Resume Analysis System Report

This report describes the functionality and insights provided by a resume analysis system designed to evaluate candidate suitability for a given job description. The system analyzes resumes based on four key components: skills, experience, education, and other relevant factors (e.g., soft skills, location).

System Workflow:

1. **Input:** The system takes two primary inputs: a job description (textual) and one or more candidate resumes (PDF format).

2. **Information Extraction:** The system uses a Large Language Model (LLM) to extract structured information from both the job description and the resumes. This includes:

    - **Skills:** Technical and soft skills mentioned in the job description and possessed by the candidates.
    - **Experience:** Years of experience, roles held, relevant domains, and experience levels.
    - **Education:** Degrees, certifications, and fields of study.
    - **Other Factors:** Location, language proficiency, and other specific requirements.

3. **Scoring:** The system calculates scores for each component (skills, experience, education, and other) by comparing the candidate's profile against the job requirements. The scoring process considers:

    - **Exact Matches:** Direct matches between candidate and job requirements are given higher weight.
    - **Related/Similar Skills:** Skills that are not exact matches but are related or similar are also considered.
    - **Relevance and Transferability:** The relevance and transferability of experience and education are evaluated.
    - **Weighting:** Each component is assigned a weight (e.g., skills: 40%, experience: 30%, education: 20%, other: 10%) to reflect its importance in the overall assessment.

4. **Total Score Calculation:** A weighted total score is calculated for each candidate by summing the weighted component scores.

5. **Recommendations:** The system generates personalized recommendations for each candidate, focusing on areas where they can improve their fit for the job. These recommendations are specific and actionable, suggesting:

    - **Skill Development:** Specific skills to acquire, recommended courses, certifications, and resources.
    - **Experience Enhancement:** Suggestions for gaining relevant experience through projects, volunteering, or highlighting transferable skills.

    - **Other Improvements:** Advice on improving soft skills, addressing location requirements, or other relevant factors.

6. **Visualization:** The system provides visualizations to compare candidates:
    - **Bar Charts:** Show total scores and component-wise scores for all candidates.
    - **Radar Chart:** Visually represents each candidate's strengths and weaknesses across the four components.

Key Insights Provided by the System:

- **Candidate Ranking:** The system ranks candidates based on their total scores, identifying the strongest and weakest candidates for the specific job.
- **Strengths and Weaknesses:** The system highlights each candidate's strengths and weaknesses in each component, providing a detailed understanding of their profile.
- **Actionable Recommendations:** The system provides personalized recommendations to help candidates improve their fit for the job.

Code Functionality Overview:

- **LLM Integration:** The system uses an LLM for natural language understanding and information extraction. Prompt engineering is used to guide the LLM to extract structured data.
- **Structured Data Models:** Pydantic models are used to define the structure of the extracted data (candidate profiles, job requirements, scores).
- **Prompt Templates:** Langchain's `ChatPromptTemplate` is used to create reusable prompt templates for interacting with the LLM.
- **Scoring Logic:** Custom scoring logic is implemented to compare candidate profiles against job requirements.
- **Visualization Libraries:** Plotly and potentially other libraries are used to create interactive charts.
- **Streamlit Integration:** The system is integrated into a Streamlit application to provide a user-friendly interface.

Benefits of the System:

- **Automated Screening:** Automates the initial screening of resumes, saving time and effort.
- **Objective Assessment:** Provides a more objective and consistent assessment of candidates compared to manual screening.
- **Actionable Insights:** Provides personalized recommendations to help candidates improve.
- **Data-Driven Decision Making:** Enables data-driven decision-making in the hiring process.