International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 13 Issue: 06 | Jun 2026 www.irjet.net p-ISSN: 2395-0072

AI-Powered SmartHire Screener: An Intelligent Resume Screening and Candidate Ranking System Using Natural Language Processing and Large Language Models

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Abstract - *Recruitment is a crucial process for organizations, but manually screening a large number of resumes is often time-consuming and inefficient. Recruiters must review candidate profiles, compare qualifications with job requirements, and identify suitable applicants, which can increase workload and delay hiring decisions. To address these challenges, this paper presents Smart Hire Screener, an AI-powered web-based resume screening and candidate ranking system. The proposed system allows recruiters to upload resumes in multiple formats, including PDF, DOCX, and TXT. Using resume parsing and Natural Language Processing (NLP) techniques, the system extracts key candidate information, including skills, educational qualifications, and work experience. The extracted information is analyzed against job requirements, and candidates are assigned scores based on their relevance to the specified role. The system then generates a ranked list of candidates, highlights matched skills, and provides recommendations to assist recruiters during the shortlisting process. In addition, Smart Hire Screener provides an interactive dashboard for efficiently managing candidate information and viewing screening results. By automating the initial stages of recruitment, the proposed system reduces manual effort, improves screening efficiency, and helps recruiters identify suitable candidates more effectively. The developed prototype demonstrates the practical application of Artificial Intelligence in modern recruitment and talent acquisition processes.*

Keywords*:* Artificial Intelligence (AI), Resume Screening, Resume Parsing, Candidate Ranking, Natural Language Processing (NLP), Skill Matching, Recruitment Automation.

1. INTRODUCTION

Recruitment is one of the most important activities in any organization, as hiring the right candidate directly influences organizational growth and productivity. With the increasing number of job applications for a single position, recruiters often struggle to manually review and shortlist resumes. This traditional approach requires significant time and effort and may lead to inconsistent candidate evaluations.

Recent advancements in Artificial Intelligence (AI) and Natural Language Processing (NLP) have created new opportunities to automate various recruitment tasks. Intelligent screening systems can analyze candidate resumes, identify relevant skills and qualifications, and assist recruiters in selecting suitable applicants more efficiently. Such systems help reduce manual workload and improve the overall hiring process.

To address these challenges, this paper presents Smart Hire Screener, an AI-powered resume-screening and candidate-ranking system. The proposed system supports resumes in multiple formats, such as PDF, DOCX, and TXT. Using resume parsing and NLP techniques, the system extracts candidate information, analyzes relevant skills and qualifications, and compares them with job requirements. Based on the analysis, candidates are assigned scores and ranked according to their suitability for a particular role. The system also provides recommendations and an interactive dashboard to support recruitment decisions.

The primary objective of Smart Hire Screener is to simplify the initial stages of recruitment by automating resume evaluation and helping recruiters identify the most suitable candidates more quickly and efficiently.

2. METHODOLOGY

The Smart Hire Screener system is designed to simplify the resume screening process and assist recruiters in efficiently identifying suitable candidates. The proposed methodology consists of several stages that work together to analyse candidate resumes and generate ranked recommendations.

2.1 Resume Upload

The recruitment process begins when the recruiter uploads candidate resumes through the web application. The system accepts resumes in multiple formats, including PDF, DOCX, and TXT, ensuring flexibility and ease of use.

2.2 Resume Parsing

Once a resume is uploaded, the system extracts the textual content from the document. This step helps convert unstructured resume data into a structured format, making it easier to identify important candidate details such as skills, educational qualifications, certifications, and work experience.

2.3 Information Extraction

After parsing the resume, Natural Language Processing (NLP) techniques are applied to analyze the extracted content. The system identifies relevant information in the candidate's profile, allowing recruiters to better understand the applicant's qualifications and expertise.

2.4 Candidate Evaluation

The extracted information is then compared with the job requirements specified by the recruiter. Based on the degree of matching between candidate qualifications and job expectations, the system generates a suitability score for each applicant.

2.5 Candidate Ranking

Using the calculated scores, candidates are arranged in descending order of relevance. This ranking process helps recruiters focus on the most suitable candidates without manually reviewing every resume.

2.6 Result Generation

Finally, the system presents the screening results through an interactive dashboard. Recruiters can view candidate details, matched skills, scores, and recommendations, enabling them to make faster and more informed hiring decisions.

Results:

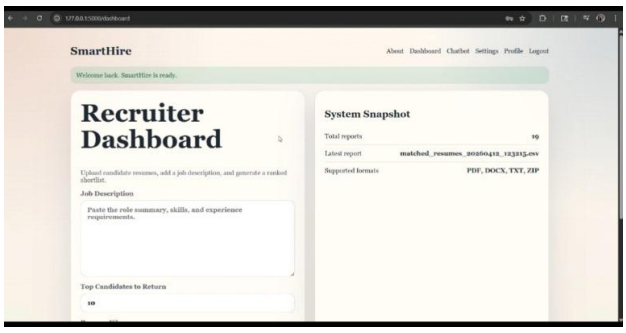

Fig.1 : Resume Screening Dashboard

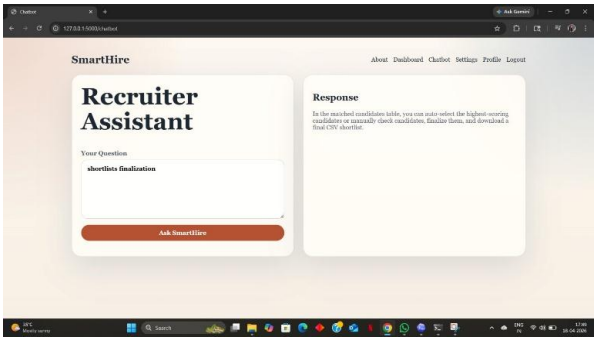

Fig.2 : AI Recruiter Assistant

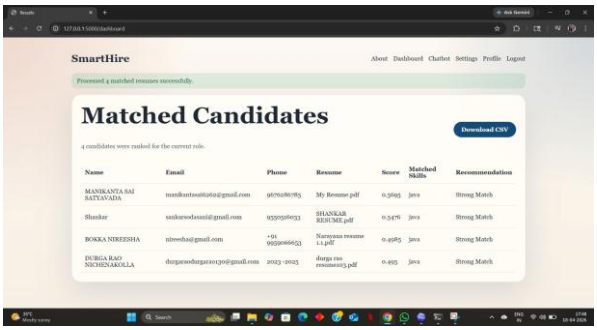

Fig.3 : Candidate Ranking Result

3. DISCUSSION

The developed Smart Hire Screener system successfully automates the initial stages of the recruitment process by reducing the need for manual resume screening. The system accepts resumes in multiple formats and extracts relevant candidate information, making the screening process more efficient and organized. Using Natural Language Processing (NLP), important details such as skills, educational qualifications, and work experience are identified and analyzed to evaluate candidates.

The candidate ranking feature enables recruiters to quickly identify applicants who best match the specified job requirements. Instead of manually reviewing every resume, recruiters can focus on the highest-ranked candidates, which significantly reduces the time required for shortlisting. The generated scores, matched skills, and recommendations provide additional support during decision-making.

The AI-powered recruiter assistant further enhances the usability of the system by allowing recruiters to access candidate-related information and recruitment support through an interactive interface. This feature improves user experience and helps simplify recruitment-related tasks.

The results obtained from the developed prototype demonstrate that Smart Hire Screener can effectively support recruitment activities by improving screening

efficiency, reducing manual effort, and providing structured candidate evaluation. Although the current implementation was tested on a limited number of resumes, the system successfully demonstrated its ability to automate resume processing and candidate ranking. Future improvements can focus on evaluating larger datasets, enhancing matching accuracy, and integrating advanced AI models to further improve recruitment outcomes.

4. CONCLUSIONS

This paper presented Smart Hire Screener, an AI-powered resume screening and candidate ranking system developed to simplify and improve the recruitment process. The proposed system automates the initial stages of hiring by allowing recruiters to upload resumes, extract candidate information through resume parsing and Natural Language Processing (NLP), and evaluate applicants based on job requirements. The system further generates candidate scores, matched skills, and ranked recommendations to assist recruiters in identifying suitable candidates efficiently.

The developed prototype successfully demonstrates the practical application of Artificial Intelligence in recruitment by reducing manual effort and improving the efficiency of candidate shortlisting. The integrated recruiter dashboard and AI-powered assistant provide a user-friendly platform for managing recruitment activities and accessing candidate insights. By automating resume analysis and ranking, the system helps recruiters make faster and more informed hiring decisions.

Overall, Smart Hire Screener serves as an effective recruitment support tool and highlights the potential of AI-driven technologies in modern talent acquisition. Future enhancements can further improve the system by incorporating larger datasets, advanced matching techniques, and additional recruitment analytics features.

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