



AI-BASED RESUME ANALYZER

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Abstract: The need for this project is to develop an AI-based resume analyzer system that automates and optimizes the resume screening and candidate evaluation process. The proposed system utilizes artificial intelligence (AI) and natural language processing (NLP) techniques to extract and analyze important information from resumes, such as personal details, educational qualifications, technical skills, soft skills, certifications, and work experience. Indeed, the system is capable of comparing the extracted resume content with predefined job descriptions to identify the most suitable candidates based on skill matching and relevance. This system is expected to reduce the time and effort involved in manual resume screening while minimizing human bias and improving recruitment accuracy. The proposed system involves intelligent text processing, resume classification, keyword extraction, and skill gap analysis to provide accurate recommendations for both recruiters and jobseekers. Moreover, the system has the capability of learning from resume patterns and job requirements, thereby improving its efficiency and decision-making ability over time. The result of this project is expected to be a fast, reliable, and accurate resume analysis system that assists recruiters in shortlisting candidates effectively and helps applicants improve their resumes.

Keywords: Artificial Intelligence, Resume Analyzer, Natural Language Processing, Resume Screening, Skill Matching, Recruitment Automation.

1. INTRODUCTION

The rapid increase in online job applications has created the need for efficient and intelligent resume screening systems. Traditional resume evaluation is time-consuming, inefficient, and often affected by human bias. The AI-Based Resume Analyzer uses artificial intelligence and natural language processing techniques to automatically extract and analyze candidate information such as skills, education, and experience from resumes. The system compares resume data with job requirements, provides skill matching scores, and suggests suitable job roles. This automated approach improves recruitment efficiency, reduces manual effort, and supports fair candidate evaluation.

1.1. OBJECTIVES

- [1] To extract and analyze resume information such as skills, education, experience, and certifications using NLP techniques.
- [2] To compare candidate resumes with job descriptions and calculate skill matching scores.
- [3] To predict suitable job roles and professional domains based on extracted skills and qualifications.
- [4] To provide resume improvement suggestions, including missing skills and relevant course recommendations.

1.2. EXISTING SYSTEM

The existing resume screening systems mainly rely on manual evaluation and basic keyword-based filtering techniques. These approaches are time-consuming, inefficient, and difficult to manage when handling a large number of job applications. Traditional systems often fail to accurately analyze candidate skills, experience, and qualifications due to different resume formats and writing styles. Furthermore, manual screening methods are prone to human bias and inconsistency, which may lead to unfair candidate evaluation and rejection of qualified applicants. Existing systems also lack advanced features such as resume scoring, skill gap analysis, and personalized recommendations, reducing the overall efficiency and accuracy of the recruitment process.

1.3. PROPOSED SYSTEM

The proposed AI-based resume analyzer is an intelligent system designed to automate resume screening using artificial intelligence and natural language processing techniques. The system extracts important information such as skills, education, experience, and certifications from resumes and compares them with job requirements. It generates resume scores, predicts suitable job roles, and provides recommendations for missing skills and career improvement. Unlike traditional manual screening methods, the proposed system improves accuracy, reduces human effort, and supports faster and fair candidate evaluation. The system also provides real-time resume analysis through a user-friendly interface. It helps recruiters shortlist candidates more efficiently and assists job seekers in improving their resumes according to industry standards. The application supports better decision-making and enhances overall recruitment efficiency.



1.4. SYSTEM FEATURES

- [1] This system automatically extracts important information such as skills, education, experience, and certifications from resumes.
- [2] It analyzes technical and non-technical skills using artificial intelligence and natural language processing techniques.
- [3] It compares resume data with job descriptions to calculate resume scores and identify suitable job roles.
- [4] It provides personalized recommendations such as missing skills and relevant courses to improve career opportunities.

2. LITERATURE SURVEY

Recently, several studies have been conducted on AI- based resume analysis, NLP techniques, and intelligent recruitment systems to improve the efficiency of candidate evaluation and hiring processes. Kumar et al. [1] proposed an automated resume screening system using natural language processing techniques to extract candidate information such as skills, education, and work experience. The study showed improved efficiency in resume evaluation compared to manual screening methods. Singh and Gupta.

[2] developed a machine learning-based resume ranking system that matched candidate skills with job descriptions to improve resume shortlisting accuracy. Their work demonstrated that automated ranking systems reduce recruiter workload and improve hiring decisions. Patel et al.

[3] presented an AI-based career recommendation system that analyzed resumes and suggested suitable job roles and skill improvements using NLP and machine learning techniques. The study highlighted the importance of skill gap analysis in improving employability. Smith [4] discussed document parsing and information extraction using NLP techniques such as tokenization, keyword extraction, and named entity recognition for processing unstructured resume data. The research confirmed that automated parsing improves speed and consistency in information extraction. Lee et al. [5] proposed an intelligent recruitment framework using artificial intelligence to automate candidate evaluation and resume screening. Their study demonstrated reduced hiring time and improved recruitment accuracy. Ahmed and Khan [6] focused on extracting technical and soft skills from resumes using NLP- based semantic analysis and keyword-matching techniques. Their research improved resume understanding beyond traditional keyword filtering. Brown et al. [7] explored resume classification using machine learning algorithms such as Naive Bayes and support vector machines to categorize resumes based on job domains. The study showed improved classification accuracy compared to rule-based approaches. The system reduced subjectivity in candidate assessment. Johnson et al. [9] studied bias reduction in recruitment using AI-based resume analysis and highlighted that automated systems improve fairness and transparency in hiring decisions. Rao and Mehta [10] proposed a Streamlit-based web application for real-time resume analysis and visualization, improving user interaction and recruitment efficiency.

3. METHODOLOGY

The system follows a structured methodology for automated resume analysis by integrating resume processing, natural language processing, machine learning techniques, and intelligent recommendation modules. The methodology begins with resume acquisition, where users upload resumes in PDF format through a Streamlit-based web interface. Each uploaded resume contains important candidate information such as personal details, educational qualifications, technical skills, certifications, projects, internships, and work experience. Since resumes are generally unstructured and may contain inconsistent formatting, duplicate information, unnecessary symbols, and varied writing styles, the uploaded resumes undergo several preprocessing operations before analysis. This preprocessing stage includes PDF text extraction, text normalization, tokenization, stop-word removal, lowercase conversion, and keyword extraction to prepare the resume content for accurate processing. After preprocessing, natural language processing techniques are applied to extract structured candidate information such as skills, education details, certifications, experience level, and contact information. The extracted information is organized into a structured format for further analysis and evaluation. The system also performs resume section identification to detect the presence of important sections such as education, skills, projects, achievements, internships, and certifications. This helps in evaluating resume completeness and quality according to industry standards. Furthermore, the processed data is securely stored in a database for future reference, analysis, and performance evaluation purposes. After successful data extraction and preprocessing, the system applies machine learning and rule-based analysis techniques to evaluate candidate profiles and generate meaningful recommendations. The extracted candidate skills are compared with predefined job-domain keyword datasets to predict suitable professional fields such as data science, web development, artificial intelligence, cloud computing, or software engineering. The system also calculates a resume score by analyzing the presence and quality of essential resume sections and matching skills with job requirements. Feature analysis techniques are used to identify missing skills, weak resume areas, and additional improvements required for better employability. Based on this analysis, the system generates personalized recommendations such as suggested technical skills, certifications, and online courses that can



help candidates improve their career opportunities. The trained analysis modules continuously improve system efficiency and accuracy by processing diverse resume patterns and formats. The analyzed results are displayed through an interactive Streamlit-based interface that provides real-time feedback, resume visualization, resume scores, skill analysis, and career recommendations to users. Recruiters can use the system for faster and more accurate candidate shortlisting, while job seekers can improve their resumes using AI-generated insights. Overall, the methodology ensures efficient resume evaluation, reduces manual screening effort, minimizes human bias, and supports intelligent and fair recruitment practices.

The complete working model / Flowchart is shown in figure 1 and its use-case diagram is presented in figure 2.

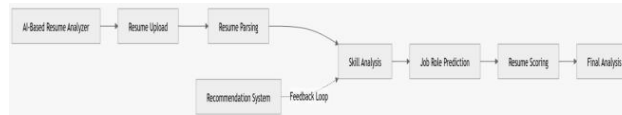


Fig 1. Working model of AI-Based Cyber Fraud Detection System

The process begins with the user uploading a resume in PDF format through the AI-based resume analyzer system. The uploaded resume contains important candidate information such as personal details, educational qualifications, technical skills, certifications, projects, and work experience. The resume data is collected and processed in real time for further analysis. The uploaded resume then undergoes preprocessing operations such as PDF text extraction, text cleaning, normalization, tokenization, and keyword extraction to prepare the content for analysis using natural language processing techniques.

After preprocessing, the system performs resume parsing and skill analysis to identify important candidate details and evaluate the relevance of skills and qualifications. Based on the extracted information, the system predicts suitable job roles and professional domains by comparing candidate skills with predefined job descriptions and industry requirements. The system also calculates a resume score by evaluating the completeness and quality of important resume sections. Finally, the analyzed results, including resume score, skill analysis, job role prediction, and personalized recommendations, are displayed to the user. The generated recommendations and feedback help candidates improve their resumes and enhance their career opportunities.

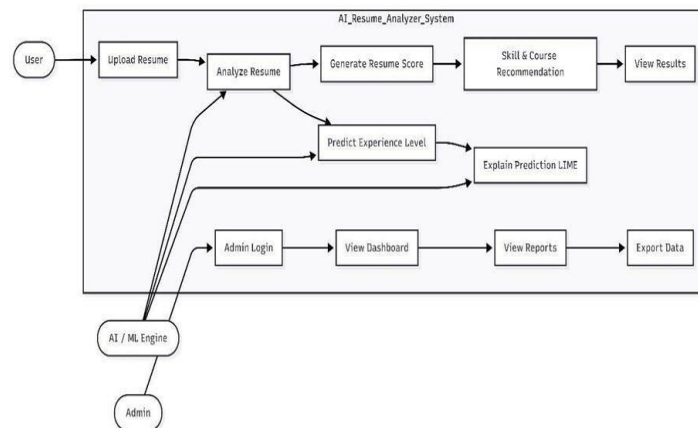


Fig 2. Use case Diagram

Fig 2 above shows the use case diagram describing the relationship between various actors and the AI-based resume analyzer system. The main actors who take part in this scenario are User, AI/ML Engine, and Administrator. The User is able to upload resumes, analyze resume content, generate resume scores, receive skill and course recommendations, predict experience level, and view the final analysis results. The AI/ML engine continuously processes resume data, performs resume parsing, analyzes candidate skills, predicts suitable job roles and experience levels, and generates intelligent recommendations using artificial intelligence and natural language processing techniques. Functions of the administrator include logging into the system, viewing dashboards, analyzing reports, and exporting user and resume analysis data. The above diagram shows the automated resume analysis process and demonstrates how AI can be used to reduce manual effort, improve recruitment efficiency, and provide accurate and intelligent candidate evaluation with minimal human intervention.



4. RESULTS AND DISCUSSIONS

The various artificial intelligence and natural language processing techniques indicate that the developed system is highly efficient when compared to the accuracy and speed of the generated results for resume analysis. The NLP and machine learning-based resume parsing models played a major role in the precise extraction of candidate information from resumes.

During the validation process, the system identified important resume details such as skills, educational qualifications, work experience, certifications, and contact information from PDF resumes. The entire process required only a few seconds to analyze the resumes and thereby proved to be a real-time resume evaluation mechanism. Another important observation is that the developed system produced fewer errors when compared to traditional manual resume screening methods. Unlike conventional recruitment processes, where recruiters may overlook important candidate details, the AI-driven model provided stable and automated resume evaluation by intelligently analyzing resume content and generating structured outputs. This ensured that recruiters could make faster and more reliable hiring decisions while job seekers could improve their resumes effectively. The system also proved to be highly efficient in identifying missing resume sections, weak skill representations, and incomplete resume structures, thereby highlighting the advantages of automated resume scoring and recommendation generation. The usability of the developed system related to the Streamlit-based web interface and resume analysis dashboard provided a simple and user-friendly environment for users to upload resumes and view detailed analytical results. Users could clearly understand their resume strengths and weaknesses through resume scores, skill analysis, and personalized recommendations. Since the developed system continuously processes resume data and supports adaptive analysis techniques, the overall efficiency and reliability of the system improved significantly when different resume formats were analyzed. This adaptive capability enables the system to remain effective and accurate for modern recruitment requirements. The results clearly indicate the capabilities and practicality of the proposed AI-based resume analyzer that significantly improves recruitment efficiency and enhances employability in the digital recruitment environment.

4.1. OUTPUTS

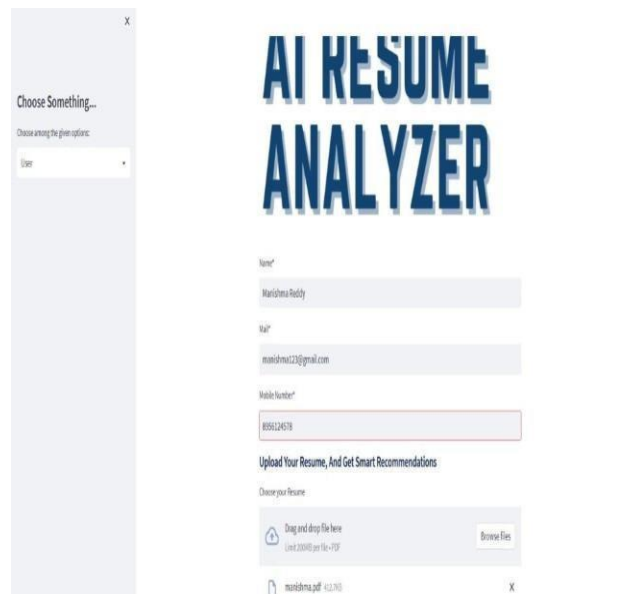


Fig 3. AI Resume Analyzer – User Resume Upload Interface

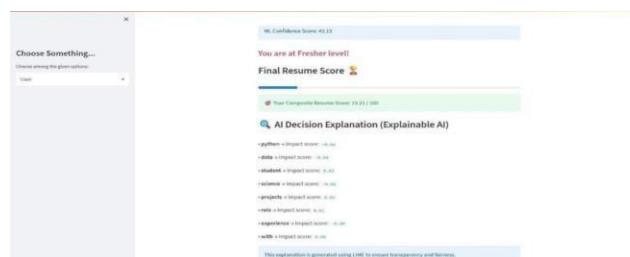


Fig 4. Resume Writing Score and Recommendation Screen

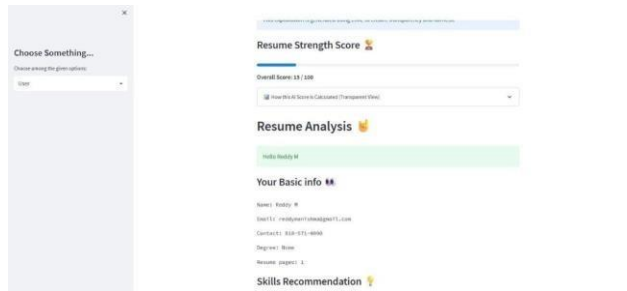


Fig 5. User basic information

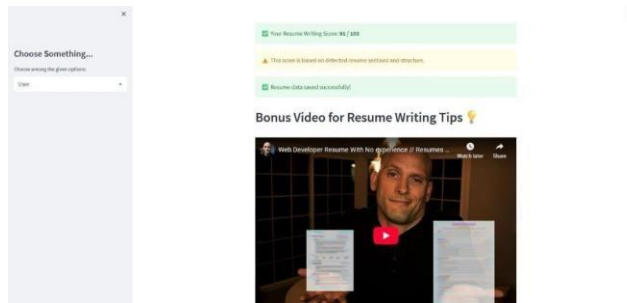


Fig 6. Resume Tips, Section Detection, and Scoring Screen

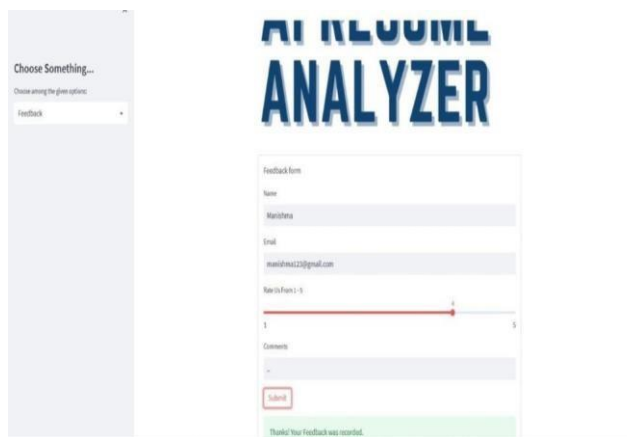


Fig 7. User Feedback Form Interface

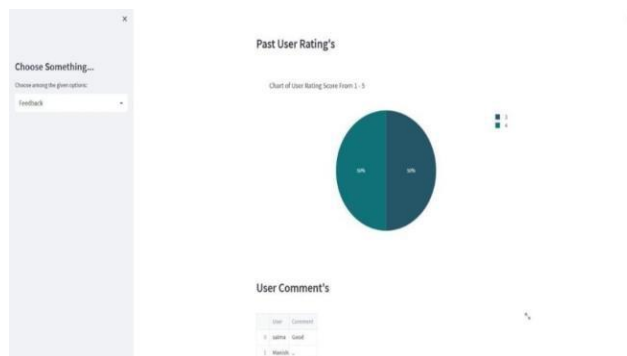


Fig 8. Admin feedback dashboard



Fig 9. AI Resume Analyzer admin login page



Fig 10. User feedback table with a pie chart showing rating distribution

5. CONCLUSION

The AI-based resume analyzer successfully automates the process of resume analysis using artificial intelligence and natural language processing techniques, enabling efficient extraction of candidate information from resumes. The system provides accurate evaluation of resume quality by generating resume scores, identifying skills, predicting suitable job domains, and offering personalized recommendations. With a user-friendly Streamlit-based interface, the system delivers real-time feedback to job seekers and recruiters, reducing manual effort and human bias in resume screening. Overall, the project enhances recruitment efficiency, supports fair hiring practices, and helps candidates improve their employability in today's competitive job market.

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