NLP TECHNIQUES IN RESUME ANALYSIS FOR APPLICANTS AND RECRUITERS

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ABSTRACT

In company's or organization's recruiting process, for a single opening there are multiple applying candidates. First process in recruiting procedure is to go with resumes one by one for the selection of best candidate. But this is time consuming and hectic process for recruiters. The reason behind this is each applicant has its own unique resume with different sections and different formats. So, it is not possible for recruiters to go with resumes one by one. To minimize the efforts of recruiters and investment of timing in this process, we have proposed system where recruiters can easily analyze resumes in simple file formats with the ranking. This project is based on Natural Language Processing (NLP). Two major components of this system are Job Applicants and Recruiters. Applicants will upload their resume in different formats mainly pdf or doc. Then parser will parse these resumes for field extraction, after analysis system will scale the resume and will give suggestions like required skills to be included in resume or courses to be done or fields to be included in resume to increase its rank.This ranking will be saved in database where recruiter will get idea about most deserving candidates for a particular role.

Keywords: Recruiting Process Optimization, Resume Analysis System, Natural Language Processing (NLP), Applicant Ranking, Database-Driven Candidate Selection.

I. INTRODUCTION

In today's rapidly evolving tech-driven world, traditional resume submission methods have given way to e-resumes viewed online. However, the current system often requires candidates to manually input all resume details, leading to inefficiencies and mismatches between job requirements and candidate skills. With thousands of resumes per job posting, manual analysis becomes impractical for recruiters, leading to dissatisfaction among candidates and challenges in finding the right fit.

To address this, innovative recruitment platforms utilize machine learning and Natural Language Processing (NLP) techniques for efficient resume parsing and matching. By categorizing resumes and job postings, these platforms reduce time complexities and improve accuracy using methods like Content-based Recommendation, cosine similarity, and KNN. However, despite their effectiveness, time consumption remains a concern.

One proposed solution involves segmenting resumes based on sections and employing NLP for data extraction, enhancing efficiency. Resume Parser and Analyzer tools further streamline the process by structuring unstructured resumes, extracting essential fields, and suggesting improvements. This not only saves recruiters time but also provides applicants with insights into their resume's standing and areas for enhancement.

Moreover, by allowing only the recruiter to access matched results, confidentiality is maintained, and the most qualified candidates are efficiently identified. This intelligent-based approach aims to optimize the recruitment process, benefiting both recruiters and job seekers alike.

II. LITERATURE REVIEW

[1] Resume Parser with Natural Language Processing Ghosh et al. proposed to parse information from a resume using natural language processing, find the keywords, cluster them onto sectors based on their keywords and lastly show the most relevant resume to the employer based on keyword matching. First, the user uploads a resume to the web platform. The parser parses all the necessary information from the resume and auto fills a form for the user to proofread. Once the user confirms, the resume is saved into our NoSQL database ready to show itself to the employers. Also, the user gets their resume in both JSON format and pdf.

[2] Resume Analysis and Suggestion System Using NLP G. Sreenivasulu and R. Akash proposed a system for finding suitable candidates for an open role could be a daunting task, especially when there are many applicants. It can impede team progress for getting the right person on the right time. An automated way of "Resume Classification and Matching" could really ease the tedious process of fair screening and shortlisting, it would certainly expedite the candidate selection and decision-making process. This system could work with a large number of resumes for first classifying the right categories using different classifier, once classification has been done then as per the job description, top candidates could be ranked using Content-based Recommendation, using cosine similarity and by using k-NN to identify the CVs that are nearest to the provided job description.

[3] Resume Parser Using ML and NLP Kulkarni et al. introduces RPES, a Resume Parser and Enhancement System using advanced NLP and machine learning. RPES automates resume creation, extracts key details, and generates well structured resumes. Its enhancement module provides tailored suggestions for improvement, such as keyword relevance and formatting guidance. The system adapts to user feedback, continually improving recommendations. In summary, RPES goes beyond traditional tools, offering automated resume building and personalized enhancements for increased visibility in the job market.

[4] Automated Resume Screening Using Natural Language Processing Kumar Singh et al. explores advanced methods for Automated Resume Evaluation using NLP, leveraging developments in deep learning. Techniques such as hybrid deep learning, transfer learning, genetic algorithms, and multisource data are examined for enhanced precision and effectiveness in screening automated resumes. Research indicates that strategies incorporating job descriptions outperform conventional methods. The findings aim to assist human resource managers and recruiters in automating and optimizing the hiring process for impartial identification of viable applicants.

[5] Survey on Resume Screening Mechanisms Jay Gandhi et al. proposed a system to evaluate the candidates' resumes and determines whether they are qualified for a role based on their education, skill sets, technical stuff, experience, and other information captured in their resume. To make it simple, it's a form of pattern that matches the job requirement and the candidate's qualifications based on their resume. It is a crucial step in the process of hiring. It is the step in which a decision is made to move the candidate to the next level or not. Among all the processes, traditional resume or manual screening is the largest followed, even today. But usually, companies receive thousands of resumes for job applications, which consumes a lot of time and effort. In addition to this, many errors may arise due to human involvement. Multiple ways were introduced to cover all these cons to performing this resume screening process. Various technologies, including Artificial Intelligence and Machine Learning, were involved in searching for solutions. This paper contains a detailed survey report on various methodologies and techniques of resume screening.

III. METHODOLOGY

In this methodology, we present a systematic approach to building a resume analyzer that leverages cosine similarity to assist both applicants and recruiters in the hiring process. By following a series of steps including data preprocessing, feature extraction, vectorization, cosine similarity calculation, thresholding, matching, and output generation, this methodology aims to streamline the resume screening process, facilitate informed decision-making, and enhance the overall efficiency of the recruitment process.

Data Preprocessing: Convert the resumes into a suitable format for analysis. This might include converting them into text files, removing any irrelevant information (like headers, footers, or formatting), and standardizing the text (lowercasing, removing punctuation, etc.).

Feature Extraction: Extract relevant features from the resumes that can be used for comparison. Common features might include keywords related to skills, education, work experience, etc. You can also use techniques like TF-IDF (Term Frequency-Inverse Document Frequency) to assign weights to these features based on their importance.

Vectorization: Convert the extracted features into numerical vectors. Each resume can be represented as a vector in a high-dimensional space, where each dimension corresponds to a feature extracted in the previous step.

Cosine Similarity Calculation: Calculate the cosine similarity between each pair of resumes. Cosine similarity measures the cosine of the angle between two vectors and is often used to compare the similarity of documents represented as vectors. It ranges from -1 (completely dissimilar) to 1 (completely similar), with 0 indicating no similarity.

Thresholding: Define a threshold value above which resumes are considered similar. This threshold value can be determined empirically based on the specific requirements of the job or the preferences of the recruiter.

Matching: Compare each applicant's resume to the job description using cosine similarity. Applicants whose resumes have a cosine similarity above the threshold value with the job description are considered potential matches.

Output: Present the results of the analysis to the recruiters in a user-friendly format, such as a list of ranked candidates or a visualization showing the similarity scores.

IV.   RESULTS AND DISCUSSION

The deployment of the AI Resume Analyzer marks a significant leap forward in the realm of recruitment and talent acquisition. Through its automated parsing and analysis capabilities driven by advanced NLP algorithms, the system delivers precise insights into candidate profiles, extracting key information such as skills, experience, and education with unparalleled accuracy. Furthermore, its sophisticated skill profiling ensures a comprehensive understanding of candidates' capabilities, empowering recruiters with invaluable data for candidate evaluation.

The AI Resume Analyzer presents a multifaceted solution to the challenges inherent in modern recruitment processes. By employing semantic matching techniques to align candidate profiles with job requirements, generating personalized recommendations for career development, and integrating seamlessly with existing HR platforms, the system not only streamlines operations but also enhances the overall candidate experience. Moreover, its commitment to bias detection and mitigation underscores its dedication to fostering fairness and inclusivity in recruitment practices. With its robust features and capabilities, the AI Resume Analyzer stands as a testament to the transformative potential of AI in shaping the future of talent acquisition.

V.   CONCLUSION

The process of recruitment is one of the most stressful periods for both the parties, viz., the applicants and the recruiters. Corporate companies and recruitment agencies process numerous resumes daily. This is no task for humans. An automated intelligent system will take out all the vital information from the unstructured resumes and transform all of them to a common structured format which can then be ranked for a specific job position and candidate according to need. This system aims to ease this process by making the deserving candidates, making them stand out against the crowd, which in turn, makes it easier for the recruiters. This system greatly automates the process of recruitment. The recruiters will have an idea about the quality of applicants beforehand. The applicants will be notified of the reasons because of which they were rejected, so they can improve their resume next time they submit. Furthermore, the unfair and discriminatory practices that take place during the recruitment process can be dampened to some effect.

VI.   REFERENCES

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