

NLP-Based Approaches for Resume Analysis and Job Automation

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Abstract:

NLP is used in NLP-Based Resume Analysis, Skill Enhancement & Job Automation to extract text and evaluate it so that users can offer insights. It recommends certain abilities for people to employee. By comparing resumes with job descriptions, NLP can find skill gaps and offer tailored training programs to improve candidates' credentials and boost their employability. In this paper, we examine many contemporary methods for automated resume screening. To increase the precision and effectiveness of the screening procedure, these approaches employ a variety of methods, including genetic algorithms, hybrid deep learning frameworks, transfer learning, and multisource data. Furthermore, a number of research investigate the use of job descriptions to improve resume screening accuracy. This technology is advantageous to recruiters.

1. INTRODUCTION

The world today focuses on more technological based approaches rather than traditional methods. The current system typically requires candidates to enter every detail from their CV manually. As a result, there is a mismatch between what applicants are capable of doing and what the job specifies. Recruiters can't go through thousands of CVs manually because every job post gets flooded. As a result, candidates have to feel disappointed in their jobs. Recruitment systems such as effective resume parsing and matching employ machine learning and natural language processing NLP techniques. Through classification.

To take into account the time complexity and accuracy of the resumes and job lists, hybrid plug-in of cosine similarity and KNN was utilized. However, the efficiency is not the issue; it is time consumption that is. One of the suggested methods to increase efficiency is section wise splitting of Resume and extracting data using NLP. The resume parser program further eases the task as it sorts the unorganized resumes, extracts the key fields, and recommends changes. Along with the time of the recruiter; candidates also learn about their resumes' strength and weaknesses through these resume review services. By limiting access to matched results to the recruiter only, privacy is maintained and candidates are found efficiently.

2. REVIEW OF RELATED WORKS

The article "Resume Screening using Natural Language Processing and Machine Learning" by Kondapalli Sai Pranay was published in the International Journal of Current Technology and engineering in 2020. The study presents a method for job description matching and resume screening that combines machine learning and natural language processing. Shweta Agrawal and Sumit Gupta's 2019 paper, "Automated Resume Screening System Using Machine Learning and Natural Language Processing," published in the International Journal of Innovative Technology and Exploratory Engineering, described a system for evaluating resumes based on how well they match job requirements.

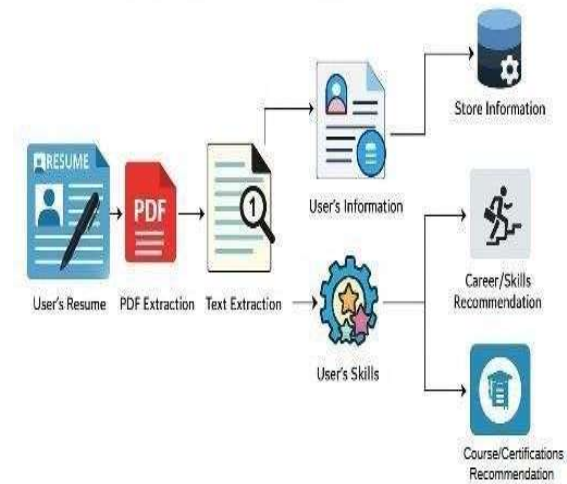
In 2018, Aditi Kaushik and Shruti Jain published "A Comprehensive Analysis of Resume Screening Techniques" in the International Journal of Computer Science and Mobile Computing for a thorough assessment of resume screening techniques. The study "Resume Parsing and Analysis Using Natural Language Processing" by Pradeep Kumar Mishra and Sanjay Kumar was published in the International Journal of Innovative Research in Computing and Communication Engineering in 2017. In order to extract important information from professional resumes, the study's researchers demonstrated how Natural Language Processing techniques operate. In

2016, Anindya Sarkar and Debajyoti Mukhopadhyay published a paper titled "Automatic Resume Filtering Using Machine Learning" in the International Journal of Engineering and Technology. In this work, a method based on machine learning was examined.

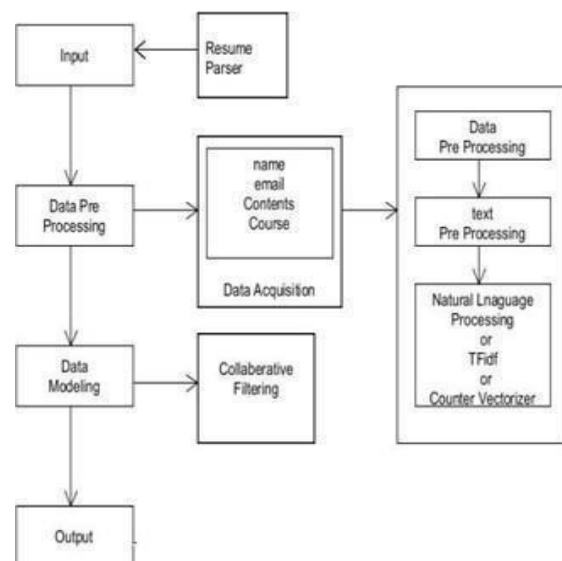
3. DESIGN METHODOLOGY ADOPTED

Traditionally, resumes are manually screened by recruiters and HR managers based on credentials, experience, and other factors. This approach is supported by automated processes in contemporary recruitment software like Taleo and Jobscan. AI-driven algorithms are used by Taleo, a cloud-based recruiting tool, to evaluate resumes and shortlist applicants who meet job requirements. It evaluates how well resumes match job descriptions using machine learning and natural language processing. Jobscan is an online tool that compares resumes with certain job descriptions by examining keywords and competencies using Applicant Tracking System (ATS) technology. However, the majority of resume screening solutions available today rely on rigid algorithms and predetermined standards, which frequently fall short of precisely matching applicants to specialized positions across several industries.

The system creates fixed-length vector representations by extracting important elements from resume text and job postings. It provides a data-driven assessment that goes beyond simple keyword matching by measuring how closely candidate qualifications fit job requirements using cosine similarity. This method ensures fair and impartial talent selection by decreasing human bias in manual screening and increasing the accuracy and dependability of application assessments. The platform improves hiring efficiency and candidate experience by effectively finding qualified applicants. In order to comprehend true candidate intent and facilitate accurate matching, sophisticated NLP algorithms evaluate contextual meaning and semantic linkages. The technology offers scalability, lower costs, and quicker decision-making without sacrificing quality by quickly reviewing hundreds or thousands of resumes.



In addition to offering career advice, the system suggests pertinent courses and certification programs based on user abilities. It recommends both free and paid learning resources that improve professional credentials and market worth based on demonstrated competencies, such as advanced content for users proficient in machine learning. The platform incorporates a specialized analytics module that analyzes various user data inputs and displays insights using understandable pie chart visuals. By displaying aggregated user statistics, skill trends, and important data points, these visual tools help managers comprehend usage patterns and facilitate well-informed decision-making. The system's primary strength is its sophisticated language processing skills, which reliably match resumes with appropriate job descriptions. by obtaining crucial information including contact details, expertise, and abilities.



When a user exhibits proficiency in machine learning, the system will suggest suitable job options together with essential tools and cutting-edge technologies. Users learn about their specialized growth chances and possible specialty options through personalized assistance.

4. RESULTS

Our deployment of CareerBoost, an NLP-based system for job automation, skill development, and resume analysis, showed notable functional capabilities and useful applications. The main results of our application development and validation process are shown in this section.

4.1 USER INTERFACE AND NAVIGATION STRUCTURE

Home, Resume Analysis, and Job Search are the three main components of the built web application's user-friendly interface (Figure 3). The dashboard offers four main features: Job, Learning Path, Skills Match, and Resume Advice.

4.2 RESUME ANALYSIS AND SKILL ASSESSMENT

A organized procedure for resume evaluation is successfully implemented by the system. The NLP-based analysis process is initiated when users upload their résumé materials and indicate desired employment roles. The algorithm successfully divided the identified talents into three separate categories for our test scenario, which used a front-end developer position.

- 1) Matching Skills: The candidate's profile already includes these competencies.
- 2) Missing Skills: The candidate's résumé lacks essential skills needed for the position, such as HTML, CSS, JavaScript, React, Angular, Vue.js, responsive design, web accessibility, version control, testing frameworks..
- 3) Less Relevant Skills: The candidate's abilities that are less relevant to the desired position, such as iOS development, C#, Go, and AI.

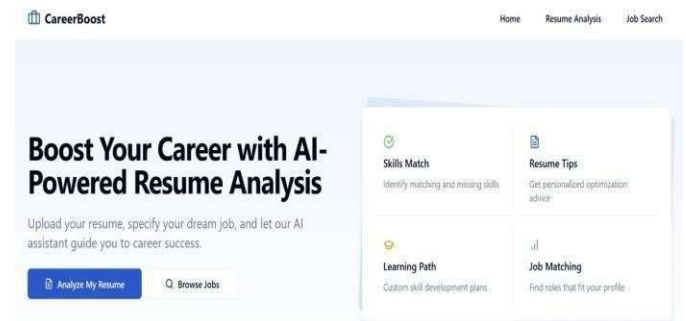


This classification accomplishes one of our main research goals by showcasing the system's capacity to conduct contextual analysis of resume content versus role-specific constraints.

4.3 RESUME OPTIMIZATION RECOMMENDATIONS

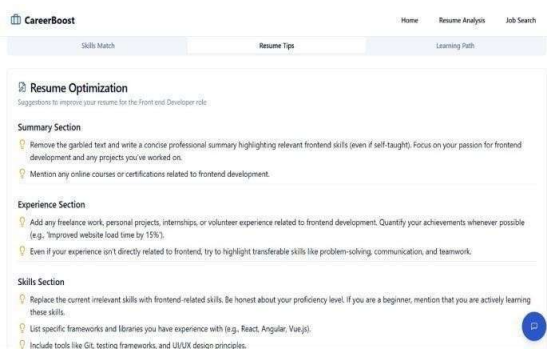
The program produces comprehensive, section-specific suggestions for improving a resume. These recommendations are specific to the intended position and the candidate's current qualifications. Recommendations for our test case included:

- 1) Rewriting the synopsis to highlight pertinent front-end abilities



How CareerBoost Works

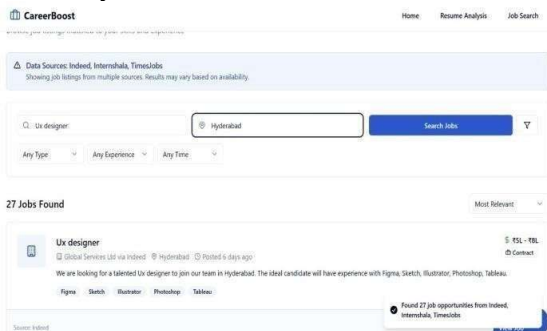
- 2) Including education and certifications related to frontend
- 3) Measuring accomplishments in the experience area
- 4) Emphasizing transferable abilities for applicants moving into front-end development
- 5) Reorganizing the skills section to give role-relevant technology priority



These contextual suggestions show how the algorithm can offer practical advice that goes beyond merely identifying skills.

4.4 JOB SEARCH INTEGRATION

The job search feature, which returned role-appropriate ads based on user qualifications, showed successful integration with many employment data sources (Indeed, Internshala, and TimesJobs). The system produced 27 pertinent results for a test search of "UX designer" jobs in Hyderabad, replete with pay data, firm information, posting dates, and necessary skills.



These findings confirm the efficacy of our combined strategy for resume analysis, skill development, and NLP-based job search automation. By offering job searchers end-to-end support throughout their career development process, the system successfully addresses the major issues noted in our research objectives.

5. CONCLUSIONS

The Intelligent Resume Analyzer platform is based on sophisticated modeling and analytical methods that include machine learning and natural language processing. Candidates receive insightful feedback that helps them enhance the quality of their resumes and the efficacy of their job targeting. By serving as a conduit between recruiters and candidates, the technology dramatically lowers the cognitive

load associated with digital hiring. It speeds up hiring processes by automating resume referencing and document organization. The platform, which aspires to revolutionize conventional resume review procedures, was created as a lightweight yet effective ATS solution. It examines uploaded documents to extract abilities, educational background, and candidate traits using automated parsing and language-processing algorithms. The main goal is to create an independent web-based tool that effectively assesses resumes without the need for direct human resource engagement.

This hiring strategy demonstrates leadership in intelligent staff selection, which facilitates better selection decisions through open procedures that match candidates' skills with company needs. The platform makes it possible to evaluate hiring as a partnership between the acquisition of qualified individuals and organizational growth while promoting shared professional success. Everyone engaged gains from the system's very effective data-driven recruitment process. Because it completely transforms the talent acquisition strategy from the evaluation stage through the matching stage, this solution performs better than a simple digital tool.

6. ACKNOWLEDGEMENT

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