Candidate Hiring Recommendation System

1.Introduction

1.1 OVERVIEW

Recruitment today often begins with a manual review of resumes, where recruiters spend hours scanning through documents to identify relevant skills and experience. This process can be repetitive, time-consuming, and prone to oversight, especially when handling a large volume of applications.

To address this, our **Resume Skill Match and Recommendation System** introduces an AI-powered solution that enhances and streamlines the hiring process. Built on top of **Large Language Models (LLMs)**, the system simulates human-like understanding of resume content to:

- **Automatically analyse resumes**: Extracts technical skills, relevant experience, and key qualifications, then compares them against the job description to calculate a fit score and provide hiring recommendations.
- **Enable structured job application intake**: Allows candidates to upload resumes and input key skills, which are stored in a structured format. Recruiters can easily filter, and shortlist candidates based on job-specific criteria.

By integrating intelligent automation into recruitment workflows, the system helps organizations reduce manual effort, improve consistency, and make faster, more accurate hiring decisions.

1.2 PROBLEM STATEMENT

Traditional resume screening methods are often manual, inconsistent, and inefficient. Recruiters must comb through numerous resumes to identify suitable candidates—a process that is:

- **Time-consuming**
- **Susceptible to human error**
- **Prone to bias**
- **Difficult to scale**

Important qualifications may be overlooked, and ensuring fairness and consistency across candidates becomes a significant challenge.

Our solution addresses these issues by providing an **AI-driven, automated screening process** that evaluates resumes against job requirements with speed, accuracy, and fairness. By leveraging LLMs, the system closes the gap between available talent and recognized talent—enabling smarter, faster, and more objective hiring.

2. SOLUTION OVERVIEW

2.1 Objectives

The **Resume Skill Match and Recommendation System** aims to enhance the efficiency, accuracy, and scalability of recruitment workflows. It provides intelligent automation for both resume evaluation and job application management. The primary objectives of the system include:

Automated Resume Analysis & Matching

- Skill Extraction
- Candidate-to-Job Matching
- Fit Score Computation
- Bulk Resume Evaluation
- Exportable Evaluation Reports

Intelligent Job Application Intake & Filtering

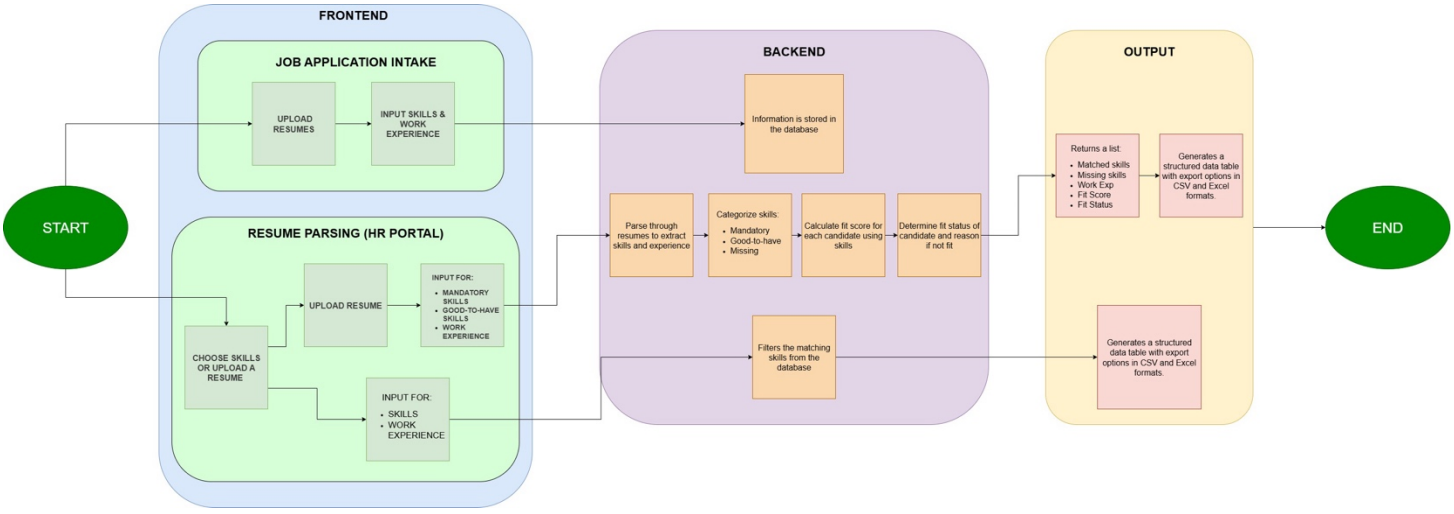
- Structured Resume Intake
- Dynamic Candidate Filtering
- Centralized Candidate Database
- Downloadable Filtered Reports

2.2 DIFFERENCE BETWEEN OUR MODEL AND NAUKRI

Feature / Aspect	Our Model	Naukri System
Technology Used	Custom LLM (OLLAMA 7B) + Lang Chain for intelligent skill extraction & scoring	Traditional keyword-based matching with limited ML-based suggestions
Scoring Model	Weighted scoring (60% skills, 40% experience) with clear "Fit" logic	Relevance-based ranking; scoring logic is mostly proprietary
Skill Matching	LLM-powered extraction followed by	Primarily exact keyword matches from resume content

Feature / Aspect	Our Model	Naukri System
	keyword matching with job description	
Experience Evaluation	Contextual estimation using LLM text analysis	Based on declared experience (years)
Customization	Fully customizable job criteria per role or requirement	Limited user-driven customization; job-post dependent
Output Format	Downloadable CSV/Excel reports with evaluation results	No downloadable reports; UI-based tracking only
File Format Support	Supports both PDF and DOC formats	Supports PDF, DOC, DOCX
Bulk Resume Evaluation	Real-time batch resume upload and scoring available	No direct bulk evaluation by job description

2.3 WORKFLOW



The system streamlines job application processing through three phases:

- **Frontend:** Users upload resumes or input skills/experience for job applications and HR manages resume parsing, categorizing skills (mandatory, good-to-have, missing).
- **Backend:** Stores all data, parses resume to extract and categorize skills, filters matching skills, and calculates candidate fit scores to determine suitability.
- **Output:** Generates structured data tables with matched skills, missing skills, work experience, fit scores, and fit status, with export options in CSV and Excel formats.

2.4 SYSTEM REQUIREMENTS

2.4.1 SOFTWARE REQUIREMENTS

- **OS**: Ubuntu/macOS/Windows
- **Database**: In-memory / MongoDB
- **Frontend**: Stream lit UI
- **Backend**: Python + Lang Chain
- **AI/ML**: Ollama 7B (LLaMA 2)
- **Web Server**: Stream lit / Nginx
- **Tools**: Git, PyPDFLoader, Pandas

2.4.2 HARDWARE REQUIREMENTS

- **Processor**: Quad / Octa Core
- **RAM**: 16–32 GB
- **Storage**: 50+ GB SSD
- **Network**: Stable broadband
- **GPU**: Optional (RTX/Apple)
- **Scalability**: Cloud-ready

3. SOLUTION DESIGN

3.1 COMPONENT BREAKDOWN

The system is built as a full-stack application with a frontend in **Stream lit** and a backend using **Lang Chain** with the **LLaMA 2 7B model via Ollama**. It operates in two main modes:

- **Automated Resume Evaluation**
- **Job Application Intake & Skill-Based HR Filtering**

FRONTEND – STREAM LIT UI

Stream lit provides a clean, interactive interface for both applicants and HR users.

Shared Features:

- **Mode Selector**: Choose between Resume Parsing and Skill-Based Search.

Mode 1: Resume Parsing & Evaluation:

- Upload PDF resumes

- Input job description, required skills, and experience
- Trigger evaluation and display results
- Download fit score results as CSV/Excel

Mode 2: Job Application Intake:

- Candidate form: upload resume, enter skills, and experience
- HR filter: enter required skills, view and download filtered candidates

BACKEND – LANG CHAIN WITH LLAMA 2 (OLLAMA)

Handles logic for parsing, extraction, evaluation, and formatting.

Key components:

- **PyPDFLoader**: Parses resumes from PDFs
- **LLaMA 2 via Ollama**: Extracts skills and experience
- **Regex + Logic**: Cleans and standardizes data
- **Scoring Algorithm**: Compares candidate data with job requirements
- **Pandas**: Structures output and supports data export

3.2 EVALUATION LOGIC

The evaluation is based on a **weighted scoring model**:

SCORING CRITERIA

- **Mandatory Skills Match** – 60% weight
  Ensures all required skills are present.
- **Experience Match** – 40% weight
  Checks if experience meets the job's threshold.
- **Good-to-Have Skills** – Informative only
  Optional skills are noted but don't affect the score.

FIT CRITERIA

- A candidate is marked **'Fit'** if:
  - All mandatory skills match
  - Experience meets or exceeds the requirement

If either is missing, the candidate is marked **'Not Fit'**, regardless of total score.

3.3 LIMITATIONS

While effective, the system has a few limitations:

- **LLM Inaccuracy**: May misinterpret rare resume formats or phrasing
- **Format Dependency**: Works best with structured PDFs
- **Experience Estimation**: Based on context, not verified dates
- **File Format Support**: Currently supports **PDF only**

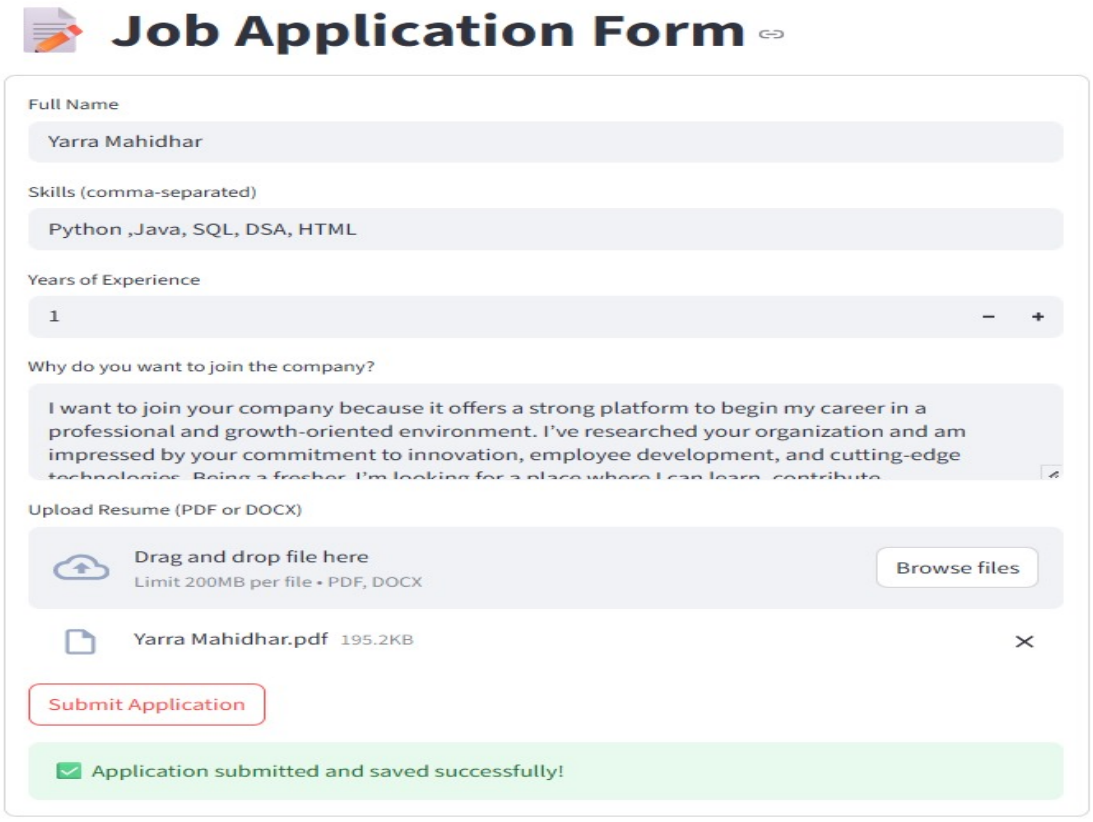
3.4 Future Enhancements

Planned improvements include:

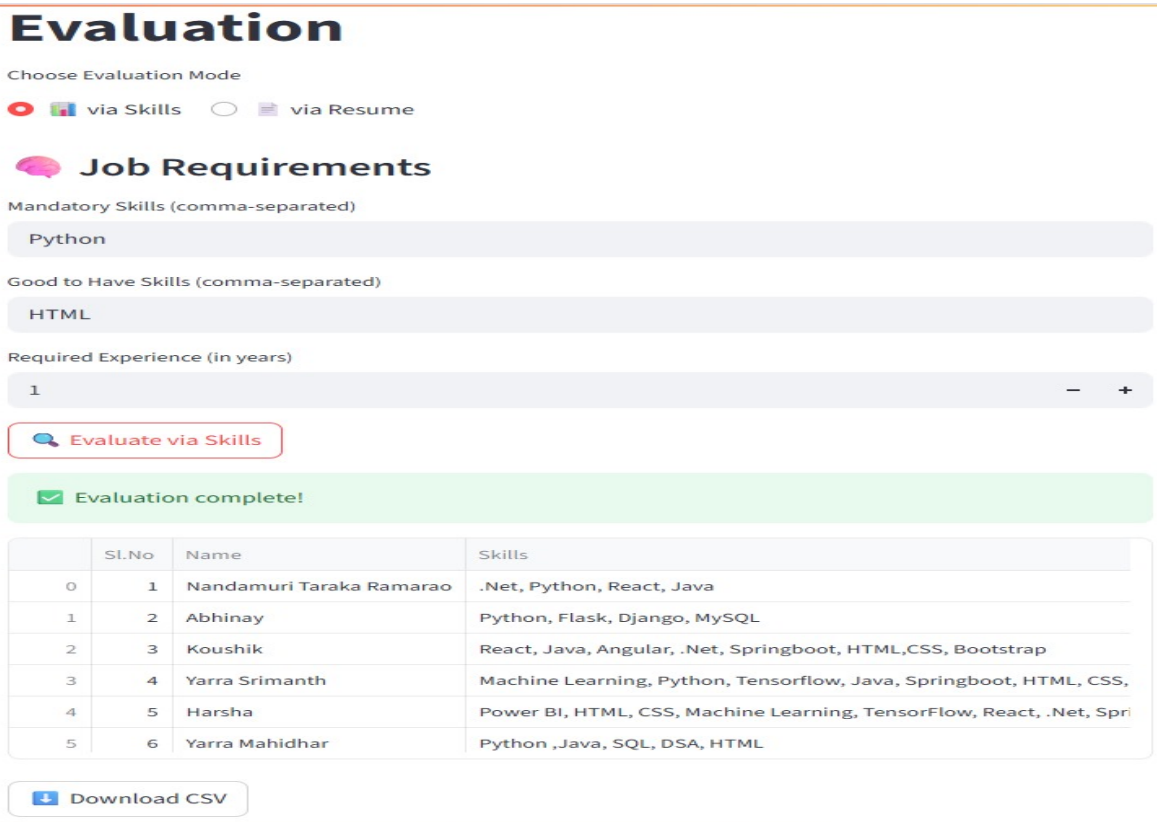
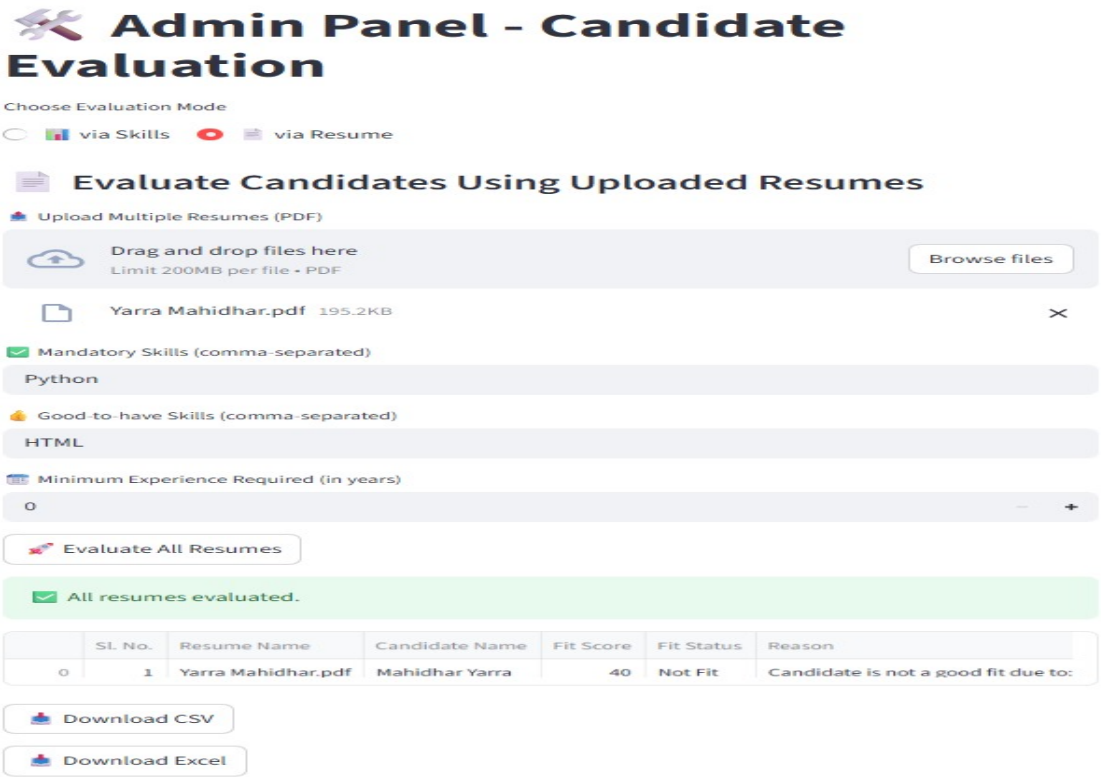
- **Multi-format Resume Support** (DOCX, TXT, etc.)
- **Fuzzy Skill Matching** using embeddings for semantic similarity
- **ATS Integration** for smoother recruiter workflow
- **Custom Weighted Scoring** for role-specific flexibility

4. Appendix

The system streamlines job applications from frontend submission and resume parsing to backend processing for skill categorization and fit score calculation. The output provides structured tables of candidate matches and status with export options.



This "Evaluation" interface defines job requirements by skills and experience, then displays a table of matching candidates with their skills, available for CSV download.



The "Admin Panel - Candidate Evaluation" allows administrators to evaluate candidates by uploading resumes against specified skills and experience. It then displays fit results in a table, offering CSV and Excel download options.