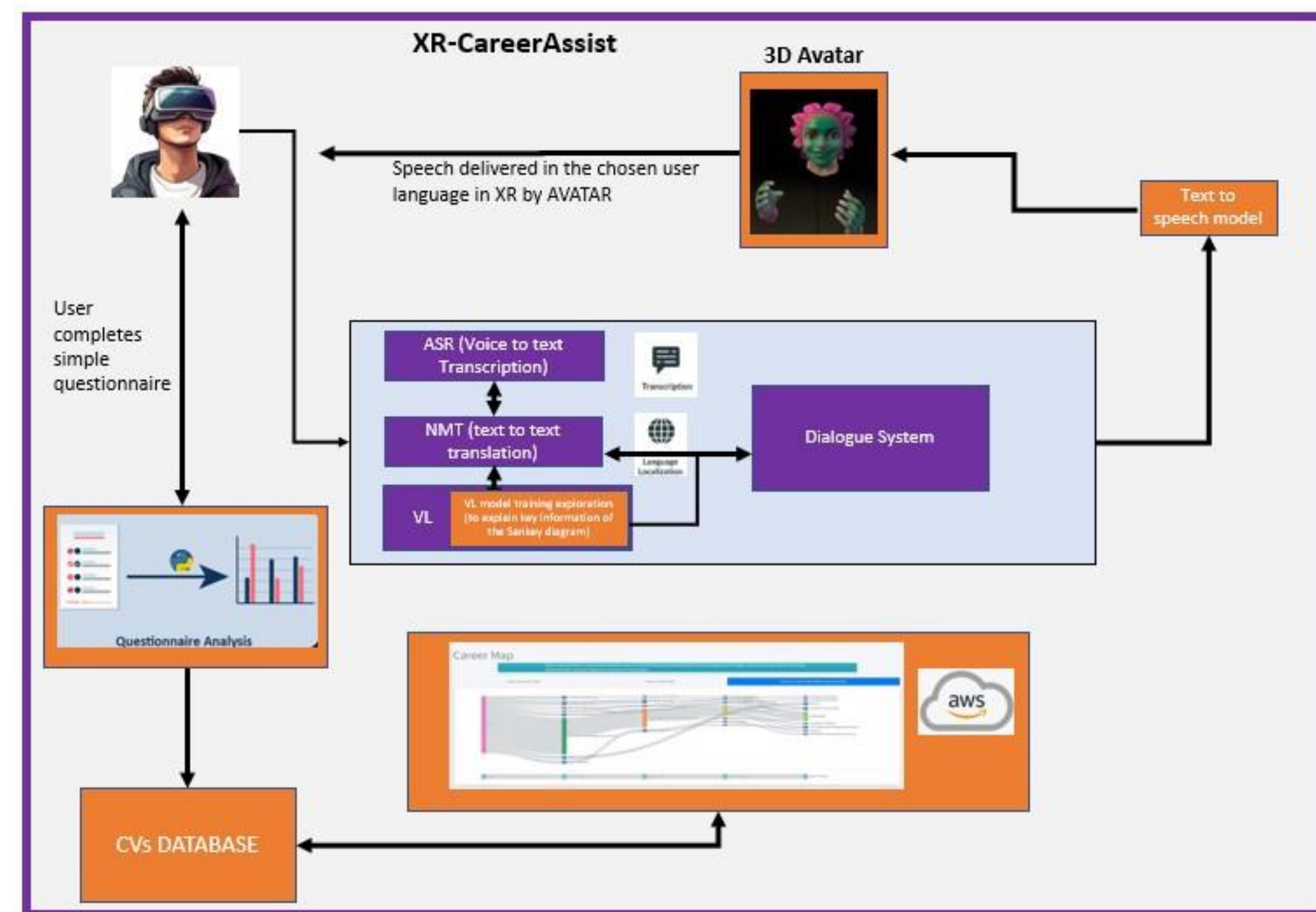


Figure 5: System architecture illustrating integration and workflow of AI models (ASR, NMT, Dialogue System, VLM) within XR-CareerAssist.

Finally, a Vision-Language Model (VLM) aids interpretation of complex visualizations by generating simple, actionable insights from Sankey diagrams [4].

Immersive User Interaction in Virtual Reality

Implemented on the Meta Quest 3.0 platform using Meta SDK 2.0, XR-CareerAssist provides a fully immersive VR experience. Users engage via voice commands and multilingual dialogues, interacting with dynamic 3D avatars. The avatars deliver personalized career recommendations and detailed insights from interactive Sankey diagrams, fostering intuitive exploration of career paths (see Fig. 6).

An initial pilot study involving 25–40 diverse participants, including career counselors and professionals from non-technical backgrounds, will evaluate usability, satisfaction, and accessibility.

Data collected through interaction logs and qualitative feedback will guide iterative improvements, ensuring that XR-CareerAssist meets the practical needs of a global, diverse user base. Long-term goals include deploying the system broadly in educational and vocational settings, contributing significantly to inclusive, impactful career guidance.

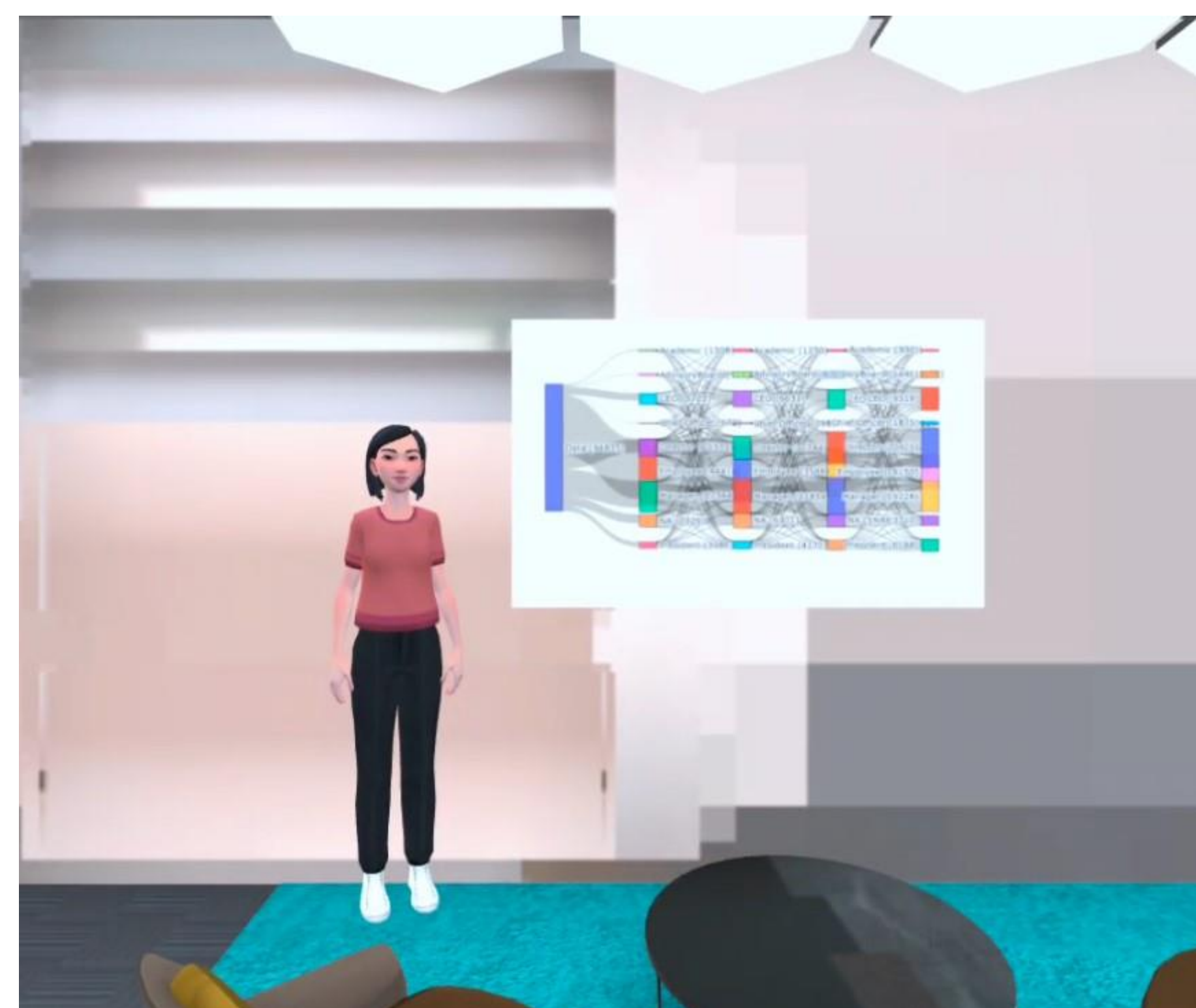


Figure 6: Interactive VR environment showcasing user interaction with career visualizations (Sankey diagram) and AI-driven avatars for personalized guidance.

Future Work

Future efforts for XR-CareerAssist will prioritize iterative refinements informed by pilot study outcomes, focusing specifically on enhancing usability, interpretability, and accessibility of the platform. Key areas identified for improvement include simplifying the interactive Sankey diagram visualizations, increasing personalization of the user experience, and further developing the AI models to improve multilingual support and intuitive interaction. Continuous training of the Vision-Language Model (VLM) on additional annotated Sankey diagrams will be essential to provide clearer and more actionable career insights. Finally, future research will involve broader empirical studies to rigorously validate the practical effectiveness of integrating Extended Reality (XR) and Artificial Intelligence (AI) in career guidance, addressing existing gaps highlighted by limited empirical evaluations in this domain.

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