

AI-Based Resume Analyzer

Mohammed Parveez, Mohammed Afraz, Jawad Ali, Mohammed Anas, Habeeb Ur
Rahman,*

*Department of computer science, P. A. College of Engineering, Karnataka 574153,
Mangaluru, India*

E-mail: habeeb_cse@pace.edu.in

Abstract

In today's competitive labor market, the recruitment process requires effective tools to filter and identify the most appropriate candidates. This project presents the development of an AI-based CV analyzer that utilizes natural language treatment (NLP) and machine learning algorithms to automatically evaluate, categorize and rank CV. The system extracts key information such as skills, experience, education and job -specific keywords, and matches them against job descriptions to determine the candidate's suitability. By automating the initial screening process reduces the CV analyzer human efforts, minimizes bias and accelerates employment decisions. Designed to be scalable and adaptable across industries, the tool offers a smart solution to modern recruitment challenges.

1 Introduction

In today's competitive job market, recruiters receive hundreds of resumes for a single job opening, making manual screening both time-consuming and inefficient. To address this challenge, technology has paved the way for automated solutions that streamline the

recruitment process. One such innovation is the AI-Based Resume Analyzer — a system designed to automatically evaluate resumes, extract key information, and match candidates with job requirements.

This tool uses intelligent techniques to analyze resumes based on predefined criteria such as skills, experience, education, and relevance to the job description. By doing so, it helps recruiters identify the most suitable candidates quickly and objectively. Moreover, it reduces human error and unconscious bias, ensuring a fair and consistent hiring process.

The AI-Based Resume Analyzer is not only beneficial for employers but also aids job seekers by offering suggestions to improve their resumes for better visibility. As organizations continue to embrace digital transformation in recruitment, this system stands out as an essential component for modern hiring practices.

2 Literature Survey

In today's competitive job market, recruiters often have to screen thousands of resumes for a single job opening. Traditional resume screening methods are time-consuming and prone to human error or bias. To address this, researchers and developers have turned toward Artificial Intelligence (AI) to create smarter, more efficient systems for resume analysis.

Several studies have explored the use of Natural Language Processing (NLP) and Machine Learning (ML) techniques for extracting and interpreting information from resumes. One such approach involves the use of NLP algorithms to parse unstructured resume data, converting it into structured formats that are easier to analyze. These systems can identify key sections such as personal details, education, skills, and work experience with high accuracy.

A study by Kumar et al. (2020) highlighted how AI-driven resume analyzers can effectively match candidate profiles with job descriptions by using semantic analysis. Instead of relying on simple keyword matching, these tools understand the context in which skills

and experiences are mentioned, leading to better candidate-job fit.

Another important development in this field is the use of ranking algorithms to score resumes based on their relevance to a specific role. Researchers have experimented with various models like Decision Trees, Support Vector Machines, and more recently, deep learning models like BERT (Bidirectional Encoder Representations from Transformers). These models have shown significant improvement in understanding the nuances of human language, allowing for deeper insights into a candidate's potential.

In addition, some works have integrated bias detection modules in AI-based resume analyzers to minimize discrimination based on gender, age, or ethnicity. This has been a growing area of interest, given the ethical concerns surrounding the automation of recruitment processes.

Overall, the literature reflects a growing interest in making recruitment smarter, faster, and fairer through AI. The adoption of intelligent resume analyzers is no longer limited to large corporations but is gradually being embraced by startups and medium-sized firms. This shows the broadening impact of AI in reshaping how organizations identify talent.

3 Methodology:

The development of the AI-Based Resume Analyzer was carried out through a structured and practical approach, divided into several key phases. Each phase focused on ensuring that the system effectively extracts, processes, and evaluates resume data to match candidates with job roles accurately.

3.1 Requirement Analysis

The first step was understanding the challenges faced by recruiters in manually screening resumes. We gathered inputs from HR professionals to identify the essential features the system should support, such as skill matching, education filtering, and experience evaluation.

3.2 Data Collection and Preprocessing

A dataset of resumes in various formats (PDF, DOCX, etc.) was collected. Each resume was pre-processed using Python libraries to extract readable text. Special care was taken to clean the data, remove unnecessary formatting, and standardize sections like education, skills, and work history.

3.3 Information Extraction Using NLP

We implemented Natural Language Processing techniques to identify and extract important fields from the resumes. Tools like SpaCy and NLTK were used to detect entities such as names, degrees, job titles, and technical skills. This structured data was then organized into a consistent format for analysis.

3.4 Matching Algorithm Design

A custom matching algorithm was designed to compare the extracted resume data with job requirements. The algorithm considers multiple factors like keyword relevance, skill overlap, and experience level to compute a compatibility score for each candidate.

3.5 Model Training and Evaluation

Machine learning models were tested to improve accuracy in matching candidates to jobs. Models such as Decision Trees and Support Vector Machines were evaluated, and the best-performing model was chosen based on precision, recall, and F1 score.

3.6 User Interface Development

A simple and user-friendly interface was developed to allow recruiters to upload resumes and view the analysis results. The interface displays the candidate scores, highlights matching skills, and ranks applicants accordingly.

3.7 Testing and Feedback

The final system was tested with sample job descriptions and real resumes. Feedback from recruiters was used to fine-tune the scoring logic and improve the overall performance and usability of the analyzer.

4 Results and Discussion

After successful implementation of the AI-Based Resume Analyzer, the system was tested using a diverse set of resumes and job descriptions to evaluate its accuracy and performance. The key results are summarized below:

4.1 Resume Parsing Accuracy

The NLP-based parsing module was able to extract key sections like name, education, skills, and work experience with approximately 92% accuracy. Even resumes with different formats and structures were handled effectively, showing the robustness of the text extraction process.

4.2 Skill Matching and Scoring

The system assigned relevance scores to candidates based on how well their skills and experience matched the job description. For technical roles, the system accurately identified programming languages, frameworks, and tools, ensuring precise matching. In test cases, the top 3 ranked resumes were consistently aligned with the job requirements, demonstrating high reliability in shortlisting.

4.3 Efficiency and Time Saving

Compared to manual screening, the analyzer reduced the time needed to review 50 resumes from several hours to just a few minutes. This clearly highlights the system's efficiency and

its potential to assist recruiters during the initial filtering stage.

4.4 User Feedback

Feedback from HR professionals and academic reviewers confirmed that the analyzer is helpful, especially in speeding up candidate shortlisting. They appreciated the clear presentation of scores and matching highlights, which simplified decision-making.

4.5 Limitations Observed

While the system performed well in most cases, it showed reduced accuracy in detecting soft skills and understanding context in highly creative or non-technical resumes. This indicates a need for further improvements in semantic analysis and possibly integrating a more advanced language model in the future.

Acknowledgement: The corresponding author acknowledges the research facility provided by VGST, Govt. of Karnataka (GRD No. 538).