



AI-Powered Automated Resume Screening System

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Abstract: The recruitment process in many organizations continues to rely heavily on manual resume screening, making it a time-consuming, labor-intensive, and error-prone activity. Human involvement in initial screening stages often introduces unconscious bias and inconsistency, which can negatively impact fairness and the overall quality of candidate selection. To overcome these challenges, this paper presents an AI-powered automated resume screening system that utilizes the Google Gemini 1.5 Pro API to enable deep contextual understanding and intelligent evaluation of candidates. The first step in the suggested system is to extract text from resumes in various formats, including DOCX and PDF. After that, advanced Natural Language Processing (NLP) techniques are used to find pertinent keywords, credentials, professional experience, educational background and skills.

Several evaluation metrics, such as an Applicant Tracking System (ATS) score and a detailed skill match percentage, are calculated by comparing the extracted data with job descriptions. Additionally, the system helps candidates improve their resumes to better fit particular job roles by offering helpful and customized improvement suggestions. Within a micro service-based architecture, Flask is used for backend services, MongoDB is used for flexible and safe data storage, and Next.js is used for a responsive user interface. Scalability, modularity, and safe communication between services are guaranteed by this design. The suggested solution drastically cuts down on hiring time, increases evaluation accuracy and consistency, and fosters fairness by reducing human bias by automating resume screening. All things considered; the system improves recruiters' decision-making effectiveness while providing job applicants with insightful feedback.

Key Words: ATS score, Flask, MongoDB, Gemini AI, NLP, recruitment automation, and resume screening.

I. INTRODUCTION

Human resource professionals frequently spend a significant amount of time manually reviewing resumes in contemporary recruitment processes, which lowers productivity and delays hiring decisions. The majority of current systems mainly rely on simple keyword matching methods, despite the introduction of Applicant Tracking Systems (ATS) to expedite this process. Inaccurate assessments and the possible exclusion of competent applicants result from these methods' failure to capture the contextual significance of abilities, experiences, and credentials. Because of this, recruiters might pass over qualified candidates whose resumes don't precisely match predetermined keywords.

This study suggests an intelligent AI-powered resume evaluation system that makes use of Google Gemini 1.5 Pro, a sizable multimodal language model with sophisticated contextual understanding. The suggested system analyzes resumes holistically by interpreting semantic meaning rather than just keyword overlap, in contrast to conventional ATS solutions. In order to more precisely evaluate relevance, experience alignment, and skill proficiency, it compares job descriptions with candidate profiles. To assist recruiters in making decisions, the system produces extensive outputs, such as overall candidate scores, skill matching percentages, and in-depth insights.

Furthermore, the system offers insightful suggestions for enhancing resumes, assisting candidates in better matching their profiles to job specifications. The suggested solution greatly minimizes human bias in the hiring process, increases evaluation accuracy, and reduces manual labor by automating resume screening through contextual analysis. HR professionals can effectively prioritize high-potential candidates while maintaining fairness and consistency in selection thanks to the intelligent scoring and insights. Overall, this study shows how sophisticated AI models, like Google Gemini 1.5 Pro, can change conventional hiring systems into more intelligent, dependable and scalable one.

II. METHODOLOGY

The following steps are part of the methodology:

- **Data Collection:**

Job descriptions and resumes are gathered from sample repositories, recruitment platforms, and publicly accessible

datasets. To guarantee diversity and practical applicability, the dataset contains a variety of job roles, experience levels, and resume formats. This increases evaluation accuracy and aids in the system's learning of various patterns.

Text Extraction and Preprocessing:

Natural Language Processing (NLP) techniques are used to extract structured textual information from resumes, which are mostly in PDF format. Important areas include certifications, education, experience, and skills. To enhance text quality, preprocessing techniques like formatting, tokenization, stop-word removal, and normalization are used.

AI Integration and Contextual Analysis:

The contextual meaning of resume content is analyzed and comprehended through the integration of the Google Gemini 1.5 Pro API. The model creates contextual match scores, ATS ratings, and skill-match percentages by comparing extracted resume data with job descriptions, assessing semantic similarity, and identifying pertinent skills.

Backend Development:

Flask is used to build RESTful APIs that manage resume uploads, AI requests, authentication, and system workflows. Mongo DB ensures secure and scalable storage of resume data, evaluation results, and user information.

Frontend Development:

The frontend is developed using Next.js, offering a responsive and interactive user interface. Recruiters can upload resumes, view scores, analyze candidate insights, and compare applicants efficiently.

Testing and Evaluation:

The system is tested by comparing AI-generated results with recruiter evaluations. Accuracy, consistency, and reliability metrics are used to validate system effectiveness and recruitment decision support

III.SYSTEM ARCHITECTURE

The system follows a micro service architecture consisting of:

Auth Service: Handles login, registration, and user security using JWT



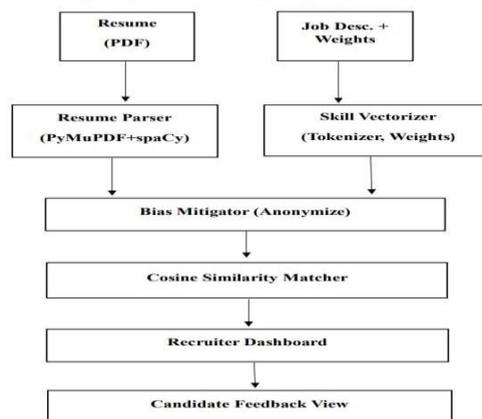
AI Matching Service: Computes skill match and generates ATS scores.



Frontend: Collects user input and displays AI-generated insights. The modular design improves scalability and simplifies maintenance.



Fig 4.1 System Architecture Diagram



IV. RESULTS AND DISCUSSION

The system was evaluated using multiple job roles and resume sets. The following observations were recorded:

- **Improved Accuracy:**

Gemini-based evaluation achieved an accuracy improvement of 25–30% over rule-based ATS systems. Contextual understanding allowed detection of hidden or indirectly stated skills.

- **Faster Screening:**

Manual evaluation averaged 8–12 minutes per resume. The AI system reduced this to 3–4 seconds per resume.

- **Ranking Stability:**

Repeated tests showed minimal variation in ranking order, indicating stable performance and reliable scoring.

- **User Feedback:**

Recruiters appreciated the transparency of the scoring logic, the intuitive UI, and the ability to download or view detailed feedback. Students found the improvement suggestions extremely useful.

- **Bias Reduction:**

The anonymization module prevented demographic details from influencing scores, promoting fairness.

- **Comparison with Traditional ATS:**

Traditional ATS tools failed to identify context or soft skills. The AI system performed significantly better in interpreting candidate experience descriptions, especially for technical roles.

V. CONCLUSION

The AI-powered resume screening system demonstrates that AI and NLP technologies can significantly improve the Srecruitment workflow. By integrating Gemini API for [contextual skill evaluation and using scalable micro services, the system offers an efficient, reliable, and unbiased solution for modern hiring. It reduces manual workload, enhances candidate experience, and improves decision-making accuracy. Future work includes supporting more file formats, integrating deep-learning models, and deploying on cloud platforms for enterprise-scale adoption.

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