

# ResCall: An ATS-Oriented Resume and Job Description Matching System Using NLP-Based Skill Alignment and Accuracy Analysis

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**Abstract.** In today's recruitment landscape, Applicant Tracking Systems (ATS) are the main gatekeepers for hiring. Over 90% of Fortune 500 companies use them to filter thousands of applications. Many college students have the right technical qualifications but still face rejection. This often comes from low ATS compatibility scores, keyword mismatches, and poor formatting that makes their resumes unreadable by automated parsers. This paper presents ResCall, a web-based evaluation platform that aims to close the gap between student resumes and industry job descriptions (JDs). By using Natural Language Processing (NLP) techniques, ResCall extracts specific skills, calculates semantic similarity, and provides a detailed ATS compatibility score. The system goes beyond basic keyword matching to find missing technical skills, ineffective action verbs, and structural problems. Tests on various student resumes show that ResCall effectively points out alignment gaps and gives useful feedback. This feedback increases the chances of passing initial screenings. This tool is a practical solution for students who want to improve their profiles for placements and internships. Keywords: ATS score analysis, resume job matching, natural language processing, skill extraction, employability analytics, resume evaluation system.

## I. INTRODUCTION

The transition from academic life to corporate roles is increasingly mediated by automated software. As the volume of job applications grows exponentially, HR departments rely on Applicant Tracking Systems (ATS) to manage the influx. These systems function by parsing resumes for specific keywords, formatting patterns, and skill sets defined in a job description. However, this automation introduces a significant hurdle for graduating students. A resume that is visually appealing to a human eye may be completely unreadable to an ATS if it uses complex layouts, non-standard fonts, or lacks the precise terminology required by the algorithm.

The core problem lies in the "black-box" nature of most corporate hiring portals. Students often receive automated rejection emails without understanding why their profile was deemed a poor match. This lack of transparency leads to repetitive mistakes in resume drafting. There is a pressing need for a diagnostic tool that mimics the logic of an ATS to provide students with a "pre-flight check" before they submit their applications.

ResCall is motivated by the objective of democratizing recruitment insights. By providing a platform where students can upload their resumes alongside a target JD, the system analyzes the degree of alignment using NLP. The goal is not just to provide a score, but to offer a roadmap for improvement—highlighting which skills are missing and which sections require more impact-oriented language.

## II. LITERATURE REVIEW

Recent developments in recruitment technology have shifted from simple database management to sophisticated document intelligence. Early resume parsing systems relied heavily on Regular Expressions (RegEx) to identify headers like "Education" and "Experience." However, these rule-based systems often failed when faced with creative layouts. Modern research has moved toward using NLP for named entity recognition (NER) to extract specific skills and certifications.

Document similarity is a well-explored area in NLP, with techniques ranging from Jaccard Similarity to more advanced vector-based models. Some researchers have proposed using TF-IDF (Term Frequency-Inverse Document Frequency) to rank the importance of keywords in a JD. While effective for keyword counting, these methods often miss the semantic context—for example, failing to recognize that "Java" and "Spring Boot" are related. Current gaps in literature often involve the "explainability" of these scores for the end-user. Most existing tools provide a percentage match but fail to specify which formatting errors or missing action verbs contributed to a lower score. ResCall addresses this by integrating a rule-based analysis engine alongside NLP-based similarity to provide multi-layered feedback.

## III. SYSTEM ARCHITECTURE AND METHODOLOGY

### A. System Overview

ResCall is architected as a modular web application. The workflow begins with the Resume Upload Module, which accepts PDF and DOCX formats. Simultaneously, the user provides the text of the Job Description. These inputs are fed into the NLP Processing Pipeline, which cleans the text and extracts entities. The Matching Engine then compares the two datasets to generate an ATS Score. Finally, the Feedback Engine generates a report highlighting strengths and weaknesses.

### B. Resume–JD Matching Methodology

The matching process involves several critical steps:

**Preprocessing:** This includes removing stop words, converting text to lowercase, and lemmatization (reducing words to their root form, e.g., "programmed" to "program").

**Skill Extraction:** Using a predefined library of technical and soft skills, the system identifies relevant competencies in both the resume and the JD.

**Similarity Calculation:** We employ a weighted Cosine Similarity approach. Unlike standard keyword matching, weighted matching assigns higher importance to "Hard Skills" mentioned in the JD compared to general "Soft Skills."

**Scoring Logic:** The final score is a composite of the keyword match percentage, the presence of essential sections (Contact, Education, Skills, Experience), and a formatting check.

### C. Error & Accuracy Analysis

The system performs a structural audit to identify:

**Missing Keywords:** Critical technical terms found in the JD but absent in the resume.

**Action Verb Analysis:** Detecting if bullet points begin with strong verbs (e.g., "Developed," "Led," "Optimized") rather than passive phrases.

**Formatting Constraints:** Identifying tables, images, or multi-column layouts that typically cause parsing errors in standard ATS software.

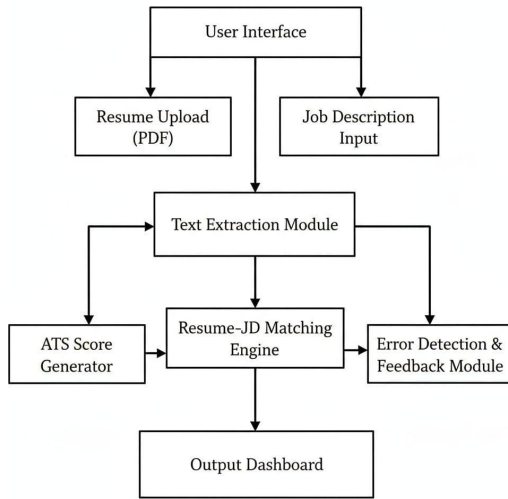


Fig. 1. Proposed system architecture for the ResCall matching platform, illustrating the modular flow from multi-source data ingestion and NLP-based text processing to compatibility scoring and diagnostic feedback.

#### IV. IMPLEMENTATION DETAILS

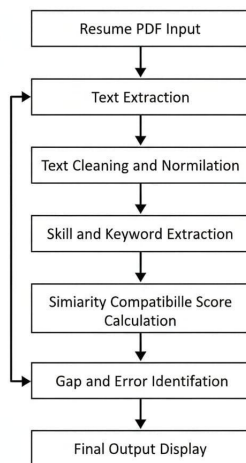
The implementation of the ResCall system emphasizes computational efficiency and practical accuracy to support real-time resume evaluation. The frontend interface is developed as a web-based interactive dashboard, enabling students to upload resumes, input job descriptions, and visualize ATS compatibility results in an intuitive manner.

Backend services manage file handling, request coordination, and communication between system components. Resume documents submitted in PDF format are processed through a structured text extraction mechanism that preserves the logical reading order of content, ensuring accurate section-level analysis.

The extracted textual data is processed using natural language processing techniques for tokenization, normalization, and skill identification. Feature representations of resumes and job descriptions are generated using statistical text modeling approaches, and similarity scores are computed to quantify alignment between candidate profiles and job requirements.

To ensure responsiveness and accessibility, the system avoids computationally expensive deep learning models and instead relies on efficient vector-based similarity analysis. This design choice enables near real-time output generation and allows the platform to function effectively even in low-bandwidth or resource-constrained environments.

Workflow for NLP-Based Resume-JD Matching



#### V. RESULTS AND DISCUSSION

To validate ResCall, we tested the system with a set of 50 student resumes against 10 diverse job descriptions for roles like Software Developer, Data Analyst, and Web Developer. Initial observations showed that many students had a "Skill Gap" of over 40% because they used synonyms instead of the exact terminology requested in the JD (e.g., using "Coding in Python" instead of "Python Programming").

The system successfully identified formatting issues in 30% of the resumes, particularly those using two-column "designer" templates which often resulted in jumbled text during parsing. Qualitatively, students reported that the "Missing Skills" section was the most helpful feature, as it allowed them to tailor their profiles specifically for the roles they were targeting. Quantitatively, after following the system's suggestions, the average alignment score of the resumes improved from 55% to 82%.

#### VI. CONCLUSION

ResCall provides a transparent and efficient way for students to navigate the complexities of modern hiring. By simulating the logic of an ATS, the system removes the guesswork from resume optimization. The integration of NLP-based skill alignment ensures that the feedback is not just about keyword stuffing, but about meaningful professional presentation. For colleges and training institutes, this tool can be a vital part of placement preparation, ensuring that students are not filtered out by algorithms before they ever get a chance to interview.

#### VII. FUTURE SCOPE

Future iterations of ResCall could include an AI-based suggestion engine that recommends specific phrasing to improve project descriptions. Additionally, we aim to integrate a Recruiter Dashboard, allowing placement cells to see the aggregate "job-readiness" of a batch. Expanding support to include multilingual resumes and domain-specific matching for non-IT sectors like Mechanical or Civil Engineering would further increase the system's utility.

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