

The logo consists of a blue arrow pointing to the right, containing the text "RADemics" in white. The arrow is positioned on a dark blue vertical bar that runs down the left side of the page.

RADemics

Machine Learning–Based Faculty Shortlisting and HRM Decision Support Systems

A decorative graphic in the bottom-left corner consisting of several thin, curved lines in shades of blue and grey, resembling stylized grass or reeds.

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Machine Learning–Based Faculty Shortlisting and HRM Decision Support Systems

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Abstract

Rapid expansion of higher education institutions and increasing global competition in academic recruitment have intensified the complexity of faculty selection processes. Evaluation of large applicant pools with diverse academic qualifications, research productivity indicators, teaching experience, and professional achievements creates significant challenges for human resource departments responsible for identifying highly qualified candidates. Conventional recruitment practices based on manual screening require extensive administrative effort and often result in inconsistencies during candidate evaluation. Data-driven analytical frameworks supported by machine learning techniques offer an effective approach for transforming traditional recruitment processes into intelligent decision-support systems. Machine learning–based recruitment systems enable automated analysis of candidate profiles by processing structured and unstructured data extracted from academic resumes, institutional records, and research publication databases. Data preprocessing and feature engineering techniques convert raw candidate information into structured analytical attributes representing academic qualifications, research publications, citation metrics, research grants, and professional expertise. Classification and ranking algorithms analyze these attributes to predict candidate eligibility and generate prioritized shortlists aligned with institutional recruitment requirements. Comparative evaluation of machine learning algorithms contributes to identification of effective analytical models capable of improving prediction accuracy and recruitment consistency. Integration of intelligent recruitment analytics with HR decision support interfaces provides transparent visualization of candidate performance indicators and algorithmic recommendations, assisting HR administrators and academic selection committees in performing systematic and evidence-based recruitment decisions. Such intelligent systems enhance recruitment efficiency, promote transparency in candidate evaluation, and support scalable analysis of large applicant datasets within modern academic environments. Adoption of machine learning–driven HR decision support systems therefore represents a significant advancement in faculty recruitment practices and contributes to the development of data-driven human resource management strategies in higher education institutions.

Keywords: Machine Learning, Faculty Shortlisting, Human Resource Management, Recruitment Analytics, Decision Support Systems, Academic Recruitment.

Introduction

Rapid expansion of higher education institutions across the world has significantly increased the demand for qualified faculty members capable of contributing to both teaching excellence and

research advancement. Universities operate within an increasingly competitive academic environment where institutional reputation, global rankings, research output, and student outcomes strongly depend on the competence of academic staff [1]. Recruitment of faculty members therefore represents a critical strategic activity within human resource management frameworks of higher education institutions. Academic recruitment processes involve evaluation of diverse candidate attributes such as doctoral specialization, research publications, citation impact, teaching experience, professional achievements, and interdisciplinary contributions [2]. Growth in doctoral graduates and international academic mobility has resulted in substantial increases in the number of applications received for faculty positions. Evaluation of these large applicant pools requires systematic analysis of complex candidate profiles [3]. Traditional manual screening approaches demand significant administrative effort and often create delays in recruitment processes. Inconsistent evaluation criteria across selection committees also introduce challenges in maintaining fairness and transparency during candidate assessment [4]. Increasing complexity of faculty recruitment therefore highlights the importance of structured analytical systems capable of supporting efficient and objective candidate evaluation. Adoption of intelligent recruitment technologies within academic human resource management systems represents an emerging strategy for addressing these challenges and improving the effectiveness of faculty selection processes [5].

Traditional faculty recruitment procedures generally follow a sequence of activities that include announcement of vacancies, submission of applications, preliminary screening, shortlisting of candidates, interview evaluation, and final appointment decisions [6]. During preliminary screening stages, recruitment committees examine candidate resumes, academic transcripts, research publications, recommendation letters, and other supporting documents. Each candidate profile contains extensive information describing educational background, research contributions, conference participation, funded projects, professional memberships, and institutional affiliations [7]. Examination of these diverse attributes requires careful interpretation of both qualitative and quantitative academic indicators. Large universities frequently receive hundreds of applications for a single faculty position, particularly in specialized academic disciplines [8]. Manual review of such extensive documentation requires considerable time and effort from HR professionals and academic experts. Variation in interpretation of recruitment criteria among different committee members also leads to inconsistent evaluation outcomes [9]. Differences in research priorities, disciplinary expectations, and institutional perspectives often influence candidate assessment during shortlisting stages. Absence of standardized analytical frameworks increases the likelihood of subjective judgment during candidate evaluation. Efficient management of recruitment data therefore requires systematic mechanisms capable of processing large volumes of applicant information while maintaining consistent evaluation standards [10].