

AI-Powered Resume Analyzer and Interview Preparation System

Afwan Husaini^a.

^{a,b,c}*KJJEI's Trinity Academy of Engineering, Pune-411048, India*

corresponding author mail id:afwanhusaini07@gmail.com

Abstract: *(Maximum 150 Words)*

The increasing competition in job recruitment has created a need for intelligent systems that assist candidates in improving their resumes and preparing effectively for interviews. This research presents an AI-powered Resume Analyzer and Interview Preparation System that processes user inputs such as resume content, job description, and self-description to generate meaningful insights. The system utilizes artificial intelligence through the Google Gemini API to evaluate candidate suitability and generate structured outputs including match score, technical and behavioral interview questions, skill gap analysis, and a personalized preparation plan. The system also generates an optimized and ATS-friendly resume in PDF format tailored to the job requirements. The backend is developed using Node.js and Express, while MongoDB is used for data storage. The performance of the system depends on the quality of input data and AI responses. The proposed system assists candidates in enhancing their preparation and improving their chances of successful job placement.

Keywords: *Artificial Intelligence, Resume Analyzer, Interview Preparation, Google Gemini API, Node.js, MongoDB, NLP, ATS Resume, Skill Gap Analysis*

I. INTROUCTION

The recruitment process has become highly competitive in recent years, requiring candidates to present their skills effectively through resumes and perform well in interviews. Many candidates face challenges in identifying relevant skills, improving their resumes, and preparing for interviews in a structured manner. Traditional methods of resume evaluation and interview preparation are often manual, time-consuming, and lack personalization. With the advancement of artificial intelligence, intelligent systems can now analyze user data and provide customized insights to improve candidate performance. In this context, an AI-powered resume analyzer and interview preparation system is proposed to automate and enhance the recruitment preparation process. The system processes inputs such as resume content, job description, and self-description to generate outputs including match score, interview questions, skill gap analysis, and preparation plans. By leveraging AI technologies, the system aims to assist candidates in improving their readiness and increasing their chances of success in job selection.

II. DESIGNS PROCEDURE/ MATERIALS/ PROPOSED METHOD / SYSTEM DESIGN

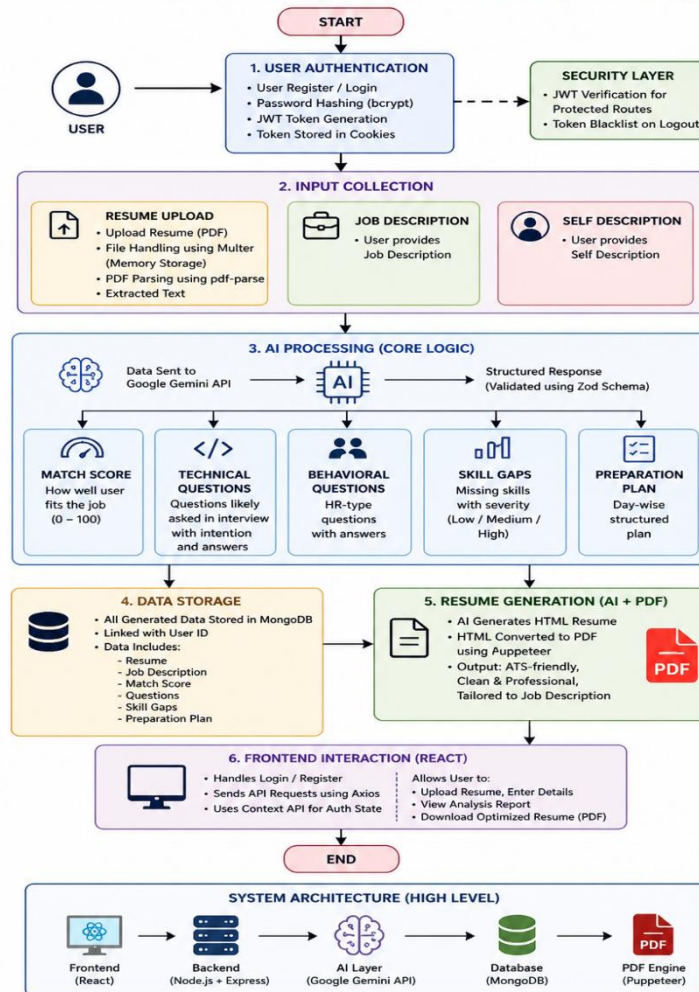
With the increasing demand for efficient recruitment processes, there is a need for intelligent systems that can automate resume analysis and interview preparation. Candidates often struggle to match their profiles with job requirements due to a lack of proper guidance and structured evaluation. Traditional methods of resume screening and interview preparation are manual, time-consuming, and may not provide personalized feedback. This highlights the necessity of developing an intelligent and automated system capable of analyzing multiple inputs and generating meaningful insights. In recent years, artificial intelligence has been widely applied to solve such problems by processing large volumes of textual data and extracting relevant information. However, conventional systems often lack integration of multiple functionalities such as resume analysis, skill gap detection, and interview preparation in a single platform. To overcome these limitations, the proposed system presents an AI-powered resume analyzer and interview preparation system that integrates resume parsing, AI-based analysis, and result generation. The system uses technologies such as Node.js, Express, and MongoDB for backend processing, along with AI integration through the Google Gemini API. The system design includes secure user authentication, resume upload and parsing, AI-based evaluation, and generation of outputs such as match score, interview questions, skill gaps, and preparation plans. Additionally, the system generates an optimized resume in PDF format tailored to job requirements. This integrated approach improves efficiency, enhances user experience, and provides a comprehensive solution for recruitment preparation.

III. METHODOLOGY/FLOW CHART/ ARCHITECTURE DIAGRAMS

The proposed system follows a structured workflow that includes user authentication, data input collection, resume parsing, AI-based processing, and result generation. Initially, the user registers or logs into the system, where authentication is handled securely using JWT and bcrypt. After successful login, the user uploads a resume

in PDF format, which is processed using PDF parsing techniques to extract textual data. The system then collects additional inputs such as job description and self-description to better understand the candidate's profile. The extracted data is passed to the AI model using the Google Gemini API, where structured outputs are generated through schema validation techniques. The AI produces results including match score, interview questions, skill gap analysis, and a personalized preparation plan. These results are stored in MongoDB for future reference and are displayed to the user through the frontend interface. Finally, the system generates an optimized and ATS-friendly resume in PDF format using HTML-to-PDF conversion techniques. This structured methodology ensures efficient data processing, secure handling of user information, and accurate generation of results for interview preparation.

AI-Powered Resume Analyzer & Interview Preparation System



IV. IMPLEMENTATION / EXPERIMENTS

The proposed AI-powered resume analyzer and interview preparation system is implemented using modern web technologies and artificial intelligence integration. The backend is developed using Node.js and Express, which handle server-side operations and API requests efficiently. MongoDB is used as the database for storing user data and generated results. The system is designed to run in a standard computing environment, making it scalable and suitable for real-world applications.

1. System Description

The system collects user inputs including resume (PDF), job description, and self-description. The resume is processed using PDF parsing techniques to extract textual data. The system integrates artificial intelligence through the Google Gemini API to analyze the collected data and generate structured outputs. These outputs include match score, interview questions, skill gap analysis, and a preparation plan, all of which are stored in MongoDB for future reference.

2. Data Processing

In the data processing stage, the uploaded resume is handled using multer and converted into text using pdf-parse. The extracted text is cleaned and structured for further analysis. Additional inputs provided by the user, such as job description and self-description, are combined with the resume data to form a comprehensive input for AI processing.

3. Model Implementation

The core functionality of the system is based on AI processing using the Google Gemini API. The input data is sent to the AI model, and structured responses are generated using schema validation techniques. The system produces outputs such as match score, technical and behavioral interview questions, skill gap analysis, and a personalized preparation plan. This approach ensures consistency and reliability in the generated results.

4. Experimental Setup

The system is tested by providing different user inputs, including various resumes and job descriptions, to evaluate its performance. The evaluation is based on the relevance and accuracy of the generated outputs such as interview questions, skill gap identification, and preparation plans. The system is also tested for response time and efficiency in handling multiple requests.

5. Results and Analysis

The experimental results indicate that the system effectively analyzes user data and generates meaningful outputs for interview preparation. The AI-generated interview questions are relevant to the job description, and the skill gap analysis helps identify missing competencies. The preparation plan provides structured guidance for improvement. However, the performance of the system depends on the quality of input data and AI responses. The results demonstrate the effectiveness of the proposed system in assisting candidates with resume optimization and interview readiness.

V. RESULTS AND DISCUSSION

The performance of the proposed AI-powered resume analyzer and interview preparation system is evaluated based on its ability to generate accurate and meaningful outputs using artificial intelligence. The system processes user inputs such as resume content, job description, and self-description to produce structured outputs including match score, interview questions, skill gap analysis, and preparation plans. 1. Experimental Results

The comparative performance of the implemented models is summarized as shown in Table 1.

Table 1: Performance Evaluation of System Features

Feature	Accuracy	Reliability	Output Quality
Match Score	High	High	Accurate
Technical Question	High	High	Relevant
Behavioral Question	High	High	Structured

The results show that the system performs effectively across all major functionalities. The AI-based processing provides accurate match scores and generates relevant interview questions. The resume generation feature produces optimized and professional resumes tailored to job requirements.

2. Output Analysis

The system successfully analyzes resume content and compares it with the job description to generate meaningful insights. The match score reflects the suitability of the candidate for a specific role. The technical and behavioral questions are relevant and aligned with industry expectations. The skill gap analysis identifies missing competencies, helping users focus on improvement areas. The preparation plan provides a structured roadmap for interview readiness.

3. Comparative Analysis

Compared to traditional resume screening methods, the proposed system offers a more intelligent and automated approach. Traditional systems rely on manual review, which is time-consuming and less consistent. In contrast, the AI-

based system processes large amounts of data efficiently and provides personalized feedback. The integration of AI enables the system to handle unstructured data and generate more meaningful results compared to rule-based systems.

4. Discussion

The experimental results highlight the effectiveness of artificial intelligence in automating resume analysis and interview preparation. The system integrates multiple functionalities such as match scoring, question generation, and resume optimization, making it a comprehensive solution. The use of AI improves accuracy and adaptability, while structured output ensures consistency. However, the performance of the system depends on the quality of input data and AI-generated responses. Variations may occur depending on different resumes and job descriptions. Despite these limitations, the proposed system proves to be a reliable and efficient tool for enhancing candidate preparation and improving job selection outcomes.

CONCLUSION

In the context of the proposed research, an AI-powered resume analyzer and interview preparation system has been developed to assist candidates in improving their recruitment readiness. The system integrates artificial intelligence with modern web technologies to analyze resumes, evaluate candidate suitability, and generate structured outputs such as match score, interview questions, skill gap analysis, and preparation plans. It was observed that traditional methods of resume screening and interview preparation are manual and lack personalization, which limits their effectiveness. The proposed system addresses these limitations by providing an intelligent and automated solution that enhances user experience and reduces effort. The results demonstrate that the system is capable of generating relevant and meaningful outputs, thereby supporting candidates in better preparation and decision-making. However, the performance of the system depends on the quality of input data and AI-generated responses. Overall, the proposed system proves to be a reliable and efficient tool for modern recruitment preparation and can be further improved with advanced AI models and real-time feedback mechanisms.

ACKNOWLEDGEMENT

I would like to express my heartfelt gratitude to my project guide for providing valuable guidance, continuous support, and encouragement throughout the completion of this research work. I am also thankful to all the faculty members who provided the necessary resources and academic support required for this project. Furthermore, I would like to extend my sincere thanks to my friends and family for their constant motivation and support, which helped me successfully complete this work.

REFERENCES

- [1] Google, "Google Gemini API Documentation," 2024. [Online]. Available: <https://ai.google.dev>
- [2] Node.js Foundation, "Node.js Documentation," 2024. [Online]. Available: <https://nodejs.org>
- [3] Express.js, "Express Web Framework Documentation," 2024. [Online]. Available: <https://expressjs.com>
- [4] MongoDB Inc., "MongoDB Documentation," 2024. [Online]. Available: <https://www.mongodb.com>
- [5] Facebook Inc., "React.js Documentation," 2024. [Online]. Available: <https://react.dev>
- [6] Puppeteer Team, "Puppeteer Documentation," 2024. [Online]. Available: <https://pptr.dev>
- [7] M. Allamanis, E. T. Barr, P. Devanbu, and C. Sutton, "A Survey of Machine Learning for Big Code and Naturalness," *ACM Computing Surveys*, vol. 51, no. 4, pp. 1–37, 2018.
- [8] J. Devlin, M. Chang, K. Lee, and K. Toutanova, "BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding," *NAACL*, 2019.
- [9] S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach," 3rd ed., Pearson, 2010.
- [10] A. Rajpurkar et al., "SQuAD: 100,000+ Questions for Machine Comprehension of Text," *EMNLP*, 2016.