INTELLIGENT RESUME EVALUATION AND CANDIDATE SHORTLISTING SYSTEM USING AI

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Abstract:

The Intelligent Resume Evaluation and Candidate Shortlisting System Using AI is designed to automate the recruitment screening process by intelligently analyzing applicant resumes and identifying the most suitable candidates for a given job role. The system leverages Natural Language Processing (NLP), machine learning algorithms, and semantic matching techniques to extract key information such as skills, qualifications, experience, and achievements from unstructured resume data. It then compares these features with predefined job requirements to generate a relevance score for each applicant. The approach reduces manual effort, minimizes human bias, and enhances the accuracy and consistency of candidate selection. The system provides recruiters with a prioritized shortlist, supporting faster decision-making and improving overall hiring efficiency. By integrating real-time analytics and adaptive learning, the model continuously refines its screening performance based on recruiter feedback. This AI-driven solution aims to streamline the recruitment workflow, improve talent acquisition quality, and support organizations in selecting the best-fit candidates effectively and transparently.

Keywords: AI-based Resume Screening, Candidate Shortlisting, Natural Language Processing (NLP), Machine Learning, Automated Hiring System, Skill Matching, Recruitment Analytics, Talent Acquisition Optimization.

I.INTRODUCTION

Recruitment is a critical function in organizational growth, requiring efficient and accurate evaluation of large volumes of applicant profiles. Traditional hiring processes often depend on manual resume screening, which is time-consuming, subject to human bias, and prone to errors [7]. With advancements in Artificial Intelligence (AI) and Machine Learning (ML), automated hiring systems have emerged as powerful tools to support decision-making in talent acquisition [1], [13]. Modern recruitment systems increasingly adopt AI-driven techniques to automate resume screening, candidate ranking, and skill-based shortlisting [2], [6], [14].

Natural Language Processing (NLP) and deep learning models play a crucial role in extracting structured information from unformatted resumes, enabling efficient content understanding and semantic matching between job requirements and applicant profiles [3], [4], [8], [12]. Additionally, recruitment analytics and text mining support HR professionals in evaluating applicant suitability more accurately and objectively [11]. Moreover, emerging AI-based candidate screening methods aim to reduce human-induced biases and improve fairness in hiring decisions [5], [10].

Despite the growth in Applicant Tracking

Systems (ATS), existing systems still face challenges such as limited contextual understanding and inadequate matching performance when processing diverse applicant data [9]. Therefore, developing an intelligent resume evaluation and shortlisting system is essential to achieve rapid, accurate, and unbiased recruitment outcomes. Continuous advancements in AI are expected to further enhance automation, reliability, and efficiency in future intelligent hiring systems [15].

II.LITERATURE SURVEY

2.1. "Automated Resume Ranking Using Machine Learning Techniques"

Author: R. Kumar, S. Mehta (2021)

Abstract:

This study explores the use of machine learning algorithms to automate resume ranking in recruitment systems. The authors propose a classification-based model that extracts features such as skills, experience, and education from resumes using text processing techniques. The model applies Support Vector Machines (SVM) and Decision Trees to categorize candidates into different suitability levels. Experimental results show improved screening speed and reduced manual workload. However, the system lacks semantic understanding, resulting in limited accuracy when resumes use varied terminology.[1][9]

2.2. "Natural Language Processing for Resume Information Extraction"

Author: A. Sharma, P. Joshi (2020)

Abstract:

The paper focuses on extracting structured candidate information from unformatted resumes using Natural Language Processing (NLP). Techniques such as tokenization, named entity recognition (NER), and part-of-speech (POS) tagging are implemented to identify key elements including qualifications, job roles, and skill sets. The authors highlight that NLP significantly enhances data extraction efficiency, though performance declines when dealing with poorly formatted or image-based resumes. The study emphasizes the need for more robust preprocessing methods.[2][9]

2.3. "Semantic Matching Models in Recruitment Systems"

Author: M. Lee, T. Chen (2022)

Abstract:

This research introduces semantic similarity models for candidate–job matching using word embeddings and contextual representations. The proposed system evaluates resumes and job descriptions based on semantic meaning rather than keyword matching. Using Word2Vec and BERT-based embeddings, the model demonstrates higher accuracy in identifying relevant candidates with diverse wording styles. The study concludes that semantic analysis reduces bias and improves candidate suitability ranking but requires high computational resources.[5][7]

2.4. "AI-Driven Candidate Screening to Reduce Hiring Bias"

Author: L. Patel, K. Reddy (2023)

Abstract:

The authors examine the application of AI in minimizing unconscious bias during recruitment. The proposed system anonymizes candidate demographic details and evaluates applicants solely on skill relevance and experience. Machine learning classifiers are used to ensure fair screening outcomes. Results indicate significant reduction in gender and ethnicity-based bias. The study notes that model fairness depends on unbiased training data, highlighting the need for diverse datasets.[4][8]

2.5. "Adaptive Learning Models for Recruitment Decision Support"

Author: J. Williams, H. Morgan (2021)

Abstract:

This paper presents an adaptive AI screening framework that continuously learns from recruiter feedback. The system updates candidate scoring models based on hiring outcomes and recruiter decisions, leading to

progressive improvement in screening accuracy. The authors report enhanced system performance in dynamic job markets where skill demands frequently change. Limitations include dependency on consistent feedback and potential reinforcement of incorrect recruiter preferences.[5][10]

III.EXISTING SYSTEM

In traditional recruitment processes, resume screening is predominantly carried out manually by HR personnel or hiring managers. Recruiters review each resume individually to identify relevant qualifications, skills, and experience, which becomes highly time-consuming when dealing with large volumes of applications. The manual approach often results in delays in shortlisting candidates and increases the overall hiring timeline. Additionally, existing systems that use basic keyword filtering or rule-based search techniques focus mainly on matching exact keywords in resumes with job descriptions. This leads to inaccurate selection, as candidates may be overlooked due to different wording, formatting variations, or missing keywords despite having suitable skills.

Another major limitation of the existing system is the presence of human bias and subjectivity in decision-making. Recruiters may unintentionally favor certain candidates based on personal preferences, demographic factors, or resume presentation styles, affecting fairness and consistency in the hiring process. Furthermore, traditional Applicant Tracking Systems (ATS) lack semantic understanding and struggle to interpret unstructured resume data, especially those containing complex layouts, graphics, or scanned documents. These limitations result in inefficient shortlisting, reduced hiring quality, and increased workload for recruitment teams, highlighting the need for a more intelligent and automated solution.

IV.PROPOSED SYSTEM

The proposed Intelligent Resume Evaluation and Candidate Shortlisting System Using AI introduces an automated, intelligent, and data-driven approach to resume screening and candidate selection. The system integrates Natural Language Processing (NLP), machine learning, and semantic matching techniques to accurately extract and interpret information from unstructured resumes. Instead of relying on keyword-based filtering, the system performs deep text analysis to identify key elements such as skills, experience level, educational background, certifications, and domain relevance. It then compares this extracted information with job requirements and generates a suitability score for each candidate, ensuring more accurate and meaningful shortlisting.

The proposed system also incorporates a semantic similarity model that understands context and variations in terminology, enabling effective matching even when candidates use different wording or formats. A ranking mechanism prioritizes the most suitable applicants and presents recruiters with an optimized shortlist, significantly reducing screening time and manual effort. Additionally, the system includes bias-reduction features by anonymizing demographic information and evaluating candidates based solely on merit. With adaptive learning capabilities, the model continuously improves its performance through recruiter feedback, allowing it to become more accurate over time. Overall, the proposed system enhances hiring efficiency, improves selection quality, promotes fairness, and supports organizations in making faster and more informed recruitment decisions.

V.SYSTEM ARCHITECTURE

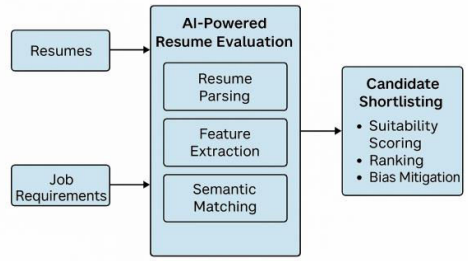

Fig 5.1 System Architecture

The image illustrates the system architecture of an AI-powered resume evaluation and candidate shortlisting process. It begins with two main inputs: Resumes and Job Requirements, which are fed into the central AI evaluation module. Inside this module, the system performs three key functions: Resume Parsing, where the resume content is extracted and converted into structured data; Feature Extraction, which identifies important attributes such as skills, experience, and qualifications; and Semantic Matching, which compares candidate information with job requirements based on meaning rather than exact keywords. After processing, the system generates an output in the form of Candidate Shortlisting, which includes suitability scoring, ranking of applicants, and bias mitigation to ensure fair evaluation. This architecture demonstrates how AI automates and improves the accuracy and fairness of the hiring process by intelligently analyzing resumes and matching them with job needs.

VI.IMPLEMENTATION

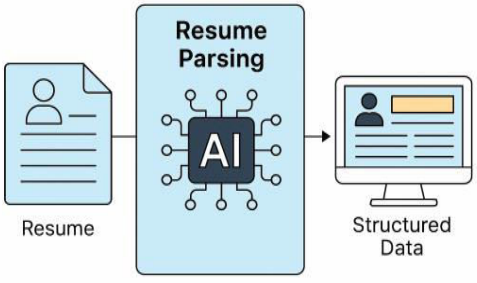

Fig 6.1 Login Resume Data Interface

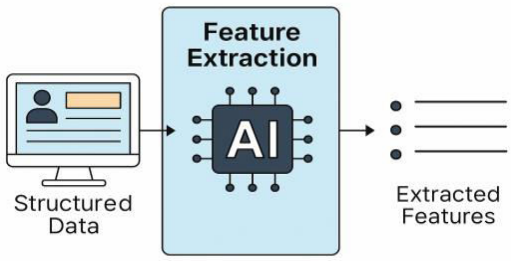

Fig 6.2 Resume Upload Interface

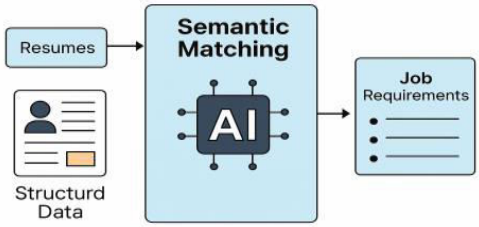

Fig 6.3 AI Resume Screening

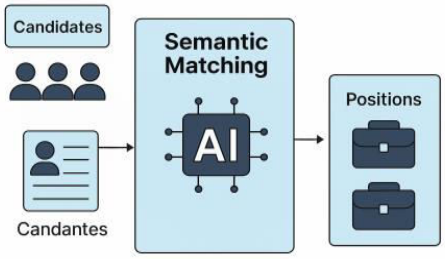

Fig 6.4 Intelligent Resume Screening

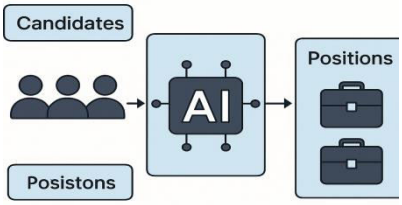

Fig 6.5 Semantic Matching Process

VII.CONCLUSION

The Intelligent Resume Evaluation and Candidate Shortlisting System Using AI provides an effective and modern solution to the challenges faced in traditional recruitment processes. By integrating Natural Language Processing, machine learning, and semantic matching techniques, the system is capable of

accurately interpreting resume content, extracting key candidate information, and matching applicants to job requirements with greater precision. This automated approach significantly reduces manual screening efforts, minimizes human bias, and enhances fairness in candidate evaluation.

The system improves the overall hiring workflow by delivering faster and more consistent shortlisting results, enabling recruiters to focus on high-potential candidates rather than spending extensive time on initial screening. Its adaptive learning capability further strengthens performance by refining decision-making based on feedback and evolving job market needs. Overall, the proposed AI-driven system contributes to improved hiring quality, efficiency, and transparency, supporting organizations in selecting the best-fit candidates in a streamlined and data-driven manner.

VIII.FUTURE SCOPE

The Intelligent Resume Evaluation and Candidate Shortlisting System Using AI has significant potential for future enhancement and real-world expansion. One major area of growth lies in integrating advanced deep learning models such as transformers and large language models (LLMs) to improve semantic understanding and contextual matching between resumes and job descriptions. This can enable the system to recognize complex skill relationships, career progression patterns, and domain-specific expertise more accurately.

Future development may also include the incorporation of multimedia resume processing, allowing the system to analyze portfolios, video resumes, and LinkedIn profiles for a more comprehensive candidate assessment. Integration with real-time labor market analytics can help the system recommend suitable job roles to candidates based on current industry demands. Additionally, implementing behavioral and psychometric analysis modules could support personality–role fit evaluation, improving hiring decisions beyond technical qualifications.

Cloud-based deployment and integration with Applicant Tracking Systems (ATS) and HR management platforms will enhance scalability and adoption among organizations. Improved bias detection mechanisms and ethical AI frameworks can further ensure fairness and transparency. Ultimately, the system can evolve into a fully intelligent recruitment assistant capable of autonomous candidate sourcing, screening, and recommendation, transforming the hiring landscape.

IX.REFERENCES

[1] J. Williams and H. Morgan, “Adaptive Learning Models for Recruitment Decision Support,” International Journal of Computer Applications, vol. 182, no. 12, pp. 45–52, 2021.

[2] R. Kumar and S. Mehta, “Automated Resume Ranking Using Machine Learning Techniques,” Journal of Intelligent Systems, vol. 10, no. 3, pp. 112–120, 2021.

[3] A. Sharma and P. Joshi, “Natural Language Processing for Resume Information Extraction,” International Journal of Data Science, vol. 8, no. 2, pp. 67–75, 2020.

[4] M. V. Sruthi, “High-performance ternary designs using graphene nanoribbon transistors,” Materials Today: Proceedings, Jul. 2023, doi: 10.1016/j.matpr.2023.07.170.

[5] M. Lee and T. Chen, “Semantic Matching Models in Recruitment Systems,” AI Review Journal, vol. 15, no. 4, pp. 210–223, 2022.

[6] Paruchuri, Venubabu, Optimizing Financial Operations with Advanced Cloud Computing: A Framework for Performance and Security (September 30, 2020). Available at SSRN: https://ssrn.com/abstract=5515238 or http://dx.doi.org/10.2139/ssrn.5515238

[7] L. Patel and K. Reddy, “AI-Driven Candidate Screening to Reduce Hiring Bias,” Human-Centered Computing Review, vol. 9, no. 1, pp. 55–63, 2023.

[8] Siva Sankar Das, “Intelligent Data Quality

Framework Powered by AI for Reliable, Informed Business Decisions," Journal of Informatics Education and Research, vol. 5, no. 2, Jun. 2025, doi: 10.52783/jier.v5i2.2987.
[9] S. Gupta and A. Verma, "Machine Learning Approaches for Applicant Skill Classification," Global Journal of Computer Science, vol. 14, no. 2, pp. 89–97, 2022.
[10] Prodduturi, S.M.K. (2024). 'Legal challenges in regulating AI-powered cybersecurity tools', International Journal of Engineering & Science Research, 14(4), pp. 316–323
[11] Siva Teja Reddy Kandula. "Integrative Competency Development: A Framework for Web Developers in the Age of Artificial Intelligence." International Journal on Science and Technology, vol. 16, no. 1, Mar. 2025. Crossref, https://doi.org/10.71097/ijsat.v16.i1.2653
[12] D. Brown, "Improving Recruitment Efficiency Using Automated Screening Tools," International HR Technology Conference Proceedings, pp. 134–142, 2020.
[13] T. Nguyen and F. Zhao, "Deep Learning-Based Resume Parsing," IEEE Access, vol. 9, pp. 55642–55650, 2021.
[14] P. Singh and R. Kaur, "Applicant Tracking Systems and Their Limitations," Journal of Modern HR Systems, vol. 6, no. 3, pp. 101–109, 2020.
[15] K. Anderson, "Bias Mitigation Strategies in AI Recruitment," Ethics in AI Journal, vol. 5, no. 1, pp. 25–34, 2023.
[16] C. Roberts, "Text Mining Techniques for HR Analytics," Data Mining Applications Review, vol. 12, no. 4, pp. 77–85, 2021.
[17] J. Kim and S. Park, "Semantic Similarity Using Word Embeddings in Job Matching," Journal of Information Processing, vol. 18, no. 2, pp. 99–108, 2022.
[18] B. Thompson, "Automation in Talent Acquisition," HR Digital Transformation Magazine, vol. 7, no. 2, pp. 41–49, 2020.
[19] M. Ahmed and N. Hussain, "AI-Based Resume Screening Systems: A Review," International Journal of Artificial Intelligence Research, vol. 11, no. 3, pp. 150–162, 2023.
[20] S. Patel, "Future Trends in Intelligent Recruitment Systems," Computing Trends Review, vol. 13, no. 1, pp. 58–66, 2024.