International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 10, NCREHAASTE - 2026

Ai-Based Resume Screening and Candidate Ranking: An Intelligent Approach to Efficient Recruitment

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ABSTRACT

Artificial Intelligence (AI) has become an important technology in modern Human Resource Management (HRM) and is increasingly being used to improve the recruitment and selection process. One of the major applications of AI in recruitment is AI-based resume screening and candidate ranking. These systems are designed to analyse a large number of resumes, identify relevant information about candidates, compare candidate profiles with job requirements, and assist HR professionals in preparing a shortlist. Traditional resume screening is mainly performed manually by HR professionals, which can require considerable time and effort, especially when an organisation receives hundreds or thousands of applications for a single position. AI-based systems can support this process by processing large volumes of resumes in a shorter period and organising candidate information in a structured manner.

AI-based resume screening systems commonly use technologies such as Natural Language Processing (NLP), machine learning, keyword and skill extraction, automated matching, and ranking algorithms. NLP enables the system to understand and extract information from resumes, such as educational qualifications, work experience, technical skills, certifications, and other relevant details. Machine learning techniques can be used to identify patterns in candidate profiles and compare them with the requirements of a particular job. Based on predefined criteria or matching models, candidates may then be ranked according to their relevance to the position. Such systems can help organisations reduce administrative workload, improve processing speed, and provide greater consistency in the initial stage of recruitment.

Keywords: Artificial Intelligence, Resume Screening, Candidate Ranking, Recruitment, Natural Language Processing, Machine Learning, Human Resource Management, Algorithmic Bias, Human Oversight, Recruitment Technology.

INTRODUCTION

Recruitment is one of the most important functions of Human Resource Management (HRM) because the success of an organisation depends significantly on its ability to attract and select suitable employees. Organisations require people whose qualifications, skills, knowledge, experience, and capabilities match the requirements of particular jobs. An effective recruitment process helps organisations identify suitable candidates and place the right person in the right position. However, recruitment can become a complex and time-consuming activity when organisations receive a large number of applications for a limited number of vacancies.

In a traditional recruitment process, HR professionals generally review applications, study resumes, compare candidate qualifications with job descriptions, shortlist suitable applicants, conduct interviews, and finally support selection decisions. The initial resume screening stage can require considerable time and administrative effort. HR professionals may have to examine hundreds or even thousands of resumes to identify candidates who meet the basic requirements of a vacancy. Manual screening may also become difficult when resumes are presented in different formats and contain information in different styles.

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Artificial Intelligence (AI) provides various tools that can support several activities within the recruitment process. AI-based systems can process large amounts of candidate information, identify relevant skills and experience, compare candidate profiles with job requirements, and generate matching or ranking outputs

AI-based resume screening refers to the use of computational methods and AI-related technologies to analyse candidate resumes and identify information relevant to a particular vacancy. A resume may contain different types of information, including educational qualifications, professional skills, technical skills, work experience, certifications, job titles, industry experience, achievements, and other career-related details

Meaning of AI-Based Resume Screening

AI-based resume screening is the automated or semi-automated analysis of candidate resumes using Artificial Intelligence-related technologies to identify, extract, organise, and compare job-relevant information.

An AI-based screening system may identify information such as:

Educational qualifications – degrees, courses, and academic qualifications relevant to the position.

Professional and technical skills – specific skills required for performing the job.

Work experience – previous employment, duration of experience, and relevant responsibilities.

Certifications – professional certificates, training, and specialised qualifications.

Job titles – previous positions held by the candidate.

Industry experience – experience gained in relevant industries or business sectors.

Job-related keywords and phrases – terms that correspond to requirements mentioned in the job description.

Relevant achievements – accomplishments, projects, awards, or other information related to the vacancy.

The extracted information can then be compared with the requirements of a job description. Based on the system design, candidates may receive a matching score or be arranged according to their apparent relevance. This process can support HR professionals during the initial shortlisting stage.

Candidate Ranking

Candidate ranking refers to the process of arranging applicants according to their level of apparent relevance to a particular job. In an AI-based recruitment system, candidates may be evaluated using predefined criteria such as educational qualifications, skills, work

Traditional Resume Screeningvs. AI-Based Resume Screening

Basis	Traditional Screening	AI-Based Screening
Process	Mainly manual review by HR professionals	Automated or semi-automated analysis of resumes
Time	Can take more time when application volumes are high	Can process large volumes more quickly
Consistency	May vary between different reviewers	Can apply predefined screening criteria consistently
Candidate Matching	HR manually compares resumes with job requirements	System can compare resume information with job requirements
Ranking	HR manually shortlists and organises candidates	System can generate matching scores or rankings
Human Role	High involvement throughout the initial screening stage	Human review remains important after automated screening
Data Processing	Requires manual extraction	Can automatically extract and

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Basis	Traditional Screening	AI-Based Screening
	and comparison of information	organise relevant information
Scalability	More difficult to manage very large application volumes	Can support screening of large numbers of applications
Decision Support	Mainly depends on HR's manual assessment	Provides automated information and matching outputs to support HR

LITERATURE REVIEW

Hunkenschroer and Luetge (2022) studied the use of AI in recruitment and selection. They highlighted that AI can support resume screening and candidate selection, while also raising concerns about bias, privacy, and transparency.

Hunkenschroer and Kriebitz (2023) examined AI recruitment from a human-rights perspective. Their study discussed the benefits of automation along with risks such as discrimination, privacy concerns, and lack of transparency.

Pisanelli (2022) studied automated resume screening and gender differences in hiring. The research showed that automated screening can influence candidate shortlisting, highlighting the importance of fairness in recruitment systems.

Chen (2023) examined ethical and discrimination issues in AI-based recruitment. The study emphasized that biased data or algorithms can lead to unfair recruitment outcomes and therefore require careful monitoring.

Albassam (2023) reviewed AI-based recruitment strategies such as resume screening, candidate matching, and automated assessment. The study highlighted their potential to improve recruitment efficiency while identifying ethical challenges.

Mori et al. (2024) conducted a systematic review of AI in recruitment and selection. Their research emphasized the importance of ethics, responsible AI implementation, and consideration of candidates' perspectives.

Heakl et al. (2024) introduced *ResumeAtlas* for large-scale resume classification using Large Language Models. Their study demonstrated the potential of AI for efficient resume classification while identifying challenges related to data quality and resume formats.

Rigotti and Fosch-Villaronga (2024) examined fairness in AI-based recruitment. They focused on algorithmic bias, discrimination, transparency, accountability, and data protection in automated hiring systems.

Gan et al. (2024) explored the use of Large Language Model agents for automated resume screening. Their research showed how LLMs can support resume analysis, classification, and candidate evaluation.

Abhishek et al. (2025) developed an intelligent resume screening tool using AI-based analysis and recommendation features. The study highlighted the potential of automation to reduce recruiters' time and effort during initial screening.

Rukadikar and Khandelwal (2025) studied Indian graduates' perceptions of AI-powered recruitment tools. Their findings highlighted the importance of trust, usability, transparency, and candidate experience when adopting AI in recruitment.

Black and van Esch (2020) examined the role of Artificial Intelligence in recruitment and selection. Their study discussed how AI can help organizations identify and evaluate candidates more efficiently. They also highlighted the need for organizations to understand the limitations of AI when making recruitment decisions.

van Esch, Black and Ferolie (2019) studied the use of AI in recruitment and its influence on applicant reactions. Their research suggested that candidates may respond differently to AI-based recruitment compared with traditional human-led processes. The study highlighted the importance of transparency and candidate experience when implementing AI in hiring

RESEARCH METHODOLOGY

This research follows a descriptive and conceptual research design to examine the role of Artificial Intelligence (AI) in resume screening and candidate ranking. The study is based on secondary data collected from research papers, academic journals, articles, reports, and reliable online sources related to AI and recruitment.

Research Design

The present study follows a **descriptive and conceptual research design** to examine the role of Artificial Intelligence (AI) in resume screening and candidate ranking. The study focuses on understanding how AI can support recruiters in

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identifying and shortlisting suitable candidates in an efficient and systematic manner.

Objectives of the Study

The main objective of this study is to examine the role of Artificial Intelligence (AI) in resume screening and candidate ranking. The study aims to understand how AI can support recruiters in identifying suitable candidates more efficiently. The specific objectives are:

- To understand the role of AI in the recruitment and selection process.
- To examine how AI can screen resumes based on qualifications, skills, and work experience.
- To understand the process of ranking candidates according to job requirements.
- To identify the benefits of AI-based screening, such as saving time and reducing manual effort.
- To examine challenges related to bias, fairness, transparency, accuracy, and data privacy.

Research Design

The study follows a **descriptive and conceptual research design**. It is based on **secondary data** collected from research papers, academic journals, conference papers, articles, and reliable online sources related to AI, recruitment, resume screening, and candidate ranking. The collected information is reviewed and analyzed to understand how AI can be used to match candidate profiles with job requirements. The study considers factors such as educational qualifications, skills, work experience, and job-related competencies. The research also examines how AI can support recruiters in shortlisting and ranking candidates while maintaining human involvement in the final recruitment decision.

Limitations of the Study

The study has some limitations. It is mainly based on secondary data; therefore, the findings depend on the availability and reliability of existing research. The study does not involve testing an actual AI resume screening system with real candidates. Different resume formats, incomplete information, and variations in job requirements may affect the accuracy of AI-based screening. In addition, issues such as algorithmic bias, fairness, privacy, and transparency can influence the effectiveness of AI in recruitment. Since AI technology is continuously developing, some findings may change with future technological advancements.

Data Sources

The study is based on **secondary data**. Relevant information has been collected from research papers, academic journals, published articles, conference papers, and reliable online sources related to Artificial Intelligence, recruitment, resume screening, candidate ranking, and Human Resource Management. The studies selected for the research mainly focus on recent developments and challenges in AI-based recruitment.

Key Factors of the Study

The research considers important factors used during resume screening and candidate evaluation, such as educational qualifications, skills, work experience, job-related competencies, and job description requirements. These factors help in determining the suitability of a candidate for a particular job role.

Data Analysis

The collected information is analyzed using a **qualitative and conceptual approach**. Previous research findings are reviewed and compared to understand how AI-based systems can screen resumes, match candidates with job requirements, and rank candidates according to their suitability. The study also examines the potential benefits and limitations of these systems.

ANALYSIS AND INTERPRETATION

This chapter analyses the working process, potential benefits, challenges, and human involvement associated with AI-based resume screening and candidate ranking systems. The analysis is based on the secondary literature reviewed for the study and on a conceptual understanding of how AI technologies can be applied to recruitment.

Job Description Analysis

The process begins with the analysis of the job description. The system identifies important information such as educational qualifications, required skills, work experience, certifications, job responsibilities, and other job-related criteria.

For example, if an organisation is looking for an HR Executive, the job description may require an MBA/PGDM qualification, recruitment experience, knowledge of HR processes, communication skills, and proficiency in Excel. These requirements can become the basis for candidate matching.

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Resume Collection

Candidate resumes are collected through different recruitment channels. These may include online recruitment portals, company career websites, email applications, recruitment agencies, or Applicant Tracking Systems (ATS).

When organisations receive a large number of applications, automated systems can help collect and organise resumes in a centralised manner. This makes it easier to process candidate information during the initial recruitment stage.

Human Review

The final stage involves human review. HR professionals examine shortlisted candidates and may verify resume information, conduct interviews, assess communication and interpersonal skills, and consider other factors relevant to the position.

Human review is important because not every aspect of candidate suitability can be identified from resume data or an automated score.

Illustrative Working Flow

JobDescriptionAnalysis
↓
ResumeCollection
↓
ResumeParsing
↓
CandidateMatching
↓
CandidateScoring
↓
CandidateRanking

HRProfessionalReview
↓
Interview and Selection

Illustrative Matching Example

Job Requirement	Candidate Profile	Match
MBA/PGDM	MBA	Yes
HR Experience – 2 years	2 years HR experience	Yes
Recruitment Experience	Recruitment experience	Yes
Advanced Excel	Advanced Excel	Yes
Payroll Experience	No payroll experience	No

The above example shows how an AI system may compare specific job requirements with information extracted from a candidate's resume. A positive match indicates that the available resume information corresponds to the requirement, while a negative match indicates that the requirement was not identified in the candidate profile.

Illustrative Candidate Ranking

For explanation purposes only, an AI system could produce results such as:

Candidate	Illustrative Matching Score
Candidate A	92%
Candidate B	84%
Candidate C	76%
Candidate D	61%

These figures are **illustrative examples only**. They are not results obtained from primary data, an actual organisation, or a real commercial AI recruitment system.

The example demonstrates how candidate ranking may help recruiters organise applications according to predefined criteria. However, the ranking should be followed by human review before any recruitment decision is made.

FINDINGS AND SUGGESTIONS

This chapter presents the major findings obtained from the literature review and conceptual analysis of AI-based resume screening and candidate ranking systems. It also provides practical suggestions for the responsible and effective use of Artificial Intelligence in recruitment. The findings focus on the potential contribution of AI to recruitment efficiency as well as the technical, ethical, and organisational challenges associated with its use.

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Findings

AI Can Support Initial Resume Screening

The study finds that AI can support the initial stage of resume screening by processing candidate information quickly. When organisations receive a large number of applications, AI-based systems can help analyse resumes and identify information relevant to the job requirements. This can reduce the amount of time required for initial screening.

NLP Can Help Analyse Resume Text

Natural Language Processing (NLP) can help identify relevant information from unstructured resume text. Resumes may contain different formats, terminology, and descriptions. NLP can assist in identifying skills, qualifications, job titles, work experience, certifications, and other relevant information.

AI Can Reduce Repetitive Administrative Work

AI can reduce repetitive administrative activities associated with initial resume screening. Activities such as extracting candidate information, identifying relevant skills, and comparing applications with predefined requirements can be partially automated.

AI Effectiveness Depends on Data and System Design

The usefulness of AI-based recruitment depends on several factors, including data quality, system design, implementation, and the criteria selected for screening. An AI system may not produce useful results if it is based on incomplete or inappropriate data or if the screening criteria do not properly reflect job requirements.

Keyword-Only Screening Can Overlook Candidates

The study finds that keyword-only screening may overlook relevant candidates whose skills or experience are expressed using different terminology.

For example, two candidates may have similar abilities but describe their experience using different words. A system that depends heavily on exact keywords may fail to recognise the similarity between the profiles.

Algorithmic Bias Is an Important Concern

Algorithmic bias is an important concern in automated recruitment. Bias may be influenced by historical data, model design, selected variables, or the way recruitment criteria are defined.

If inappropriate patterns are present in the data or system design, automated screening may reproduce those patterns. Regular evaluation is therefore necessary to identify potentially unfair outcomes.

Candidate Data Requires Privacy and Security

Recruitment systems process significant amounts of candidate information. Resumes may contain personal, educational, professional, and employment-related information.

The study finds that organisations need appropriate privacy and security controls to protect candidate data. Access to candidate information should be properly managed, and organisations should follow applicable data-protection requirements.

The responsible implementation of AI requires continuous monitoring, appropriate data protection, bias testing, transparency, system updates, HR training, and the use of fair and job-related assessment criteria. Such an approach can help organisations obtain the efficiency benefits of AI while maintaining appropriate human responsibility and oversight in recruitment

CONCLUSION

Artificial Intelligence has become an increasingly relevant technology in Human Resource Management, particularly in the recruitment and selection process. AI-based resume screening and candidate ranking systems can support organisations in managing the initial stages of recruitment by processing candidate information, identifying job-related qualifications and skills, comparing resumes with job requirements, and organising applicants for further review.

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