AI-Powered Resume Ranker - Project Report

Name: Ujjwal Dwivedi

Introduction

Hiring the right candidate from a pool of resumes can be time-consuming and prone to human bias. This project, AI-Powered Resume Ranker, leverages Natural Language Processing (NLP) to automate resume screening based on a provided job description. It enables recruiters to upload multiple resumes and receive a ranked list based on relevance, improving decision speed and objectivity.

Abstract

The system extracts text from PDF resumes, processes it using NLP techniques, and compares it to a job description using TF-IDF vectorization and cosine similarity. A Flask-based web interface allows HR users to upload resumes and instantly see rankings, with the ability to download a report. This tool aims to save time, reduce manual screening errors, and streamline candidate shortlisting.

Tools Used

- Python - Core programming language
- Flask - Web framework for building the UI
- SpaCy - NLP library for text preprocessing
- scikit-learn - Used for TF-IDF vectorization and cosine similarity
- PyMuPDF (fitz) - PDF text extraction
- HTML + Bootstrap - Frontend styling
- Pandas - Report generation

Steps Involved in Building the Project

1. PDF Text Extraction: Extract content from uploaded PDF resumes using PyMuPDF.
2. Text Preprocessing: Clean and tokenize both resume and job description text using SpaCy.
3. TF-IDF Vectorization: Convert text into numerical vectors using scikit-learn's TfidfVectorizer.
4. Similarity Scoring: Compute cosine similarity between job description and each resume.
5. Ranking: Sort resumes based on similarity scores in descending order.
6. Web Interface: Built a Flask app to upload resumes, display ranked results, and allow report download.
7. HR Report Export: Generate a CSV report with resume filenames and their scores.

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Conclusion

The AI-Powered Resume Ranker is an effective tool to assist HR professionals in quickly identifying the most relevant candidates. By automating the comparison between resumes and job requirements, it reduces manual effort and improves consistency. The modular design allows for future enhancements like skill gap analysis, keyword highlighting, or integration with ATS platforms.