AI-POWERED RESUME RANKER

Introduction

In today's competitive job market, recruiters often face the challenge of reviewing hundreds of resumes for a single job opening. Manual screening is not only time-consuming but also prone to bias and oversight. To address this, the AI-Powered Resume Ranker was developed as a web-based application that automates the evaluation of resumes based on a provided job description. By utilizing Natural Language Processing (NLP) and Machine Learning (ML) techniques, this system ensures that resumes are scored and ranked with consistency, fairness, and accuracy. This tool is intended to assist HR professionals and recruiters in streamlining the initial screening process, saving time and improving decision-making accuracy.

Abstract

This project aims to streamline and enhance the resume shortlisting process through intelligent automation. The system uses a combination of NLP methods for text processing and various algorithmic scoring techniques to assess the compatibility of a resume with a given job description. It factors in:

- TF-IDF similarity between job description and resume content
- Keyword extraction and matching
- Experience extraction using temporal text parsing
- Education level identification
- Technical and soft skill evaluation

A Flask-based web interface allows HR professionals to upload resumes in PDF format and receive a ranked list with score breakdowns. An Excel report is also generated for record-keeping. Additionally, the backend supports API integration for HR systems, enabling seamless workflow automation.

Steps Involved

1. Text Processing:
- Extracts text from each PDF.
- Preprocesses text by removing special characters, stop words, and performing lemmatization of pdf and job description

2. Scoring Components:
- TF-IDF Similarity: Measures document similarity between the job description and resumes using cosine similarity.
- Keyword Matching: Checks for the presence of essential keywords and partially matches using fuzzy logic.
- Experience Scoring: Detects date patterns to estimate total years of experience.
- Education Scoring: Identifies educational qualifications and institutional keywords.
- Skill Scoring: Matches technical and soft skills from a curated skill list with job requirements.

3. Ranking Algorithm:
Each resume receives a composite score based on:
- 25% TF-IDF Similarity
- 20% Keyword Matching
- 20% Experience
- 15% Education
- 20% Skills Matching

The resumes are then sorted in descending order based on their final scores.

Tools Used

Technology	Purpose
Python	Core programming language
Flask	Web application framework
PyPDF2	PDF text extraction
SaCy	NLP preprocessing and lemmatization
Scikit-learn	TF-IDF vectorization and cosine similarity
FuzzyWuzzy	Partial matching of keywords
Pandas	Data handling and report generation
XlsxWriter	Excel report generation

Key Features

- Resume Upload: Supports multiple PDF resumes for analysis.
- Job Description Input: Users can input detailed job descriptions.
- Automated Text Extraction: Extracts text from PDF resumes using PyPDF2.
- Advanced Text Preprocessing: Uses SpaCy and custom cleaning functions to standardize text.
- Keyword Extraction: Identifies key terms from the job description using NLP-based keyword extraction.
- Multi-Factor Scoring: Calculates scores based on:
- TF-IDF Similarity
- Keyword Match
- Experience Evaluation
- Education Level
- Skill Relevance
- Ranking Mechanism: Aggregates all scores into a final weighted ranking.
- Detailed Report: Generates an Excel report of ranked resumes for easy download.
- Web Interface: Built using Flask with user-friendly templates.

Conclusion

The AI-Powered Resume Ranker provides an innovative solution to one of the most tedious parts of recruitment: resume screening. By applying modern data science and NLP techniques, it ensures that every candidate is evaluated fairly based on merit and relevance. This system not only saves time but also helps in identifying the most suitable candidates accurately and consistently. In the future, it could be expanded to support other file formats, integrate with major Applicant Tracking Systems (ATS), and analyse multi-resumes.