AI Hiring Assistance platform: TouchWood Hiring

Introduction:

Recruitment processes often suffer from inefficiencies in resume screening, candidate-job matching, and follow-up communication. Traditional Applicant Tracking Systems (ATS) rely heavily on keyword-based filters, often failing to capture the contextual and nuanced suitability of candidates for specific roles. Our AI Hiring Assistance Platform TouchWood Hiring aims to transform the hiring experience by leveraging modern AI capabilities—including LLMs, automated reasoning, and agentic workflows—to streamline the evaluation of resumes against job descriptions, and to automate intelligent candidate engagement.

The platform takes as input the candidate's resume, location, and the job description (in PDF format), and uses AI models to classify profiles based on their compatibility with the role: **Strong Match, Medium Match, or Weak Match**. For non-strong matches, the system goes one step further—generating personalized follow-up questions to extract missing or clarifying information, suggesting whether it's worth reaching out to the candidate. It also drafts tailored email communications and, in future iterations, will use agentic AI to initiate voice calls and autonomously follow up with candidates.

Objectives:

1. **Automated Profile Evaluation:**
   The system will take the location of candidate resumes (Stored in .pdf and .docx format) and pdf/html for job description as input. I will then analyze resumes in conjunction with job descriptions to categorize candidate suitability into Strong, Medium, and Weak match levels.

2. **Intelligent Candidate Engagement:**
   For Medium and Weak matches, the platform will decide whether the candidate is potentially suitable and should be contacted for further information.

3. **Dynamic Questionnaire Generation:**
   Automatically generate relevant, personalized questions to fill gaps in candidate profiles and improve decision-making.

4. **Automated Communication Drafting:**
   Generate professional, personalized email drafts to reach out to candidates based on their match category and required information.

5. **Agentic AI Roadmap:**
   Plan and build toward integrating AI agents that can autonomously make calls, follow up with candidates via voice and email, and handle ongoing candidate interactions.

Related Work:

Proposed WorK and Methodologies:

The proposed solution aims to develop an AI-powered hiring platform that leverages Large Language Models (LLMs) for intelligent resume-job matching, candidate analysis, and automated engagement workflows. The platform will be built with a modular architecture, supporting local deployment of LLMs using OLLama with LLaMA 2/3, and an interactive frontend built in Streamlit for ease of use and rapid iteration.

The core components of the proposed work include:

1. Resume and Job Description Ingestion:
   The system will accept candidate resumes (PDF/Docx), location metadata, and job descriptions (also in PDF format).Preprocessing pipelines will extract structured text using document parsers (e.g., PyMuPDF, pdfminer, docx).Extracted information will be vectorized and embedded for downstream matching.

2. Profile-Job Matching Engine:
   An LLM-based comparison module will analyze the semantic similarity between a resume and the job description.Each profile will be scored and classified into:
   a. Strong Match
   b. Medium Match
   c. Weak Match
   The classification will consider skills, experience alignment, education relevance, location constraints, and other role-specific metadata.

3. Follow-Up Strategy for Medium/Weak Matches:
   For candidates in Medium/Weak categories, the system will determine whether a follow-up is warranted based on gaps or ambiguities in the resume.An LLM will generate a custom set of questions to clarify areas such as:
   a. Domain-specific expertise
   b. Willingness to relocate
   c. Certifications, achievements, or tools used

4. Automated Email Drafting:
   The platform will use prompt templates and LLM completions to generate professional, personalized outreach emails.Emails will include:
   a. A brief introduction to the role
   b. Reason for interest in the candidate
   c. A dynamic questionnaire for further input

5. Streamlit Based User Interface:
   A lightweight, intuitive UI built with Streamlit will allow recruiters to:
   a. Upload resumes and job descriptions
   b. View match results
   c. Review generated questions and email drafts
   d. Customize or send outreach messages
6. Future Expansion – Agentic AI for Voice and Follow-ups:

The platform is designed to support future integration of agentic AI workflows.These agents will:

a. Place voice calls to candidates
b. Conduct two-way follow-up conversations
c. Provide summaries and update candidate profiles based on interaction outcomes

7. Local and Private Deployment (via OLLama):
   The platform will prioritize data privacy and cost efficiency by running LLMs locally using OLLama. LLaMA 2/3 models (quantized versions) will handle the primary inference tasks, ensuring responsiveness without requiring cloud-based APIs.

Requirements:

- Python 3.12 (or latest versions)
- Numpy
- Pandas
- Stremlit
- Ollama
- Llama 2 or 3 model
- Transformers library
- pytoch/Tensorflow
- Matplotlib
- Jupyter notebook (for experimentations)

Implementation:

Results:

References:

1. https://www.coursera.org/specializations/machine-learning-introduction
2. https://huggingface.co/docs/transformers/en/model_doc/llama2
3. https://medium.com/analytics-vidhya/an-open-guide-to-machine-learning-part-1-1-5a8fc5770070
4. https://course.fast.ai/ , https://course19.fast.ai/