AI-Powered Resume Filtering and Ranking System

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Abstract:**"AI-Powered Resume Filtering and Ranking System" is a large web-based platform that provides smart, automated candidate screening and ranking to meet the needs of modern hiring. The technology pulls out important candidate information, such as their education, skills, work history, certificates, and contact information, so it can give accurate recommendations that are specific to each employer. It looks at a wide range of candidate traits, such as their technical and people skills, their education, and their work history, to make sure that the shortlist for each job opening is both correct and useful.**

The platform uses advanced Natural Language Processing (NLP) and machine learning methods, such as semantic similarity models and rule-based validation, to look at job requirements and candidate profiles and find the best matches. The semantic matching part looks at how relevant each resume is to the job, and the rule-based validation part makes sure that only candidates who meet the minimum requirements are considered. These mechanisms work together to improve ranking accuracy by giving each candidate a personalized score that fits the employer's needs and the specific needs of the job.

In addition to smart recommendations, the platform has a real-time tracking system that keeps an eye on candidates' progress through the recruitment pipeline, giving recruiters timely insights and detailed performance reports. The "AI-Powered Resume Filtering and Ranking System" is meant to help companies make confident, data-driven hiring decisions. This will improve the quality of the hiring process and make it easier to find good candidates.

Keywords- semantic matching, resume verification, real-time insights, candidate ranking, recruitment automation, natural language processing, and machine learning.

I.INTRODUCTION

It's hard to find the right people to hire, especially when you get so many resumes for each job opening. The "AI-Powered Resume Filtering and Ranking System" is a web-based platform that is easy to use and helps companies and recruiters make better hiring decisions. It gives personalized candidate recommendations based on the requirements of the job, the qualifications of the candidates, and how well they fit the open position. The platform uses important information from resumes, like education, skills, work history, certifications, and contact information, to make personalised rankings of candidates. It works with a lot of different jobs and fields, and it uses advanced natural language processing (NLP) and machine learning to make sure that the recommendations are correct and fit the job description. Semantic similarity models look at how well resumes and job postings fit together in context, and rule-based validation makes sure that only qualified candidates are looked at.

The system does more than just filter candidates; it also lets recruiters keep an eye on their progress throughout the hiring process. It gives recruiters real-time information and performance reports, which makes it easier for them to keep an eye on how well candidates fit and change their selection strategies as needed.

The "AI-Powered Resume Filtering and Ranking System" makes hiring easier by helping companies make smart hiring decisions with confidence. It is a useful tool for anyone who wants to improve and manage their hiring process well because it combines smart automation with real-time tracking.

II.LITERATURE SURVEY

1. In 2021, S. Gupta, R. Kumar, and A. Sharma wrote "Automated Resume Screening using Natural Language Processing and Machine Learning."

This paper examines the application of Natural Language Processing (NLP) and machine learning to automate the screening of resumes. The authors show that semantic analysis and keyword extraction help match candidate profiles with job requirements more accurately.

Their method is better than traditional manual screening because it constantly improves the selection of candidates and cuts down on human bias. The study shows how advanced computer methods can help manage and evaluate resumes better in fast-paced hiring situations. [1]2. In 2022, M. Patel, S. Desai, and K. Mehta wrote
"A Hybrid Approach for Resume Ranking using Semantic Similarity and Rule-Based Filtering."

This study presents a resume ranking system that utilises semantic similarity models and rule-based validation to deliver pertinent candidate recommendations to recruiters. We used real-world hiring data to test how well the system worked, focusing on how happy recruiters were with it and how well it worked. The results indicate that these hybrid systems can successfully fulfil recruiter expectations and enhance the quality of candidate shortlisting. This research advances the expanding domain of AI-driven recruitment and underscores the potential of integrating machine learning with rule-based analytics in the hiring process. [2]

3. In 2023, L. Wang, J. Singh, and P. Roy wrote "Intelligent Resume Parser and Matcher for Recruitment Automation".

This research introduces a resume recommendation system that employs deep learning and contextual natural language processing to extract and analyses candidate information.

The proposed system uses contextual and semantic analysis to improve prediction accuracy, which is different from traditional keyword-based methods. The system also works with job boards and HR tools, making it easy for recruiters to use.

Tests show that the hybrid model works better than traditional methods in both speed and accuracy.

The study shows that using technical analysis, semantic understanding, and AI-driven automation together could make hiring better. [3]

III.ADVANTAGES OF THE PROPOSED SYSTEM

Holistic Candidate Evaluation:

Creates detailed profiles of candidates based on their education, skills, experience, certifications, and background to make sure that each candidate is accurately evaluated for the job.

Multi-Tier Candidate Recommendations:

Supports recommendations for people at all levels of seniority, from entry-level to executive positions, in a wide range of fields, such as technology, finance, healthcare, and manufacturing.

AI-Powered Engine:

Semantic Matching: It suggests jobs based on how well a resume fits with the job requirements and how similar the meanings are.

Rule-Based Validation:

Makes sure that candidates who meet the basic requirements are clearly identified using criteria that can be checked.

User-Friendly Interface:
The design is simple and easy to use for everyone, including recruiters, HR managers, and hiring managers. It has clear visualizations and useful suggestions.

IV. TECHNOLOGIES USED

Technology Stack:

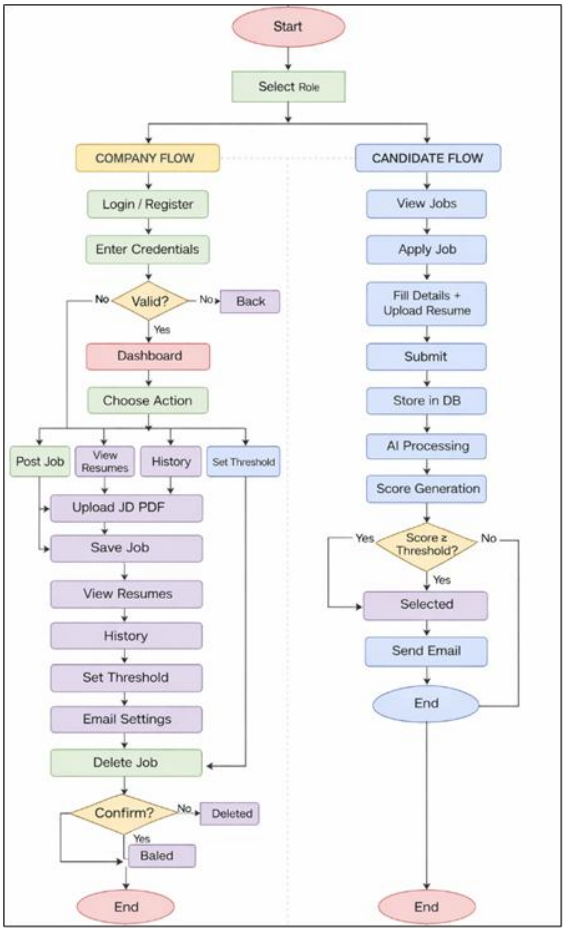
Frontend: React, HTML, CSS, JavaScript

Backend: Python, Flask

Database: MongoDB

IDE: VS Code

V. IMPLEMENTATION

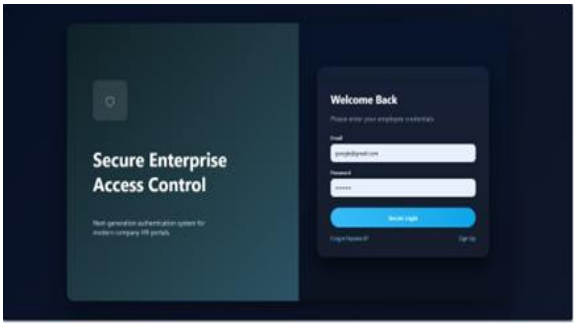


Landing Page:

The Home Page welcomes users with the title and logo "AI-Powered Resume Filtering and Ranking." The main message is "Upload resumes, match candidates with job requirements, and shortlist top profiles using explainable AI scoring." There are two main buttons, "Candidate/Recruiter" and "Company Login," that take users to their own portals. The design is professional, with a dark theme and blue accents.

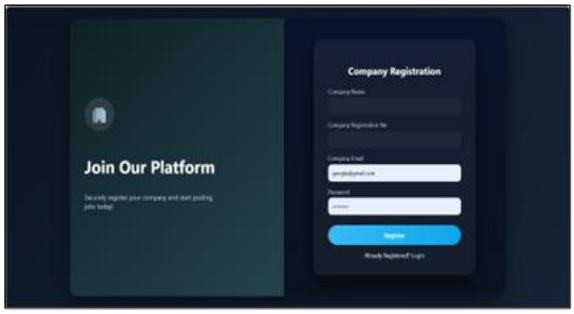
Login Page:

On the Login Page, users see the message "Secure Enterprise Access Control" along with fields to enter their email and password. A "Secure Login" button lets you in, and links for "Forgot Password?" and "Sign Up" let you get your account back or sign up for a new one.



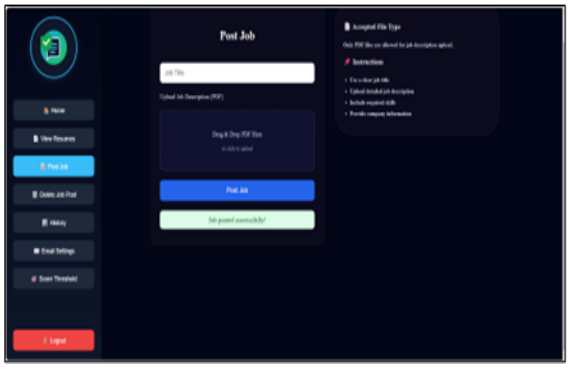
Register page:

The Company Registration Page allows businesses to sign up to post jobs by entering their company name, registration number, email, and a password, while also offering a login link for already registered users.



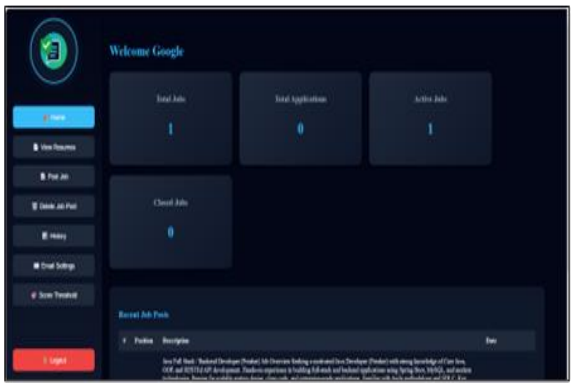
Post Job Page:

In the Post Job Page, recruiters enter a Job Title and upload job description PDF via drag-and-drop interface, with options to manage posts, view resumes, check history, change settings, and establish score criteria before posting the job.



Home Page:

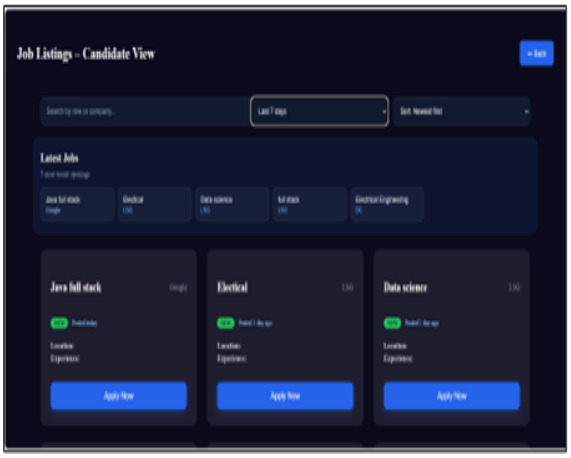
In the Home Page (Dashboard), recruiters are presented with a summary view showing total jobs listed, total applications received, and the number of active jobs. Recent job posts are shown at the bottom for convenient access, and the sidebar provides navigation to all important functions including posting jobs, viewing resumes, history, and settings.



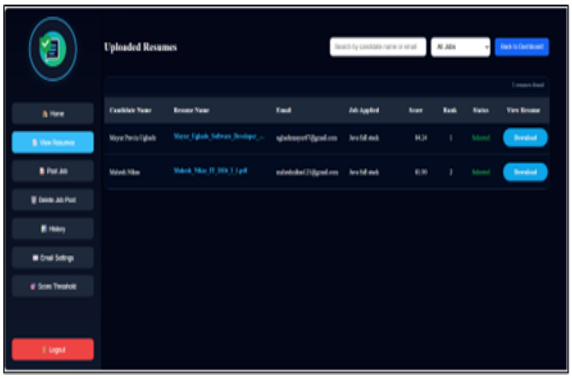
Job list:

In the Job Listings – Candidate View Page, candidates search and filter open opportunities using search, date range, and sort options, viewing job cards displaying job title, company, posting timestamp, location, experience requirements, and "Apply Now" button for submitting applications.

View Resume page:



Recruiters can search and filter candidate submissions by name or email on the Uploaded Resumes Page. They can also see a list of ranked candidates in a table that shows candidate details, AI scores, ranking position, application status, and "Download" buttons for downloading resumes.

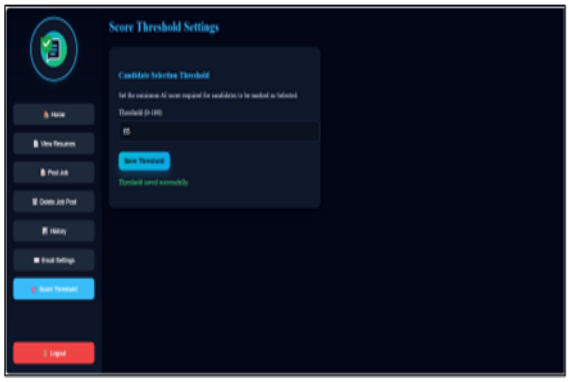


Job Deleted page:

In the Delete Job Post Page, recruiters choose jobs from a dropdown menu and delete them for good. They are given step-by-step instructions to make sure there are no ongoing applications before deletion, and a confirmation message appears when the job is successfully removed.

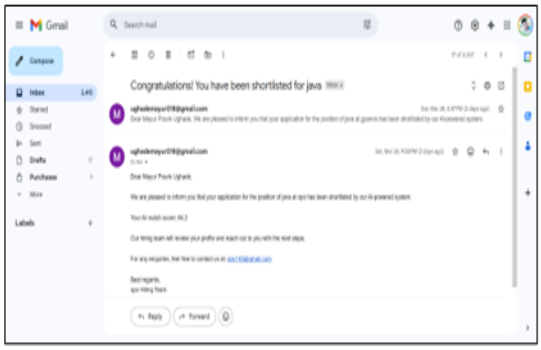
Score Threshold Page:

Recruiters set the "Candidate Selection Threshold" on the Score Threshold Settings Page by choosing the lowest AI score (on a scale of 0 to 100) that candidates must have in order to be automatically marked as selected. There is a "Save Threshold" button and a confirmation message when the update is successful.



Email Notification Page:

The Candidate Shortlisting Notification Email automatically sends candidates congratulations messages saying they made the shortlist, shows their AI match score (for example, 84.2), and gives them next steps and contact information for questions from the hiring team.



Database:

There are three main collections in the database: "Application," "Job," and "Company."

Application Collection:

The applications collection keeps track of candidate submissions, resume files that go with them, and the calculated AI match scores.

Field Name	Data Type	Required	Description	Example
_id	ObjectId	Yes	Unique MongoDB document identifier	6f9ca02105e4f...
applicationId	String	Yes	System-generated unique application ID	"468827c270f9..."
jobId	String	Yes	Reference to the associated job posting	"7887035040fa..."
jobTitle	String	Yes	Title of the applied position	"Java full stack"
companyId	String	Yes	Reference to the hiring company	"90fb252ff3a7..."
candidateName	String	Yes	Full name of the applicant	"Mayur Pravin Ughade"
email	String	Yes	Applicant's contact email	"ughademayur67@gmail.com"
phone	String	Yes	Applicant's contact number	"7823029229"
degree	String	Yes	Applicant's highest degree	"BE"
branch	String	Yes	Applicant's field of study	"IT"
resumeName	String	Yes	Original filename of the uploaded resume	"7ef41a2ec..._Resume.pdf"
resumePdfPath	String	Yes	Local server path to the stored PDF	"D:\...\resumes\..."
status	String	Yes	Current application stage	"Selected", "Rejected"
score	Number	No	Overall AI-generated matching score	84.2384
emailSent	Boolean	Yes	Tracks if the candidate was notified	true, false
createdAt	Date	Yes	Application submission timestamp	"2026-03-30T04:54..."
blendedScore	Number	No	Aggregated score from multiple metrics	84.2384
educationScore	Number	No	Score based on educational matching	100
experienceScore	Number	No	Score based on experience matching	100
semanticScore	Number	No	Semantic similarity score from NLP engine	0.737307
scoreSource	String	No	Method used to calculate the score	"jd-only-blended"

Job Collection:

The jobs collection keeps active job postings and the high-dimensional vector embeddings that are needed for semantic matching in one place.

Field Name	Data Type	Required	Description	Example
_id	ObjectId	Yes	Unique MongoDB document identifier	69b4441d76f2...
jobId	String	Yes	System-generated unique job ID	"3513925a7203..."
title	String	Yes	Job position title	"Full stack"
description	String	Yes	Full text of the job description	"Job Title: Full Stack..."
descriptionPdfPath	String	Yes	Local server path to the uploaded JD PDF	"D:\...\job_descriptions\..."
companyId	String	Yes	Reference ID to the hiring company	"7a53b8433ffe..."
companyName	String	Yes	Name of the hiring company	"Google"
status	String	Yes	Current status of the posting	"active"
postDate	Date	Yes	Timestamp of job creation	"2026-03-13T17:06..."
jd_hash	String	No	Cryptographic hash of the description text	"c61d2f8ff114..."
embedding	Array	No	Numerical vector embedding for AI matching	[-0.036, -0.018...]

Company Collection:

The companies collection keeps track of employer profiles, login information, and custom platform settings like email templates and scoring thresholds.

Field Name	Data Type	Required	Description	Example
_id	ObjectId	Yes	Unique MongoDB document identifier	69b443aa76f2...
companyId	String	Yes	Unique identifier for the company	"7a53b8433ffe..."
name	String	Yes	Name of the company	"Google"
registrationNo	String	Yes	Official company registration number	"REG123"
email	String	Yes	Primary account email address	"google@gmail.com"
passwordHash	String	Yes	Encrypted password (scrypt algorithm)	"scrypt:32768:8:1$..."
createdAt	Date	Yes	Timestamp of account registration	"2026-03-13T17:04..."
scoreThreshold	Number	No	The minimum AI match score to shortlist	65
emailTemplate	Object	No	Embedded document for email configurations	{...}
emailTemplate.subject	String	No	Automated email subject line	"Congratulations!..."
emailTemplate.body	String	No	Automated email body text	"Dear {candidateName}..."

VI.CONCLUSION

We offered a full AI-powered resume filtering and ranking system for this project to meet the growing need for smart applicant screening and real-time recruiting automation. This platform analyses candidates based on their qualifications for the post, which is separate from how other systems work.

The technology allows organizations to automate hiring by supporting numerous job positions and industries with semantic similarity models and rule-based validation. Recruiters may make picks rapidly and alter their selection tactics as needed with real-time tracking.

Companies may control their employment process with this solution since it helps them manage candidate pools with both intelligence and automation on one platform. Using advanced natural language processing and machine learning, the AI-Powered Resume Filtering and Ranking System is a superb technique to speed up

VII.FUTURE SCOPE

The AI-powered resume filtering and ranking system has a lot of room to grow and get better. The platform

can be improved and expanded in the following ways as the needs of organizations and the dynamics of hiring change:

Deep Learning Models Integration: Future versions can use more advanced transformer-based deep learning methods to give even more accurate and flexible candidate recommendations by looking at deeper patterns in candidate behaviour, hiring preferences, and recruitment trends.

Support for multilingual resumes: Future versions can be expanded to include multilingual resume parsing, which will allow businesses to screen candidates from a wider range of language backgrounds and improve their ability to find talent around the world.

Advanced Predictive Tracking: Adding predictive analytics to the tracking module will let recruiters guess how hiring will go, look at different candidate scenarios, and get proactive suggestions for improving their pipeline and changing their recruitment strategy.

Talent Market Trends: The system could predict changes in the talent market and suggest timely changes to recruitment strategies by combining real-time market data with predictive algorithms. This would help companies stay ahead of possible talent shortages and new opportunities.

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