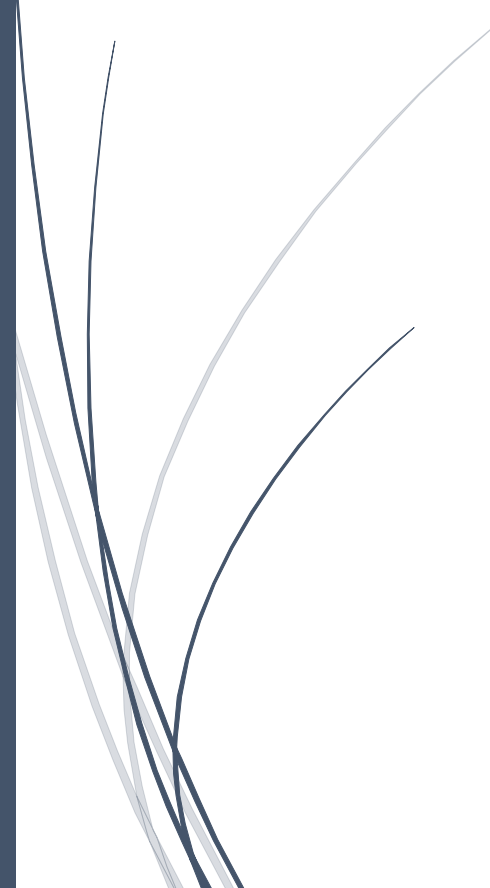


The logo for RADemics, featuring the text "RADemics" in white on a blue arrow-shaped background pointing to the right. The arrow is part of a larger blue horizontal bar that is positioned over a dark blue vertical bar on the left side of the page.

RADemics

AI-Enabled Career Prediction and Skill Mapping Systems for Higher Education Students

A decorative graphic consisting of several thin, curved lines in shades of blue and grey, originating from the bottom left and extending upwards and to the right, resembling stylized grass or reeds.

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AI-Enabled Career Prediction and Skill Mapping Systems for Higher Education Students

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Abstract

The rapid transformation of the global job market and the increasing complexity of career pathways require a new approach to career counseling within higher education. Traditional methods often fail to meet the diverse and evolving needs of students, particularly in the context of emerging industries and non-traditional career paths. This chapter explores the application of Artificial Intelligence (AI) in career prediction and skill mapping systems, focusing on how these technologies can be leveraged to offer personalized, data-driven career guidance. AI-powered systems analyze a wide range of student data, including academic performance, extracurricular activities, and social media presence, to generate tailored career recommendations that align with individual interests, competencies, and evolving job market demands. The chapter examines the integration of deep learning, natural language processing, and predictive analytics in career prediction models and skill mapping frameworks, while also addressing the challenges posed by data imbalance and ethical considerations. Key insights are drawn from case studies demonstrating the successful implementation of AI in educational institutions, emphasizing its potential to improve student engagement, academic motivation, and long-term career outcomes. As the job market continues to evolve, the chapter emphasizes the growing importance of AI in preparing students for future careers by ensuring that skill mapping and career guidance remain relevant, dynamic, and personalized.

Keywords: Artificial Intelligence, Career Prediction, Skill Mapping, Deep Learning, Personalization, Data-driven Systems.

Introduction

The landscape of career guidance in higher education is undergoing a radical shift, largely driven by advancements in technology [1]. Traditional career counseling approaches, which often rely on generalized advice and standardized assessments, struggle to keep pace with the rapid evolution of the job market [2]. As industries transform and new career paths emerge, students are faced with a growing need for personalized career guidance that takes into account their unique skills, interests, and aspirations [3]. The emergence of Artificial Intelligence (AI) offers a promising solution, enabling higher education institutions to provide tailored [4], data-driven

career predictions and skill mapping that align with both students' individual profiles and the dynamic demands of the workforce [5].

AI-powered career prediction systems offer a significant departure from traditional methods by utilizing vast amounts of student data to generate highly personalized career recommendations [6]. These systems collect and analyze a wide range of information, including academic performance, extracurricular involvement, soft skills, and even digital footprints such as social media activity and online learning [7]. By integrating these data points, AI models can paint a more accurate and holistic picture of a student's capabilities and career potential [8]. Unlike traditional methods, which often rely on a limited set of factors [9], AI enables a nuanced understanding of a student's readiness for various career paths, ensuring that the career guidance provided is both relevant and aligned with real-world job market trends [10].

Deep learning and machine learning algorithms play a central role in the accuracy and effectiveness of AI-driven career prediction and skill mapping systems [11]. These technologies enable the processing of large, complex datasets to uncover hidden patterns and relationships that might otherwise go unnoticed [12]. For example, deep learning models can analyze past academic performance, extracurricular activities, and even psychological traits to predict a student's success in specific careers [13]. Through iterative learning, these systems continuously refine their predictions as they gain access to new data, making career counseling a dynamic, real-time process [14]. This adaptability is especially valuable in today's fast-paced job market, where industries are constantly evolving and emerging career opportunities require a diverse and ever-changing set of skills [15].