AI-Powered Resume Analyzer

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Abstract— In the competitive job market, aligning resumes with job requirements is critical for job seekers. This project presents an AI-powered Resume Analyzer that automatically parses resumes, evaluates their quality, and compares them with job descriptions to suggest improvements. Key features include skill extraction, job role recommendations, resume scoring, and AI-powered gap analysis using Google Gemini API. The application is built using Flask and deployed locally, offering a user-friendly interface for both candidates and administrators.

Keywords— Resume Parsing, Flask, Gemini API, Skill Gap Analysis, Job Matching, NLP, Resume Scoring

I. INTRODUCTION

A. Background and Motivation

In today's digital recruitment landscape, companies use Applicant Tracking Systems (ATS) to automate the initial stages of candidate selection. These systems primarily depend on keyword-based filtering, often discarding potentially qualified resumes that do not match the job description verbatim. Consequently, candidates are forced to modify their resumes for each job application—a time-intensive and error-prone process.

Our project, AI-powered Resume Analyzer, seeks to solve this problem by leveraging Natural Language Processing (NLP) and Large Language Models (LLMs) to analyze resumes, evaluate their quality, and compare them with job descriptions. By doing so, it provides personalized suggestions to enhance resumes and boost job-seeking efficiency, especially for fresh graduates and early-career professionals aiming to enter competitive job markets.

B. Scope and Objectives

The project aims to:

1. Parse resumes to extract key fields: name, contact info, skills, experience, education.

2. Evaluate resume quality by checking presence of essential sections.

3. Score resumes using a weighted section-based approach.

4. Recommend skills and courses based on the resume's content.

5. Compare the resume with a job description using the Gemini LLM API.

6. Provide improvement suggestions to the candidate.

7. Collect feedback and offer an admin dashboard for performance review.

II. LITERATURE REVIEW

A. Resume Parsing and NLP

Resume parsing is the task of converting unstructured resume text into a structured format for analysis. Prior work in this area has used tools like pyresparser, spaCy, and pdfminer3 to extract entities such as names, emails, and skillsets using Named Entity Recognition (NER) and POS tagging. Studies have demonstrated success in entity extraction from diverse formats and templates, yet challenges persist with multi-page resumes, PDF image formats, and ambiguous terminology. Recent developments focus on contextual embeddings and rule-based enhancements for higher accuracy.

B. Large Language Models in Job Matching

With advancements in LLMs such as GPT-4 and Gemini, the field of job-resume fit analysis has seen a significant shift. These models outperform traditional keyword-matching systems by using contextual understanding of resumes and job descriptions. LLMs can highlight missing tools, skills, and certifications, while also generating human-like suggestions. Academic research supports LLMs for personalized career guidance, although concerns remain around model transparency, bias, and token limitations.

III. PROPOSED METHODOLOGY

A. Resume Upload and Parsing

The system accepts resumes in PDF format. Text is extracted using pdfminer3, after which a custom NLP parser identifies and categorizes information into structured fields:

- Personal Information: Name, email, phone
- Professional Details: Skills, Work Experience
- Educational Background: Degree, Institutions, CGPA

The parser uses regex patterns and NER models to detect and tag relevant sections, ensuring maximum coverage.

B. Resume Scoring

The resume is scored based on the presence of important sections like Objective, Education, Skills, Projects, Certifications, etc. A total of 100 points is distributed across these components.

C. Course and Skill Recommendations

Once the skills are extracted, the system checks for domain relevance using a predefined keyword-course mapping. For instance, if a candidate shows Python and pandas, it may suggest Data Science as a domain and recommend online courses from platforms like Coursera or Udemy. This helps users upskill in alignment with industry standards.

D. Job Description Comparison (Gemini Integration)

The user can input a Job Description (JD) alongside the resume. The Gemini API processes both inputs and performs semantic comparison. The model identifies:

- Missing hard skills/tools (e.g., TensorFlow, Docker)
- Unmentioned soft skills (e.g., teamwork, adaptability)
- Required qualifications or certifications not listed

The model then provides textual feedback tailored to the JD, allowing users to improve alignment.

IV. RESULTS

The system was tested with over 20 sample resumes. The parser achieved 90% accuracy in extracting relevant fields. Gemini API successfully suggested skills in alignment with job descriptions. The resume score matched expected patterns across fresher, intermediate, and experienced resumes.

V. DISCUSSION

A. Implications of Findings

This system helps students and job seekers improve their resumes for specific job roles, especially when facing automated filtering by ATS systems. Recruiters can also use it to pre-screen candidates.

B. Limitations and Future Work

1. LLM feedback is limited to the token/context window.
2. Course recommendations rely on static keyword dictionaries.
3. Currently supports English resumes and JDs only.

VI. CONCLUSION

This AI-powered Resume Analyzer leverages structured parsing, resume scoring, and Gemini-based job alignment to guide job seekers. By offering actionable suggestions and resume optimization techniques, it significantly enhances interview readiness. Future improvements will include multilingual support, dynamic course APIs, and real-time deployment options.

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