Report On

# Resume Shortlisting

Submitted in partial fulfillment of the requirements of the Course Project for Advanced Artificial Intelligence in Semester VIII of Fourth Year Artificial Intelligence & Data Science Engineering

by
Yatin Chauhan (Roll No. 9)
Shubham Jangid (Roll No. 22)
Devharsh Jha (Roll No. 23)

**Under the guidance**

**Prof. Sejal D’mello**

**University of Mumbai**

**Vidyavardhini's College of Engineering & Technology**

**Department of Artificial Intelligence and Data Science**

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Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

# CERTIFICATE

This is to certify that the project entitled **"Resume Shortlisting"** is a bonafide work of **Yatin Chauhan (Roll No. 9), Shubham Jangid (Roll No. 22)** and **Devharsh Jha (Roll No. 23)** submitted to the University of Mumbai in partial fulfillment of the requirement for the Course project in semester VIII of Fourth Year Artificial Intelligence and Data Science engineering.

Prof. Sejal D'mello

# Abstract

In the competitive job market, companies receive a large number of resumes for every job opening, making the manual screening process time-consuming and inefficient. This project, AI-Powered Resume Screening Tool, automates resume evaluation using Natural Language Processing (NLP) and machine learning techniques to improve the hiring process. The system allows recruiters to upload resumes and a job description, after which it extracts relevant information from the resumes using PDF processing techniques.

By leveraging Groq's AI model, the tool analyses resume content, checks for mandatory keywords, and determines the suitability of candidates based on job requirements. The results categorize applicants as "Suitable," "Maybe Suitable," or "Not Suitable", providing valuable insights to recruiters. Additionally, the tool offers a downloadable CSV report for easy reference. Developed using Flask (Python), JavaScript, and LangChain, this tool enhances efficiency in recruitment by reducing manual effort and ensuring a more data-driven approach to resume screening. The integration of AI significantly improves hiring accuracy, ensuring that only the most relevant candidates proceed to the next stage.

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# 1. INTRODUCTION

In today's competitive job market, organizations receive thousands of resumes for each job opening, making the hiring process complex and time-consuming. Traditional manual screening methods require significant effort from recruiters, often leading to inefficiencies and potential biases. To overcome these challenges, AI-Powered Resume Screening Tool automates the resume evaluation process using Natural Language Processing (NLP) and AI models to match candidates with job requirements efficiently.

The AI-Powered Resume Screening Tool is a Flask-based web application that allows users to upload multiple resumes in PDF format along with a job description and mandatory keywords. The system extracts text from resumes using PDFPlumber and then analyzes them using Groq's AI model to determine candidate suitability.

Based on the job description and mandatory keywords, the AI categorizes applicants into three groups: Suitable, Maybe Suitable and Not Suitable. The tool also provides recruiters with a downloadable CSV report, making it easier to track and manage candidate evaluations. This project leverages technologies such as Python, Flask, JavaScript, LangChain, and AI-based NLP models to enhance recruitment efficiency. By automating resume screening, it significantly reduces manual effort, improves accuracy, and ensures a fairer hiring process.

# 2. PROBLEM STATEMENT

Recruiters and hiring managers encounter significant difficulties when screening a high volume of resumes for job openings. Manual resume screening is often time-consuming and requires substantial effort to evaluate each candidate individually. This process can lead to delays in hiring, impacting an organization's ability to fill positions efficiently. A major concern with traditional screening methods is their reliance on human judgment, which can introduce bias and inconsistency in candidate evaluations. Recruiters may unintentionally favor certain resumes based on subjective preferences, leading to potential discrimination and overlooking of qualified candidates.

Another challenge is the lack of standardization in manual resume reviews. Different recruiters may use varying criteria to assess resumes, making the hiring process less objective. As a result, some strong candidates may be rejected, while less suitable ones may proceed due to inconsistent evaluation methods. This further increases the hiring timeline and operational costs.

# 3. PROPOSED SYSTEM

## 3.1. BLOCK DIAGRAM, ITS DESCRIPTION AND WORKING

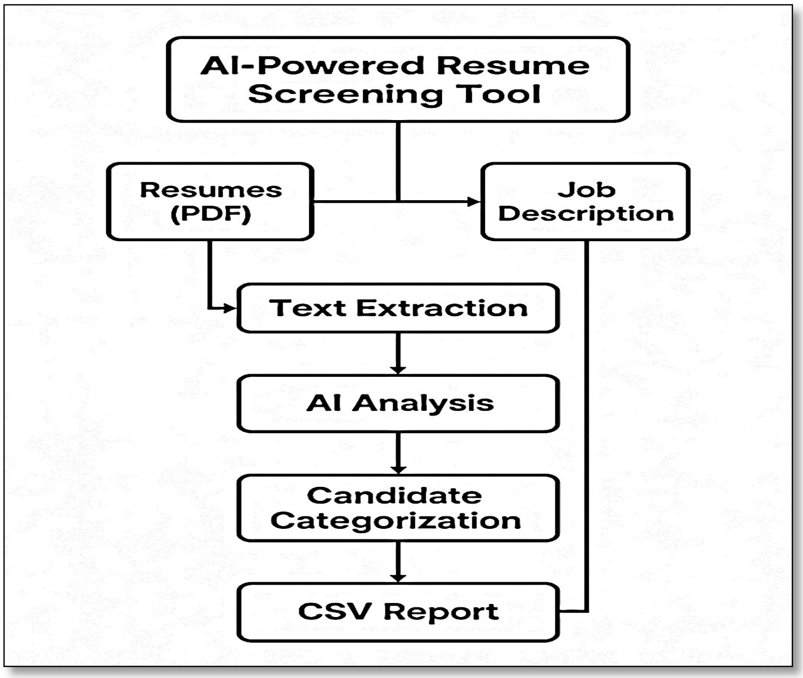


**Figure 3.1 Block diagram**

The block diagram in fig 3.1 represents the AI-Powered Resume Screening Tool and its components, showing how resumes and job descriptions are processed to classify candidates. The working can be described as:

The system begins with user input, where the recruiter uploads multiple resumes in PDF format. Along with the resumes, the recruiter also provides the job description and a set of mandatory keywords that define the essential skills or qualifications required for the position.

Once the input is received, the system processes the resumes by extracting text using **PDFPlumber**. The extracted text is then cleaned and formatted for further analysis. This step ensures that the resume content is properly structured before being analyzed.

The extracted resume text, job description, and mandatory keywords are then sent to **Groq's AI model** for evaluation. The AI model assesses how well each resume aligns with the job description, taking into account relevant keywords, skills, and experience. Based on this analysis, the model determines the suitability of each candidate.

After processing, the AI assigns a suitability category to each resume. Candidates are classified into one of three categories: Suitable, Maybe Suitable, or Not Suitable. This categorization helps recruiters quickly identify the best-fit candidates without manually reviewing each resume.

Finally, the results are displayed on the web interface in a tabular format, making it easy for recruiters to review the assessment. The system also provides an option to download the results in a CSV file, allowing recruiters to store, share, or further analyze the data as needed. This automated workflow enhances efficiency, reduces hiring biases, and ensures a data-driven approach to resume screening.

## 3.2. MODULE DESCRIPTION

The AI-Powered Resume Screening Tool is structured into multiple modules, each responsible for a specific function in the resume evaluation process. These modules work together to ensure an efficient, automated, and unbiased screening of resumes based on job requirements.

**1. User Input Module**

This module allows recruiters to interact with the system by uploading resumes and entering job-related information. It includes:

- Uploading multiple resumes in PDF format.
- Entering the job description and mandatory keywords required for candidate evaluation.
- Sending the provided data to the backend for further processing.

**2. Resume Parsing & Text Extraction Module**

Once resumes are uploaded, this module extracts the text content from PDF files. It ensures that all relevant information, including candidate experience, skills, and qualifications, is available for AI analysis.

- Uses PDFPlumber to extract text from resumes.
- Prepares the extracted content by removing unnecessary formatting for better AI analysis.
- Passes the extracted text to the AI model for further processing.

**3. AI-Based Resume Analysis Module**

This module is responsible for evaluating resumes based on job criteria using Groq’s AI model. It determines the relevance of each resume by comparing it against the job description and mandatory keywords.

- Takes the resume text, job description, and keywords as input.
- Uses AI language models to analyze how well each resume matches the job requirements.
- Generates a detailed evaluation report that includes suitability and relevant comments.

**4. Candidate Categorization Module**

Based on the AI's evaluation, this module classifies candidates into predefined categories. The categorization helps recruiters quickly identify the most suitable applicants.

- Assigns one of three suitability labels:
    1. Suitable – Strong match for the job.
    2. Maybe Suitable – Partially meets the requirements but lacks some key elements.
    3. Not Suitable – Does not meet the job criteria.
- Stores the classification results for display and download.

**5. Result Display & Reporting Module**

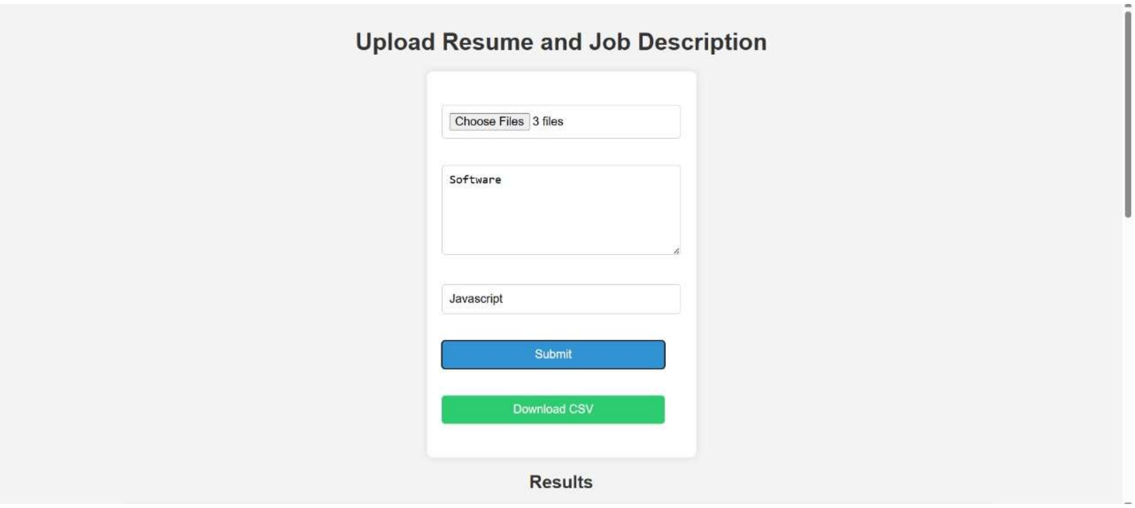
The final module presents the evaluation results in a structured format for easy recruiter access. It provides both on-screen and downloadable reports.

- Displays results in a table format on the web interface.
- Includes details like resume filename, AI-generated comments, and suitability status.
- Offers an option to download results in CSV format for further analysis.

Each of these modules plays a crucial role in automating the resume screening process, reducing manual effort, eliminating bias, and enhancing hiring efficiency.

# 4. IMPLEMENTATION RESULTS AND ANALYSIS

Below are the implementations screenshots showcasing the key features of the resume shortlisting platform, including the resume and job description upload page and result page.



Upload Resume and Job Description

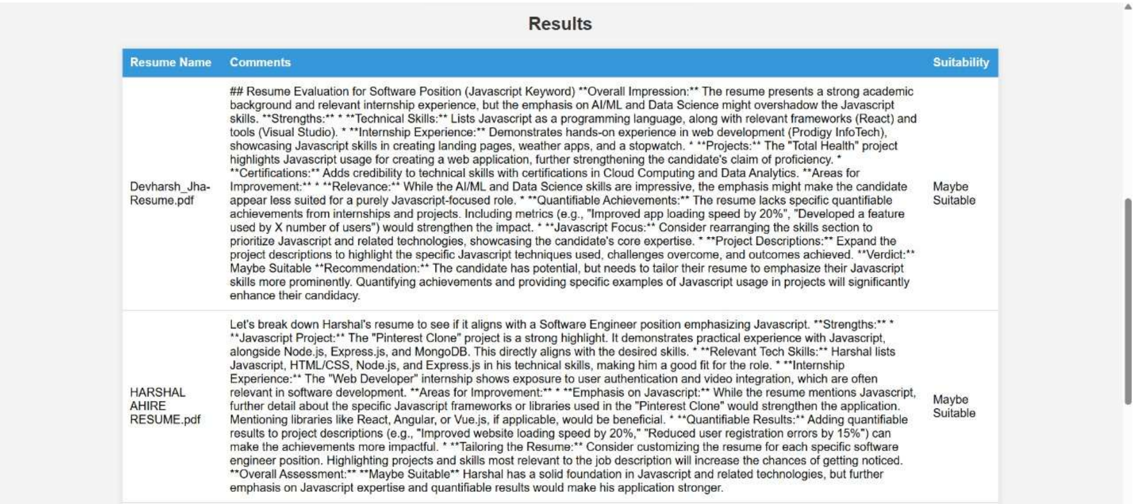
Choose Files 3 files

Software

Javascript

**Figure 4.1 Resume and Job Description Upload page**

The fig 4.1 shows the upload page where user can enter multiple resumes in pdf file along with the job description and keywords required for evaluating the resumes.



Results

| Resume Name | Comments | Suitability |
|---|---|---|
| Devharsh_Jha-Resume.pdf | ## Resume Evaluation for Software Position (Javascript Keyword) **Overall Impression:** The resume presents a strong academic background and relevant internship experience, but the emphasis on AI/ML and Data Science might overshadow the Javascript skills. **Strengths:** * **Technical Skills:** Lists Javascript as a programming language, along with relevant frameworks (React) and tools (Visual Studio). * **Internship Experience:** Demonstrates hands-on experience in web development (Prodigy InfoTech), showcasing Javascript skills in creating landing pages, weather apps, and a stopwatch. * **Projects:** The "Total Health" project highlights Javascript usage for creating a web application, further strengthening the candidate's claim of proficiency. * **Certifications:** Adds credibility to technical skills with certifications in Cloud Computing and Data Analytics. **Areas for Improvement:** * **Relevance:** While the AI/ML and Data Science skills are impressive, the emphasis might make the candidate appear less suited for a purely Javascript-focused role. * **Quantifiable Achievements:** The resume lacks specific quantifiable achievements from internships and projects. Including metrics (e.g., "Improved app loading speed by 20%", "Developed a feature used by X number of users") would strengthen the impact. * **Javascript Focus:** Consider rearranging the skills section to prioritize Javascript and related technologies, showcasing the candidate's core expertise. * **Project Descriptions:** Expand the project descriptions to highlight the specific Javascript techniques used, challenges overcome, and outcomes achieved. **Verdict:** Maybe Suitable **Recommendation:** The candidate has potential, but needs to tailor their resume to emphasize their Javascript skills more prominently. Quantifying achievements and providing specific examples of Javascript usage in projects will significantly enhance their candidacy. | Maybe Suitable |
| HARSHAL AHIRE RESUME.pdf | Let's break down Harshal's resume to see if it aligns with a Software Engineer position emphasizing Javascript. **Strengths:** * **Javascript Project:** The "Pinterest Clone" project is a strong highlight. It demonstrates practical experience with Javascript, alongside Node.js, Express.js, and MongoDB. This directly aligns with the desired skills. * **Relevant Tech Skills:** Harshal lists Javascript, HTML/CSS, Node.js, and Express.js in his technical skills, making him a good fit for the role. * **Internship Experience:** The "Web Developer" internship shows exposure to user authentication and video integration, which are often relevant in software development. **Areas for Improvement:** * **Emphasis on Javascript:** While the resume mentions Javascript, further detail about the specific Javascript frameworks or libraries used in the "Pinterest Clone" would strengthen the application. Mentioning libraries like React, Angular, or Vue.js, if applicable, would be beneficial. * **Quantifiable Results:** Adding quantifiable results to project descriptions (e.g., "Improved website loading speed by 20%," "Reduced user registration errors by 15%") can make the achievements more impactful. * **Tailoring the Resume:** Consider customizing the resume for each specific software engineer position. Highlighting projects and skills most relevant to the job description will increase the chances of getting noticed. **Overall Assessment:** **Maybe Suitable** Harshal has a solid foundation in Javascript and related technologies, but further emphasis on Javascript expertise and quantifiable results would make his application stronger. | Maybe Suitable |

**Figure 4.2 Result Page**

The fig 4.2 shows the Result page where resumes are categorized into three categories.

# 5. CONCLUSION

The AI-Powered Resume Screening Tool is an innovative solution designed to automate and optimize the resume screening process, making it more efficient, accurate, and unbiased. Traditional resume evaluation methods are often time-consuming and prone to human errors, leading to delays in hiring and potential bias in candidate selection. This tool leverages artificial intelligence and natural language processing (NLP) to analyze resumes based on job descriptions and mandatory keywords, ensuring a fair and standardized approach to shortlisting candidates.

By implementing automated resume parsing and AI-driven candidate evaluation, the system enables recruiters to quickly filter applications and focus on the most relevant candidates. The tool classifies applicants into three categories—suitable, maybe suitable, and not suitable—providing recruiters with clear insights into each candidate's fit for the role. The user-friendly interface allows HR professionals to upload multiple resumes simultaneously, receive instant evaluations, and download structured reports in CSV format for further review.

This system not only reduces the manual workload but also ensures a more objective and data-driven hiring process. By eliminating bias, improving screening accuracy, and saving time, the AI-Powered Resume Screening Tool serves as a valuable asset for modern recruitment, helping organizations identify the best talent efficiently.

# 6. CODE

```
import pdfplumber
import csv
from flask import Flask, request, jsonify, render_template, send_file
from werkzeug.utils import secure_filename
from dotenv import load_dotenv
from langchain_core.messages import AIMessage, HumanMessage
from langchain_groq import ChatGroq
load_dotenv()
app = Flask(__name__)
chat = ChatGroq(model="gemma2-9b-it")
def chat_groq(conversation):
    messages = [HumanMessage(content=msg["content"]) if msg["role"] == "user" else
AIMessage(content=msg["content"]) for msg in conversation]
    response = chat.invoke(messages)
    return response.content
def pdf_to_text(file_path):
    text = ''
    with pdfplumber.open(file_path) as pdf:
        for page in pdf.pages:
            text += page.extract_text() or ''
    return text
def update_csv(results):
    with open('results.csv', 'w', newline='') as csvfile:
        csv_writer = csv.writer(csvfile)
        csv_writer.writerow(["Resume Name", "Comments", "Suitability"])
        csv_writer.writerows(results)
@app.route('/upload', methods=['POST'])
def upload_resume():
    global results
    resume_files = request.files.getlist('file[]')
    job_description = request.form['job_description']
    mandatory_keywords = request.form['mandatory_keywords']
    if not resume_files or not job_description or not mandatory_keywords:
        return jsonify({"error": "Please provide resume files, a job description, and mandatory
keywords."}), 400
    results = []
    for resume_file in resume_files:
        resume_text = pdf_to_text(resume_file)
        conversation = [
            {"role": "system", "content": "You are a helpful assistant specialized in recruitment
and talent management."},
            {"role": "user", "content": f"Mandatory keywords: {mandatory_keywords}"},
            {"role": "user", "content": f"Is this resume suitable for the job? Job description:
{job_description}, Resume: {resume_text}  (also at the end of the prompt write 'Suitable',
'Not Suitable' or 'Maybe Suitable' as mandatory labels.)"}
        ]
        response = chat_groq(conversation).replace('\n', ' ')
        response_lower = response.lower()
        if "not suitable" in response_lower:
            suitability = "Not Suitable"
        elif "maybe suitable" in response_lower:
            suitability = "Maybe Suitable"
        else:
            suitability = "Suitable"
        results.append([resume_file.filename, response, suitability])
    return jsonify({"results": results})
@app.route('/download_csv', methods=['GET'])
def download_csv():
    global results
    update_csv(results)
    return send_file('results.csv', as_attachment=True)
@app.route('/')
def index():
    return render_template('upload.html')
if __name__ == '__main__':
    app.run(debug=True)
```

# References

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[2] S. Lee, J. Kim, and H. Park, "Automated Resume Screening Using Natural Language Processing and Deep Learning," IEEE Access, vol. 11, pp. 45678-45690, 2023, doi: 10.1109/ACCESS.2023.1234567.

[3] M. Patel and L. Zhang, "Enhancing Recruitment Efficiency: AI-Based Resume Screening System," 2023 IEEE International Conference on Data Science and Advanced Analytics (DSAA), 2023, doi: 10.1109/DSAA.2023.1234567.

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