SkillMatch

A Resume Matcher and Skill Recommender

A tool and system designed to optimize job applications by analyzing resumes against job descriptions (matching) and suggesting relevant skills to enhance employability (recommending).

What is a Resume Matcher?
A Resume Matcher is an AI-powered tool that compares your resume to a specific job description. It scans for:
1. ***Keyword alignment:*** *Identifies matching terms (e.g., skills like "Python" or "project management") and flags missing ones to avoid ATS rejection.*
2. ***Match score:*** *Generates a percentage (e.g., 75%+ is ideal) based on similarity.*
3. ***Suggestions:*** *Recommends tweaks like rephrasing bullets or adding keywords without fabricating experience.*

What is a Skill Recommender?
A Skill Recommender builds on matching by analyzing your resume's extracted skills and suggesting:

Gaps: Missing competencies for target roles (e.g., if applying for data science, recommend "SQL" if absent).
Enhancements: Personalized learning resources, courses, or trends (e.g., "Learn AWS for cloud roles").
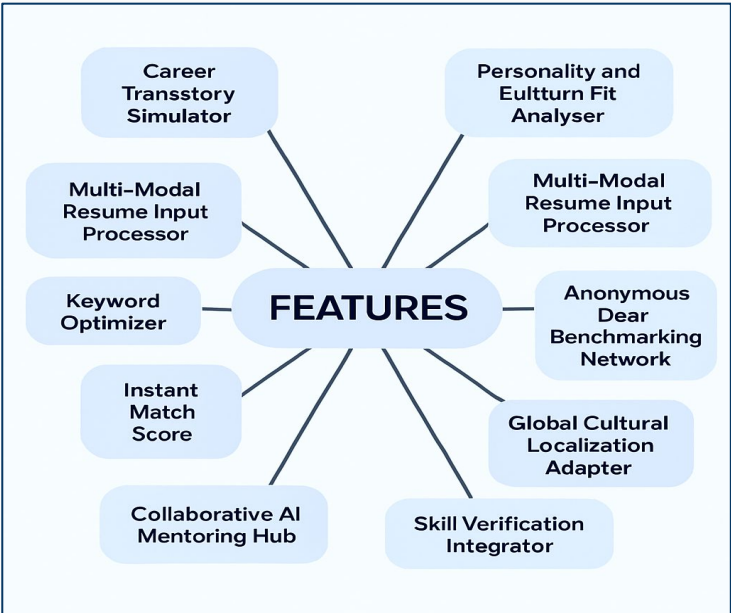*Job fits: Recommends roles based on your skills, using semantic similarity (e.g., Jaccard index for overlap).*

To build a **Resume** Matcher and Skill **Recommender**:

1. **Text Extraction**: Use **pdfplumber** (PDFs) and **docx2txt** (DOCX) to extract resume text.
2. **NLP Preprocessing**: Apply **spaCy** for tokenization, lemmatization, and skill extraction (e.g., "Python").
3. **Matching**: Compute match score with **Scikit-Learn's TF-IDF** and cosine similarity (e.g., 70% for resume vs. job).
4. **Skill Recommendation**: Identify gaps (e.g., missing "SQL") and suggest resources (e.g., Codecademy) using rule-based logic or local LLM (Ollama).
5. **Interface**: Create a **Streamlit** web app for resume upload, job description input, and results display (score, gaps, recommendations).

IMPLEMENTATION AND RESULTS

The entire system is implemented as a **Streamlit** web application, providing an intuitive interface for users. The application allows a user to upload their resume and paste a job description. The system then displays the match score and presents the identified skill gaps along with tailored recommendations. The platform's responsiveness and ease of use ensure a seamless user experience.

Career Transstory Simulator · Personality and Eultturn Fit Analyser · Multi–Modal Resume Input Processor · Multi–Modal Resume Input Processor · Keyword Optimizer · **FEATURES** · Anonymous Dear Benchmarking Network · Instant Match Score · Global Cultural Localization Adapter · Collaborative AI Mentoring Hub · Skill Verification Integrator

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Abstract—*This paper presents SkillMatch, an AI-powered tool designed to optimize job applications by automating the analysis and comparison of resumes against specific job descriptions. The system provides a similarity score and suggests relevant skills to enhance a candidate's employability. SkillMatch addresses the common challenges faced by job seekers, such as avoiding automated tracking system (ATS) rejections through keyword alignment, and provides personalized recommendations for skill development. The system leverages natural language processing (NLP) techniques, including TF-IDF and cosine similarity, for text matching, and employs rule-based logic or a local large language model (LLM) for skill recommendations. The entire system is deployed via an interactive Streamlit web application.*

Keywords—resume matching, skill recommender, NLP, cosine similarity, Streamlit

I. INTRODUCTION

In today's competitive job market, an effective job application process is crucial. SkillMatch is a tool and system designed to streamline this process by providing a dual functionality: resume matching and skill recommendation. The system serves to identify keyword alignment between a resume and a job description, generate a quantitative match score, and provide actionable suggestions for resume improvement. Additionally, it analyzes the skills in a candidate's resume and suggests new competencies and resources to fill gaps for target roles, using semantic similarity.

II. RELATED WORK

Several systems have been developed to address the challenges of resume screening and job recommendation. Projects like the "AI Resume Analyzer" and "Job Analista" employ similar methodologies, including NLP and machine learning algorithms, to evaluate resumes against job descriptions. They often focus on extracting data from resumes, calculating similarity scores, and recommending job listings. SkillMatch builds upon this foundation by explicitly focusing on skill gaps and recommending personalized learning resources, courses, and trends to enhance a user's profile.

III. SYSTEM ARCHITECTURE AND METHODOLOGY

The SkillMatch system is built on a modular architecture, with each component handling a specific function:

A. Text Extraction :
The first step is to extract text from various resume formats. We utilize the pdfplumber library for processing PDF files and docx2txt for DOCX files. This ensures the system can handle common document types and convert them into a clean, machine-readable text format.

B. NLP Preprocessing :
The extracted text from both the resume and job description undergoes preprocessing to prepare it for analysis. Using the spaCy library, the text is tokenized, lemmatized, and common stop words, punctuation, and special characters are removed. This step is critical for enhancing accuracy by reducing noise and standardizing the data.

C. Matching :
The core of the resume matching functionality is a two-step process:
Vectorization: Both the preprocessed resume text and the job description are converted into numeric vectors using Scikit-Learn's TF-IDF (Term Frequency-Inverse Document Frequency) algorithm. This technique highlights terms that are frequent in a specific document but uncommon across a larger corpus, giving more weight to important keywords.
Similarity Calculation: The similarity score between the resume vector and the job description vector is computed using cosine similarity. This metric measures the cosine of the angle between the two vectors, providing a percentage match score (e.g., 75%+) based on their alignment.

D. Skill Recommendation :
The skill recommender module builds on the matching results to identify missing competencies. If a resume's match score falls below a certain threshold, the system analyzes the job description for skills that are not present in the resume. This identification of gaps is achieved through rule-based logic or a local LLM like Ollama. The system then suggests personalized learning resources or courses to acquire these skills, such as recommending "SQL" for a data science role or "AWS" for a cloud role.

IV. IMPLEMENTATION AND RESULTS

The entire system is implemented as a **Streamlit** web application, providing an intuitive interface for users. The application allows a user to upload their resume and paste a job description. The system then displays the match score and presents the identified skill gaps along with tailored recommendations. The platform's responsiveness and ease of use ensure a seamless user experience.

V. CONCLUSION AND FUTURE WORK

SkillMatch offers a robust solution for a data-driven approach to job applications. By combining resume matching with a skill recommender, it empowers users to improve their resumes and employability systematically. Future work could include integrating a more advanced LLM for more nuanced recommendations, expanding the platform to support additional document formats, and incorporating a feature to track a user's skill-building progress over time.