

ANALYSIS OF AI-DRIVEN APPROACHES TO PROFESSIONAL SELF-DETERMINATION: A FOCUS ON PSYCHOLOGY, SKILLS, AND MARKET TRENDS

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Abstract. Artificial Intelligence (AI) is increasingly transforming career guidance by offering personalized recommendations based on psychological profiles, skill mapping, and labor market trends. This paper examines the current and potential applications of AI in career development, particularly in the fields of psychology, skill mapping, and market trend analysis. By leveraging AI-driven tools, career counselors can provide personalized advice by assessing individual personality traits, cognitive abilities, and professional skills. Additionally, AI systems use real-time labor market data to align individual capabilities with emerging job opportunities, helping people navigate an ever-evolving workforce landscape. This study also explores AI's integration into career counseling tools, such as chatbots, and its role in skill mapping to match personal abilities with career demands. A systematic literature review (SLR) was conducted, including primary studies retrieved from databases such as ScienceDirect, IEEE Xplore, ResearchGate, and ASICT. The findings highlight the growing role of AI in shaping career decisions, offering new opportunities for career development in a competitive job market. Despite being in early stages, AI's potential for revolutionizing career guidance is significant, with the promise of improving decision-making accuracy and aligning skills with market needs.

Keywords: artificial intelligence, career counseling, professional self-determination, psychological self-assessment, personalized career guidance, career development

Introduction. Artificial Intelligence (AI) has revolutionized numerous sectors, and its applications in career guidance and professional self-determination are no exception. As the workforce evolves and new technologies reshape industries, individuals face increasing complexity in making career decisions. AI-driven approaches are increasingly becoming a critical tool in navigating these challenges, offering data-driven insights into career selection based on psychological profiles, skill assessments, and market trends. By analyzing large datasets, AI systems can provide personalized career advice tailored to an individual's strengths, preferences, and potential opportunities within the labor market.

This paper explores the role of AI in career development, with a specific focus on its applications in psychology, skill mapping, and market trends. We examine how AI-driven tools assess psychological factors, such as personality traits and cognitive abilities, to suggest careers that align with an individual's characteristics. Additionally, the study explores the impact of AI in skill mapping, where technologies match an individual's skills to the demands of the labor market, helping to ensure a good fit between a person's abilities and their professional path. Finally, we look into how AI systems leverage real-time labor market data to guide career choices, helping individuals make informed decisions in an increasingly competitive and fast-changing world. The aim of this work is to provide a comprehensive analysis of AI-driven methods in professional self-determination, highlighting both their current applications and future prospects in shaping the workforce of tomorrow.

As AI continues to evolve, the future of career guidance looks even more promising. With advancements in natural language processing (NLP), machine learning, and data analytics, AI-based career counseling tools are expected to become increasingly sophisticated. These tools will not only provide real-time, dynamic advice based on an individual's current profile but also predict future career trajectories by analyzing trends in the labor market, emerging industries, and technological developments. By enabling individuals to better understand the intersection between their personal skills, psychological profile, and external market conditions, AI has the potential to significantly enhance career planning and professional growth. As the workplace continues to undergo transformation due to automation and digitalization, AI-driven career guidance will be crucial in helping individuals adapt to new roles, acquire relevant skills, and stay competitive in a rapidly evolving job market.

Current Applications of AI in Career Guidance. Artificial Intelligence (AI) is increasingly integral to human resource management, providing substantial advantages in efficiency, cost reduction, and decision-making. According to

Microsoft's research (2019), AI has the potential to double innovation rates and enhance productivity by reducing repetitive tasks, enabling employees to focus on skill development and achieve a better work-life balance. In recruitment, AI streamlines processes, boosts HR productivity, and improves the applicant experience. Beyond hiring, AI aids career growth by assessing skills, understanding employee aspirations, and offering data-driven insights for professional development. As digitalization reshapes the workforce, some traditional roles may face challenges, but AI can support adaptive career growth by helping individuals explore new paths and gain relevant skills for a changing work landscape. This trajectory underscores AI's role in achieving sustainable success for both employees and organizations [1].

Modern applications of artificial intelligence (AI) in career guidance play a pivotal role in enhancing the quality and accessibility of professional orientation. AI is actively used to develop platforms that assist students in selecting suitable careers by analyzing their skills, interests, and educational background. For example, AI systems can predict the most likely career paths with high accuracy, as shown in a study predicting students' career choices with 74.1% accuracy [2]. AI also aids in career matching by connecting students with appropriate companies and positions, optimizing the labor market [2]. Furthermore, AI provides personalized career recommendations based on the analysis of professional data and industry trends, making career guidance more accurate and effective. The development of such intelligent platforms allows for the automation of career selection processes, reducing the burden on traditional counseling services and providing students with valuable tools for professional growth.

AI-powered career counseling systems are revolutionizing how students navigate career choices after higher secondary education. These systems assess a student's complete academic profile, including their grades and extracurricular activities, to offer personalized career suggestions. By considering a wide array of factors, such as skills, interests, and academic performance, AI systems significantly reduce the likelihood of academic misalignment and poor professional

decisions. Moreover, they provide a more tailored approach to career guidance, ensuring that each student's unique strengths and preferences are considered. These advancements are not only enhancing the decision-making process but also helping students understand their potential career paths more clearly. In addition, such systems incorporate data-driven predictions to align students with professions that match both their capabilities and the demands of the workforce. As explored in the research [8], AI's role in career counseling is becoming integral in shaping students' futures, with the potential for further growth in providing actionable insights and comprehensive guidance.

AI is increasingly being utilized in career guidance to enhance decision-making processes and support students in making informed career choices. Current applications of AI in career guidance include career counseling tools, skill mapping, and personality-based career selection systems, all of which leverage AI to analyze vast amounts of data and provide personalized recommendations. AI-based career counseling tools, such as chatbots, are designed to assist individuals by offering real-time guidance and personalized advice based on their preferences and skills. These tools can also integrate with various career assessment systems to help students identify career paths that align with their interests and abilities. Additionally, AI is being used in skill mapping to match individuals' skillsets with available career opportunities, ensuring a better fit between a person's abilities and their chosen profession. As AI technologies continue to evolve, these tools are expected to become more sophisticated, offering even more tailored and accurate guidance to individuals in their career journeys [10].

AI-Based Career Counseling Tools and Chatbots. AI-based career counseling tools and chatbots have emerged as innovative solutions to address the challenges faced by secondary school students in navigating their career paths. These systems utilize advanced machine learning models and natural language processing (NLP) techniques to assess a student's personality, academic skills, and interests, ultimately providing tailored career recommendations. By combining

these technologies, AI-powered chatbots offer personalized guidance that adapts to each student's unique profile, ensuring that recommendations align with their strengths and aspirations. The integration of external APIs for career path suggestions further enhances the system's ability to offer up-to-date, industry-specific advice. The proposed methodology emphasizes a secure user authentication process, an interactive personality and skills assessment, and continuous feedback integration, which collectively contribute to a more engaging and effective counseling experience for students. Such systems not only enhance the accuracy and relevance of career advice but also ensure data privacy and security, which is crucial when working with sensitive personal information of minors [3].

In the research presented by [4], the development of a chatbot system aimed at assisting students, faculty, and staff with college-related inquiries is explored. The chatbot leverages natural language processing (NLP) algorithms to process user inputs, identify intents, and match them with appropriate responses from a predefined dataset. The design follows an iterative agile methodology, where prototypes are quickly developed and refined based on user feedback. The research highlights the importance of understanding user needs, particularly in terms of career guidance and college events, and how these insights guide the chatbot's functionality and user interaction design. Unlike traditional systems, the career counseling chatbot integrates seamlessly with the Wit.ai platform, enabling efficient processing of queries without manual intervention. This system offers valuable insights into the practical applications of NLP for educational purposes, especially in providing personalized career counseling to university students.

The proposed approach for career counseling combines machine learning and natural language processing to create a personalized and interactive experience for students. By leveraging an ML-based career prediction model that analyzes students' talents, educational background, and interests, the system offers tailored career recommendations. The integration of the RASA-powered chatbot enhances the experience further by engaging students in personalized conversations and

providing additional guidance. The use of multiple machine learning algorithms, with KNN achieving the highest accuracy, adds credibility to the effectiveness of the model. Overall, this solution presents a comprehensive and innovative way to support students in making informed decisions about their career paths, offering a modern and practical approach to career counseling [6].

The proposed solution, CareEx, aims to address the challenges faced by students in navigating their career choices, offering a comprehensive platform for career guidance. By leveraging AI and machine learning, CareEx provides a career dendrogram, presenting a wide array of alternatives aligned with real workforce demands in both public and private sectors. This system not only helps individuals identify their interests and explore career options, but also offers personalized advice from successful professionals in the field. Additionally, it assists students in setting realistic professional goals and estimating their chances of gaining admission to their desired universities. By providing insights into future career opportunities and empowering users to better understand their strengths, CareEx offers a valuable tool for students to make informed decisions about their educational and career paths. This innovative approach aims to help students build the skills necessary to thrive in a rapidly evolving job market [7].

AI in Skill Mapping and Personality-Based Career Selection. One of the most significant ethical concerns raised in the study was the need for transparency in the use of AI-powered career guidance services. While students did not explicitly express concerns about the ethical implications of AI, they raised important questions about the data used to generate career suggestions and the underlying algorithms that drive these recommendations. This highlights the critical importance of ensuring transparency in AI systems, particularly in how data is collected, processed, and used to inform decision-making. For instance, students wanted to understand which personal and career data the AI was accessing and how this influenced the guidance they received. Transparency is essential not only for building trust among users but also for ensuring that the AI system

operates fairly and without bias. Furthermore, it addresses broader concerns related to privacy, fairness, and accountability, as AI systems are increasingly embedded in educational and professional contexts. This reflects a growing recognition that AI technologies, while offering significant potential benefits, must be deployed responsibly, with clear communication about how they function and how they impact users. Developing guidelines and frameworks for ethical AI use in career guidance will be key to balancing the promise of personalized, data-driven support with the need to protect users' rights and maintain fairness in the decision-making process [5].

In this study, the performance of different classifiers in predicting MBTI personality types was evaluated using several machine learning techniques, including SMOTE (Synthetic Minority Over-sampling Technique), feature selection, and popular classifiers such as Support Vector Machine (SVM), Random Forest, and Logistic Regression (LR). SMOTE, which addresses class imbalance by generating synthetic samples, played a crucial role in improving the performance of these classifiers. For instance, Random Forest achieved an accuracy of 91%, with an average AUC of 0.92, demonstrating its robustness in handling imbalanced datasets. The classification results were measured using several metrics, including precision, recall, and F-score.

The formulas for precision ($\text{Precision} = \frac{TP}{TP+FP}$), recall ($\text{Recall} = \frac{TP}{TP+FN}$), and score ($\text{F-score} = 2 \cdot \frac{\text{Precision} \cdot \text{Recall}}{\text{Precision} + \text{Recall}}$) were used to assess the classifier performance across different personality types, where TP, FP and FN represent true positives, false positives, and false negatives, respectively. These formulas reflect the model's ability to correctly identify personality traits while minimizing misclassification.

The experimental results for the classifiers are presented in various tables, which show the performance of each algorithm across different personality types. For example, Random Forest results with SMOTE indicated that the model achieved high precision and recall values for most personality traits, such as 0.88 for extrovert, 0.87 for introvert, and 0.92 for thinking. These results highlight the

ability of Random Forest to handle complex, high-dimensional data effectively. Similarly, SVM also performed well with an average AUC of 0.93 with the best performance observed for thinking (AUC = 0.93) and intuition (AUC = 0.92). These results reinforce the idea that classifier selection, when combined with techniques like SMOTE and feature selection, can significantly improve the accuracy of personality prediction models, offering valuable insights for applications such as career suggestions based on MBTI traits [9].

Conclusion. In conclusion, the integration of artificial intelligence (AI) into career counseling and career choice assistance opens up new possibilities for enhancing the career guidance process. The use of AI significantly increases the accuracy and personalization of recommendations for students, based on a deep analysis of data such as skills, interests, academic achievements, and personal qualities. With technologies like machine learning and natural language processing, AI platforms can effectively predict career paths, help students select the most suitable professions, and even forecast their chances of success in specific fields. These systems automatically analyze vast amounts of data and provide up-to-date advice tailored to the real needs of the labor market.

One key aspect is the use of AI in the form of chatbots and platforms for career counseling, which allow for personalized recommendations in real-time. Through tools such as analysis of academic performance, extracurricular activities, and personal interests, AI systems offer recommendations that are more accurately aligned with students' individual preferences. This significantly reduces the likelihood of errors in career choice and helps prevent academic mismatches. Platforms like CareEx use AI to create careers that meet the actual demands of the labor market and students' potential interests, offering them relevant and well-founded advice on career paths and professional goals.

Additionally, AI is actively used for skill mapping and personality profiling, which allows aligning personal traits with the requirements of professions. AI-based systems can efficiently process data and predict which careers will be most

suitable for an individual. For example, the use of machine learning methods to predict personality types based on the MBTI model shows high accuracy and enables the suggestion of career paths that best match a student's personality traits. This opens new horizons for creating more accurate and justified career recommendations, based on a broader range of factors than just academic performance.

However, despite all the benefits of using AI in career guidance, ethical considerations related to the use of personal data and decision-making algorithms must be taken into account. Recent studies emphasize the need for transparency in data use, as many students express concerns about what data is being used to generate career recommendations and how these recommendations influence their future. It is crucial that such systems operate based on transparent and ethical principles, considering user rights and minimizing the risks of bias in algorithms. This requires AI platform developers to establish clear standards and frameworks that ensure the safety and fairness of these systems.

Thus, despite the potential challenges and risks, AI has a positive impact on the career counseling process, significantly improving the quality and accessibility of services for students. It helps not only make well-informed decisions but also opens up new perspectives for career growth, aligned with the modern demands of the labor market. Future developments in AI will further improve the accuracy and personalization of recommendations, which in turn will provide students with more effective tools for planning their professional lives. It is essential that these technologies develop in accordance with ethical standards, which will allow their full potential to be realized and ensure sustainable success for both students and society as a whole.

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