

AI-powered Resume Screening and Ranking System

A Project Report

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by

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ABSTRACT

In today's fast-paced world, the recruitment process is evolving to meet the demands of efficiency, accuracy, and fairness. The rise of Artificial Intelligence (AI) presents a transformative opportunity in the domain of human resources. This project focuses on leveraging AI to enhance resume screening and candidate ranking, aiming to streamline hiring processes while ensuring the best-fit candidates are identified.

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CHAPTER 1

Introduction

1.1 Problem Statement:

- For each recruitment, companies take out the resume, referrals and go through them manually.
- Companies often received thousands of resumes for every job posting.
- When companies collect resumes then they categorize those resumes according to their requirements and then they send the collected resumes to the Hiring Teams.
- It becomes very difficult for the hiring teams to read the resume and select the resume according to the requirement, there is no problem if there are one or two resumes but it is very difficult in case of hundreds of resumes.
- To solve this problem, we will screen the resume using machine learning and NLP using Python so that we can complete days of work in few minutes.

1.2 Motivation:

- Resume screening is the process of determining whether a candidate is qualified for a role based on their education, experience, and other information captured on their resume.
- It's a form of pattern matching between a job's requirements and the qualifications of a candidate based on their resume.
- The goal of screening resumes is to decide whether to move a candidate forward – usually onto an interview – or to reject them.

1.3 Objective:

The major objective of our system is to take the current resume ranking system to another level and makes it more flexible for both the entity.

1. Candidates, who have been hired.
 2. Client company, who is hiring the candidates
- To propose an algorithm that provides a list of applicants with appropriate experience and then presents the high points of each selected resume, unlike the conventional way of applying filters and manually scanning resumes.
 - To identify the most qualified candidates for a certain vacancy.

- To automate tasks that the human resources can do and recognize and identify human faces.
- It proposes a resume ranking software that uses natural language processing (NLP) and machine learning.
- It could be used in MNCs where multiple resumes must be screened every single day for multiple jobs, government, and administrative offices.
- If an organization gets the right candidates in place in the company, human resources can focus their efforts on building a driven company culture, and on boarding the right human capital for the positions that come up.

1.4 Scope of the Project:

- Designed to meet the needs of recruiters that current technology can't solve, a new class of recruiting technology called AI for recruitment has arrived.
- AI for recruiting is an emerging category of HR technology designed to reduce or even remove-time-consuming, administrative activities like manually screening resumes.
- The best AI software is designed to integrate seamlessly with your current recruiting stack so it doesn't disrupt your work-flow nor the candidate work-flow.
- Industry experts predict this type of automation technology will transform the recruiting function.

CHAPTER 2

Literature Survey

2.1 Advancements in Natural Language Processing (NLP) AI has become an essential instrument in transforming the traditional recruitment processes by automating mundane work, minimizing human interference, and enhancing the accuracy of decision-making. Henry (2024) exemplifies how AI has helped Human Resource Management scale candidate evaluation while being instrumental in efficiency as well as inclusivity. Large-scale hiring is optimized by AI systems such as resume analyzers. They leverage both structured and unstructured data for actionable insights in order to fill gaps in the manual screening method. AI provides predictive analytics, which goes beyond candidate ranking and helps organizations forecast trends in talent acquisition and workforce planning. These are in alignment with broader organizational goals of better talent retention and alignment with strategic objectives.

2.2 Bias Mitigation and Ethical Considerations Algorithmic bias is also a key source of concern in AI-based recruitment. Gada (2023) discusses methodologies to minimize biases on the basis of gender, race, and age in candidate assessment. The study underlines the necessity of fair-aware algorithms which anonymize the sensitive data in order to have unbiased decision making. Similarly, there are also ethical concerns with AI-enabled tools like how it may not always be fair and not always confidential. They are asking for transparent AI systems that have an explainable decision-making process so that trust is established with stakeholders.

2.3 Integration with Applicant Tracking Systems (ATS) Seamless integration with Applicant Tracking Systems (ATS) is a pivotal feature of AI resume analyzers. D’Souza and Paiithannkar (2024) discuss how AI tools enhance recruiter workflows by automating candidate evaluations, resulting in a 40% reduction in processing times. ATS integration also enables the consolidation of candidate profiles, ensuring smoother recruitment pipelines. Tools such as the AI Resume Analyzer offer realtime insights into candidate suitability, helping recruiters make data-driven decisions with minimal effort.

2.4 Risks, Regional Adoption, and Legal Challenges Despite their potential, AI recruitment tools face significant challenges related to regional adoption and regulatory compliance. Tsiskaridze, Reinhold, and Jarvis (2023) identify GDPR constraints as a key barrier to adoption in Europe, limiting the implementation of AI-driven recruitment

systems. The study highlights the uneven global distribution of research and application, with Africa and Asia leading in empirical studies and adoption rates. Ethical concerns, such as perceived job displacement among HR professionals and transparency in algorithmic decision-making, further complicate adoption. These risks necessitate a balanced approach, integrating AI technologies while maintaining human oversight to ensure ethical and legal compliance.

2.5 AI-Driven Recruitment: Transforming HRM The integration of AI into recruitment has revolutionized traditional hiring processes, enabling the automation of resume screening, ranking, and candidate selection. Henry (2024) emphasizes the impact of AI on enhancing decision-making accuracy in Human Resource Management (HRM). By leveraging AI algorithms, organizations streamline talent acquisition while addressing inefficiencies in manual processes. Furthermore, tools like the AI Resume Analyzer harness machine learning to identify patterns in candidate data, ensuring alignment with organizational requirements. This highlights AI's dual role in improving both operational efficiency and inclusivity in hiring decisions. e-ISSN: 2582-5208 International Research Journal of Modernization in Engineering Technology and Science (Peer-Reviewed, Open Access, Fully Refereed International Journal) Volume:07/Issue:01/January-2025 Impact Factor- 8.187 www.irjmets.com [@International Research Journal of Modernization in Engineering, Technology and Science](http://www.irjmets.com) [427]

2.6 Emerging Technologies: Explainable AI (XAI) and Adaptive Learning Models Emerging technologies like Explainable AI (XAI) and adaptive learning models represent the next frontier in recruitment innovation. XAI ensures that recruiters and stakeholders understand how AI systems arrive at decisions, fostering trust and transparency. Kaygin (2023) argues that the integration of XAI is essential for widespread AI adoption in recruitment, as it provides detailed explanations of candidate rankings, factor weightings, and bias detection. This makes decision-making more accountable and mitigates concerns of opacity in AI models. Gada (2023) highlights adaptive learning as a solution to evolving organizational needs, where AI systems iteratively refine algorithms based on recruiter feedback and changing market trends. These models are particularly effective in addressing emerging skill demands and recalibrating hiring priorities, ensuring sustained relevance and accuracy in candidate evaluations.

2.7 Leveraging Machine Learning for Enhanced Recruitment Machine learning plays a central role in optimizing AI recruitment systems. L. Kumar and S.K.R. Gowrigari (2023)

present a ranking framework that combines deep learning and NLP models to enhance the precision of candidate matching. Similarly, Priyanka and Parveen (2024) propose hybrid approaches that merge traditional NLP methods with advanced machine learning algorithms to improve the accuracy of resume parsing and ranking systems. These studies underscore the importance of continuous algorithmic refinement, ensuring recruitment tools remain aligned with industry demands and organizational goals.



CHAPTER 3

Proposed Methodology

3.1 System Design

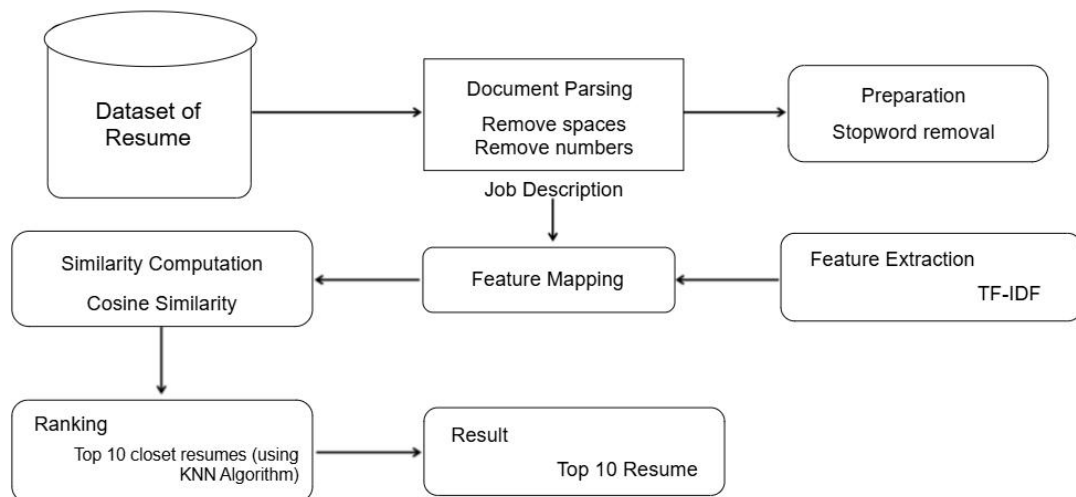


Figure1 :System architecture

3.2 Requirement Specification

Mention the tools and technologies required to implement the solution.

3.2.1 Hardware Requirements:

Laptop

3.2.2 Software Requirements

Frontend:streamlit

Backend:python

Frameworks:Sklearn/NLTK/Spacy

Scikit-learn:For extracting the text feature and find the similarity between the documents.

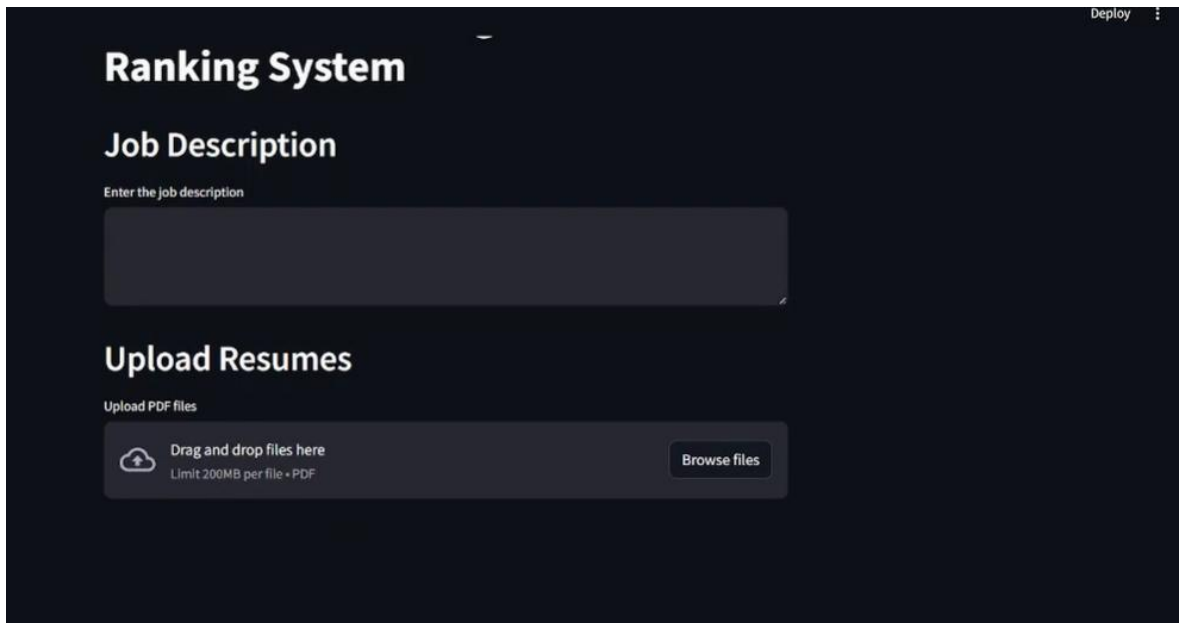
NLTK/Spacy:For natural language processing task such as parsing and tokenization.

Deployment:Streamlit cloud.

CHAPTER 4

Implementation and Result

4.1 Snap Shots of Result:



The screenshot shows a web application titled "Ranking System". It has a dark theme. At the top right, there is a "Deploy" button. Below the title, there is a section for "Job Description" with a text input field and a label "Enter the job description". Below that is a section for "Upload Resumes" with a label "Upload PDF files". It features a drag-and-drop area with a cloud icon and text "Drag and drop files here" and "Limit 200MB per file • PDF". There is also a "Browse files" button.

Figure 2: Candidate screening and resume ranking system

	Candidate	Similarity Score
0	Resume1.pdf	0.86
1	Resume2.pdf	0.83
2	Resume3.pdf	0.45

Table1: Candidate ranking

4.2 GitHub Link for Code:

<https://github.com/S-pyth/Aicte-internship-.git>

CHAPTER 5

Discussion and Conclusion

5.1 Future Work:

To ensure fair and effective AI-powered resume screening, organizations should:

Adopt a Hybrid Approach – Combine AI automation with human oversight to maintain fairness and avoid overlooking qualified candidates. Implement Ethical AI Practices Conduct regular bias audits, use diverse training datasets, and maintain transparency in AI-driven decisions. Ensure Data Privacy and Compliance – Follow strict data protection policies to safeguard candidate information and comply with legal regulations. Continuously Improve AI Models – Update algorithms regularly to enhance accuracy, fairness, and adaptability to changing job market trends. Educate Recruiters and Candidates – Provide training to HR professionals on AI usage and ensure candidates understand how AI impacts the hiring process.

5.2 Conclusion:

AI-powered resume screening has transformed recruitment by increasing efficiency, reducing bias, improving job-candidate matching, and enabling scalability. It allows companies to process large volumes of applications quickly, saving time and resources while enhancing decision-making. However, challenges such as algorithmic bias, lack of contextual understanding, over-reliance on keywords, transparency issues, and data privacy concerns must be addressed. These challenges highlight the need for a more responsible and balanced approach to AI adoption in hiring.

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