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## Research Paper

# AI-POWERED RESUME SCREENING AND CANDIDATE RANKING SYSTEM

<sup>1</sup> Prasad .V, <sup>2</sup>G.Subhash Babu, <sup>3</sup>P.Devanand, <sup>4</sup>G.Prateet Sai, <sup>5</sup>B.Venkaiah Naidu

<sup>1</sup>Assistant Professor, Dept. of CSE - AI & ML, St. Ann's College Of Engineering & Technology, Chirala, Andhra Pradesh – 523187, India.

<sup>2,3,4,5</sup>U. G Student, Dept. of CSE - AI & ML, St. Ann's College Of Engineering & Technology, Chirala, Andhra Pradesh – 523187, India.

## ABSTRACT

*Recruitment processes in organizations often involve manual resume screening, which is time-consuming, inefficient, and susceptible to human bias. With the rapid growth of job applications, traditional screening methods fail to scale effectively. This paper presents an AI Powered Resume Screening and Candidate Ranking System developed using full stack web technologies. The proposed system automatically analyzes resumes and matches them with job descriptions using Natural Language Processing (NLP) techniques such as TF-IDF vectorization and cosine similarity. The system ranks candidates based on relevance scores, assisting recruiters in selecting suitable candidates efficiently. The application is*

*developed using Python, Flask, HTML, Tailwind CSS, and a cloud-based database, providing a secure and user-friendly interface. This system reduces manual effort, improves screening accuracy, and enables faster and unbiased recruitment decisions*

## Index Terms:

*AI Resume Screening, Candidate Ranking, NLP, TF-IDF, Cosine Similarity, Flask, Full Stack Web Development, Recruitment Automation.*

## INTRODUCTION

In today's digital era, recruitment has become increasingly complex due to the large volume of job applications received for every position. Traditional resume screening methods require significant

manual effort and are prone to inconsistency and bias. Recruiters often rely on keyword matching or human judgment, which may overlook qualified candidates or introduce subjective decisions.

Artificial Intelligence (AI) and Natural Language Processing (NLP) provide powerful techniques to automate and improve resume screening. By analyzing unstructured textual data such as resumes and job descriptions, AI-based systems can objectively evaluate candidate suitability. In this work, an **AI Powered Resume Screening and Candidate Ranking System** is proposed, implemented as a **full stack web application**. The system automates resume analysis, evaluates candidate relevance, and ranks applicants based on similarity scores. By integrating AI techniques with a user-friendly web interface and secure data storage, the proposed system improves recruitment efficiency, accuracy, and scalability.

## LITERATURE SURVEY

Several research works highlight the challenges of traditional recruitment systems and emphasize the need for automation. Studies show that keyword-based filtering lacks contextual understanding, leading to inaccurate candidate selection. Recent research

focuses on NLP-based approaches such as TF-IDF, cosine similarity, and semantic embeddings for resume analysis.

Recent studies have explored the application of NLP techniques for resume screening and candidate matching. Researchers have shown that cosine similarity combined with TF-IDF vectorization provides reliable results for comparing resumes with job descriptions. Other works highlight that automated ranking systems reduce recruiter workload and minimize human bias during candidate selection.

Some studies demonstrate the effectiveness of machine learning classifiers in resume categorization, while others emphasize ranking candidates based on similarity scores. However, many existing solutions lack complete web-based integration and scalability. The reviewed literature confirms that combining AI-driven resume analysis with full stack web development provides an efficient, scalable, and unbiased recruitment solution.

## RELATED WORK

The development of AI-based recruitment systems involves integrating text processing techniques with web technologies. Existing systems primarily

use rule-based filters or basic keyword matching. Advanced systems incorporate NLP techniques for improved accuracy but often lack real-time usability or user-friendly interfaces.

In contrast, the proposed system integrates AI-based screening with a web application framework. It supports resume uploads, automated analysis, candidate ranking, and secure data storage. This end-to-end implementation bridges the gap between AI research and practical recruitment applications.

## **EXISTING SYSTEM**

Most organizations currently use manual resume screening or semi-automated recruitment tools. Manual screening involves reviewing resumes individually, which is time-consuming and prone to errors. Semi-automated systems often use basic keyword matching that lacks contextual understanding.

These existing approaches suffer from several limitations, including high processing time, inconsistent evaluation, and susceptibility to human bias. Additionally, many systems do not provide transparent ranking mechanisms or scalable data management, making them inefficient for large-scale recruitment.

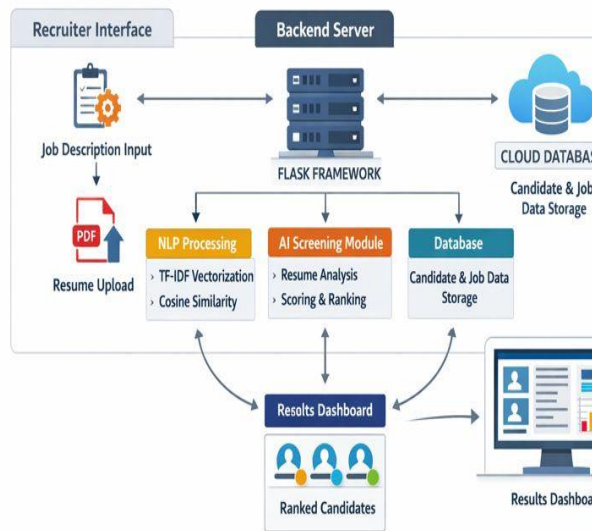
## **PROPOSED SYSTEM**

The proposed system automates resume screening using AI and NLP techniques. Recruiters upload job descriptions and candidate resumes through a web interface. The system extracts resume text, preprocesses it, and converts it into numerical vectors using TF-IDF. Cosine similarity is then used to compute relevance scores between resumes and job descriptions.

Based on these scores, candidates are ranked automatically, enabling recruiters to identify suitable candidates efficiently. The system is implemented as a full stack web application, ensuring ease of use, scalability, and secure data storage.

## **SYSTEM ARCHITECTURE**

**AI Powered Resume Screening and Candidate Ranking System Architecture**



**Fig:1 AI RESUME SCREENING AND CANDIDATE RANKING SYSTEM**

**METHODOLOGY DESCRIPTION**

**CLIENT SIDE:**

The client side is developed using HTML and Tailwind CSS to provide a responsive and user-friendly interface. Recruiters can create job roles, upload resumes, and view ranked candidate lists through the web application

**API REQUEST/APIRESPONSE:**

The system follows RESTful principles, using standard HTTP methods for communication between frontend and backend. Structured data exchange ensures reliability and clarity in processing requests and responses.

**SERVERSIDE:**

The server side is implemented using the Flask framework, which handles routing, business logic, and AI processing. It manages resume uploads, job description processing, and candidate evaluation requests. The server coordinates between the AI module and the database to compute scores and rankings. This layer ensures security, scalability, and efficient request handling.

**STORE/RETRIEVE:**

This module handles the storage and retrieval of job details, resumes, and candidate scores. Data is efficiently stored in a structured manner to allow fast access during ranking operations. Retrieval mechanisms ensure that recruiters can view updated results in real time. This process supports scalability and consistent data management

**DATABASE:**

A cloud-based database is used to store resumes, job descriptions, and candidate rankings securely, ensuring scalability and centralized access

**RESULTS AND DISCUSSION**

### STUDENT REGISTER:

The Student Registration Page allows candidates to securely create an account by providing essential credentials such as email and password. The system validates user input to ensure data accuracy and prevent duplicate registrations.

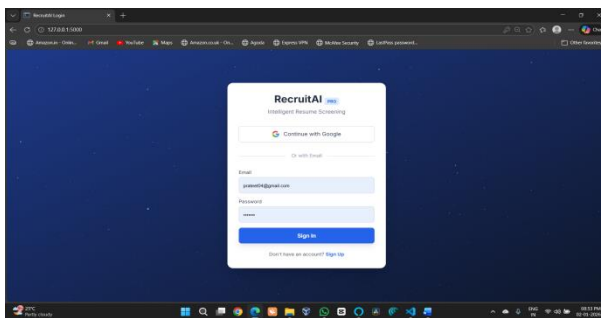
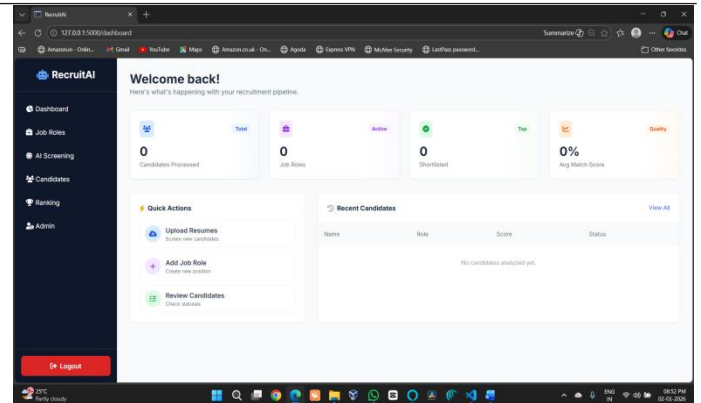


Fig :3 REGISTRATION PAGE

Successful registration enables students to access the resume upload and screening features. This module ensures secure onboarding and controlled access to the recruitment system.

### HOME PAGE:



The Home Page serves as the central dashboard of the system, providing an overview of the recruitment process. It displays key metrics such as the number of candidates processed, job roles created, shortlisted candidates, and average match scores. Quick action options enable recruiters to upload resumes, add job roles, and review candidates efficiently.

### AI RESUME ANALYSIS:

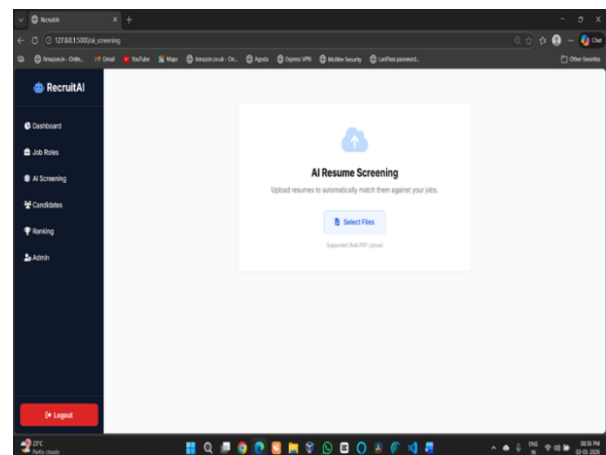


Fig 4: RESUME ANALYSIS

This page enables recruiters to upload candidate resumes for automated screening

using AI-based NLP techniques. The system analyzes resumes against job requirements and computes relevance scores. Bulk PDF upload support improves efficiency when handling multiple applications. This module forms the core of the automated resume evaluation process.

### JOB ROLE MANAGEMENT:

This page allows recruiters to create, upload, and manage multiple job descriptions within the system. Each job role serves as a reference for AI-based resume screening and candidate matching.

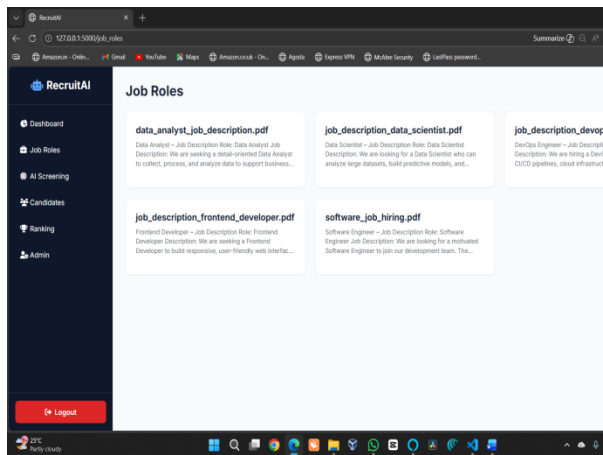


Fig 5: JOB ROLE PAGE

The module supports bulk job uploads and centralized role management. It ensures structured job definition for accurate and consistent candidate evaluation.

### CANDIDATE EVALUATION:

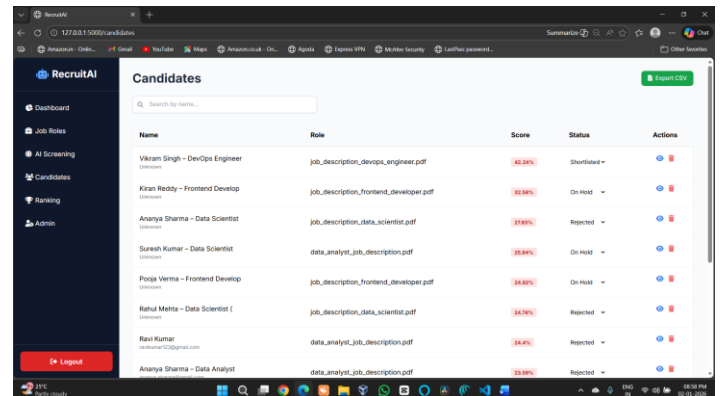
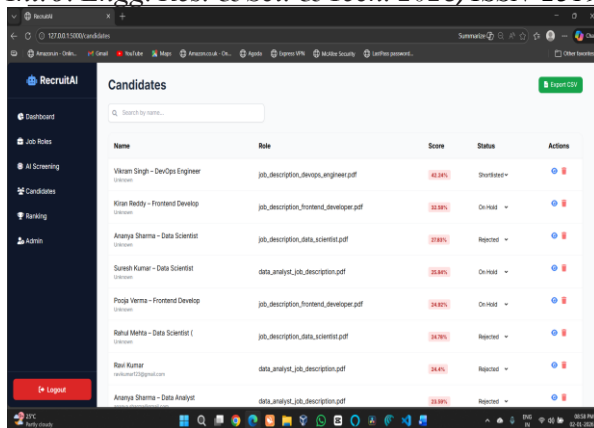


Fig 6: CANDIDATE EVALUATION PAGE

This page displays the list of candidates along with their applied job roles, AI-generated match scores, and application status. Recruiters can review, update candidate status, and manage profiles efficiently. The system enables search and export options for better data handling. This module supports transparent and data-driven candidate evaluation.

### CANDIDATE RANKING:

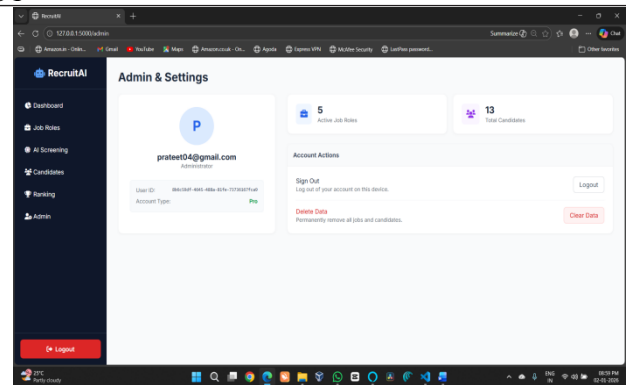


**Fig 7: CANDIDATE RANKING PAGE**

This page provides a comprehensive view of all candidates along with their applied job roles, AI-generated match scores, and current application status. Recruiters can search candidates, update their status (shortlisted, on hold, rejected), and manage profiles efficiently. The export feature enables easy data analysis and reporting. Recruiters can quickly identify top-performing candidates for each role. This module supports structured and data-driven recruitment decisions.

**ADMIN DASHBOARD:**

The Admin Dashboard provides a consolidated view of the recruitment system for administrators. It displays key metrics such as active job roles, total candidates, and system status.



**Fig 7: ADMIN PAGE**

Administrators can monitor recruitment activities, manage data, and control system settings efficiently. This dashboard ensures secure oversight and effective administration of the recruitment process.

**CONCLUSION**

The AI Powered Resume Screening and Candidate Ranking System successfully automates the recruitment process by integrating Artificial Intelligence with full stack web development. By utilizing NLP techniques such as TF-IDF and cosine similarity, the system objectively evaluates resumes and ranks candidates based on job relevance. The web-based architecture ensures usability, scalability, and secure data management. Overall, the proposed system reduces manual effort, minimizes

bias, and enhances efficiency in modern recruitment workflows.

## FUTURE SCOPE

The system can be further enhanced by integrating advanced deep learning models for semantic resume analysis to improve matching accuracy. Support for multi-language resumes and skill-level extraction can be added to broaden applicability. Integration with enterprise Applicant Tracking Systems (ATS) and automated interview scheduling can enhance functionality. Additionally, analytics dashboards and real-time notifications can be introduced to support data-driven recruitment decisions.

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