

NLP-Based Intelligent Resume Screening System

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Abstract—This research paper presents an NLP-Based Intelligent Resume Screening System that uses Artificial Intelligence, Natural Language Processing (NLP), and Machine Learning (ML) to automate and improve the recruitment process. The system analyzes resumes by extracting important information such as skills, education, work experience, and certifications, and then compares these details with job requirements to identify suitable candidates. The proposed approach helps reduce manual effort, saves screening time, and improves the accuracy of candidate selection while supporting fair and consistent hiring decisions. In addition, the system provides resume scoring and recommendations that assist applicants in improving their resumes according to industry needs. The study highlights how AI-driven recruitment technology can enhance hiring efficiency and provide a smarter and more reliable talent acquisition process.

I. INTRODUCTION

A. Introduction

The “NLP-Based Intelligent Resume Screening System” is designed to improve the recruitment process by using Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML) techniques to automate resume analysis and candidate evaluation. In today’s competitive job market, organizations receive a large number of resumes for different job roles, making manual screening time-consuming, inefficient, and prone to human errors and bias. The proposed system addresses these challenges by automatically extracting important information such as skills, educational qualifications, work experience, certifications, and projects from resumes and comparing them with job descriptions to identify suitable candidates. The system helps recruiters reduce manual effort, save time, and improve the accuracy and consistency of hiring decisions. Additionally, it provides resume scoring,

skill-gap analysis, and personalized recommendations to help applicants enhance their resumes according to industry requirements. This project demonstrates how AI-driven recruitment systems can make the hiring process faster, smarter, and more efficient while improving both recruiter productivity and candidate experience.

B. Scope of Project

The scope of the NLP-Based Intelligent Resume Screening System is to develop an automated recruitment solution that simplifies and improves the resume screening and candidate selection process using Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML). The project focuses on analyzing resumes, extracting important candidate information, and matching it with job requirements to identify the most suitable applicants efficiently.

The system is designed to perform multiple functions such as resume upload, text preprocessing, skill extraction, experience analysis, education verification, and candidate ranking based on similarity with job descriptions. It supports automated resume scoring, feature selection, and re-ranking of candidates to help recruiters make faster and more accurate hiring decisions. The project also aims to reduce manual effort, screening time, and human bias in recruitment. Additionally, the system provides personalized suggestions and skill-gap analysis to help candidates improve their resumes according to industry standards and job expectations. The proposed solution can be used by companies, HR departments, recruitment agencies, and online hiring platforms for efficient talent acquisition. The project demonstrates the practical application of NLP and ML techniques in modern recruitment systems and can be further extended with advanced technologies such as deep

learning, chatbot integration, and real-time job recommendation systems.

C. Objectives of the Project

1. To develop an intelligent resume screening system using Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML).
2. To automate the process of resume analysis and candidate evaluation for efficient recruitment.
3. To extract important information such as skills, education, work experience, certifications, and projects from resumes.
4. To compare candidate resumes with job descriptions and identify the most suitable applicants

II. LITERATURE REVIEW

[1] Kajal Rai and Pawan Kumar introduced a computerized recruitment assistance platform that examines resume data with intelligent algorithms to recognize suitable applicants for different job roles.

[2] Nariseti Saideepthi, Movva Hema Latha, Kalluri Deepthi, and Guttula Krupa Harika proposed a resume assessment framework capable of interpreting applicant profiles, academic records, and technical expertise for effective employee selection.

[3] Shrushti Washimkar, Kashish Gour, Kanak Gour, Hushali Bokade, Shrikant Utane, and Dr. P. S. Prasad designed a technology-driven hiring solution that automates resume verification and streamlines recruitment activities with reduced human involvement.

[4] Ashvini Chavan, Nikita Tatewar, Pavina Naicker, and Prof. Sareeka Deore developed an advanced applicant evaluation model that processes resume information intelligently to support precise and reliable candidate shortlisting.

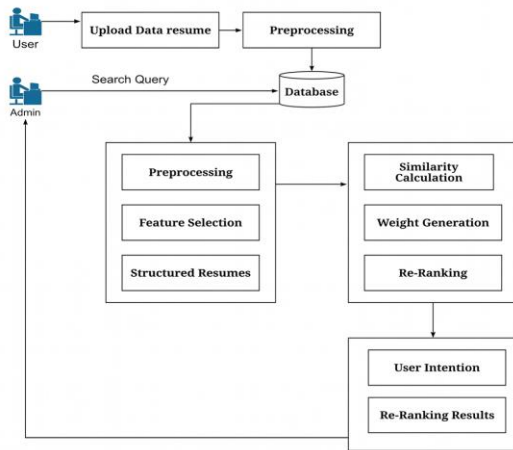
[5] Current studies in automated recruitment technology explain that AI-based methods and language-processing techniques play a major role in improving applicant screening, reducing recruitment complexity, and enhancing hiring performance.

III. PROMBLEM SATATMENT

In modern recruitment processes, organizations receive a large number of resumes for job openings, making manual resume screening a time-consuming and challenging task. Traditional hiring methods require significant human effort to analyze candidate qualifications, skills, and experience, which can lead to delays, inconsistency, and human bias in candidate selection. Recruiters may also overlook qualified candidates due to the large volume of applications and the lack of an efficient filtering mechanism. Additionally, manually comparing resumes with job requirements reduces recruitment efficiency and increases operational costs. To overcome these challenges, there is a need for an intelligent automated system that can accurately analyze resumes, extract relevant information, compare candidate profiles with job descriptions, and rank applicants efficiently using Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML) techniques.

IV. METHODOLOY

The diagram represents the workflow of the NLP-Based Intelligent Resume Screening System used for automated recruitment and candidate ranking. The process begins when the user uploads a resume into the system. The uploaded resume then undergoes a preprocessing stage, where unnecessary information, symbols, and formatting issues are removed, and the text is converted into a structured format suitable for analysis. After preprocessing, the resume data is stored in the database for further processing and retrieval. On the recruiter side, the admin enters a search query or job requirement into the system. The query is matched with the stored resume data from the database. The system then performs another preprocessing step followed by feature selection, where important attributes such as skills, education, experience, certifications, and projects are identified and extracted. These extracted details are converted into structured resumes for easier comparison and analysis.



Next, the system performs similarity calculation, where the resumes are compared with the job description using NLP and Machine Learning techniques to measure candidate suitability. After similarity matching, weight generation is applied to assign importance to different features such as technical skills, experience, or qualifications. Based on these weights, the system carries out re-ranking, which arranges the resumes according to their relevance and suitability for the job role.

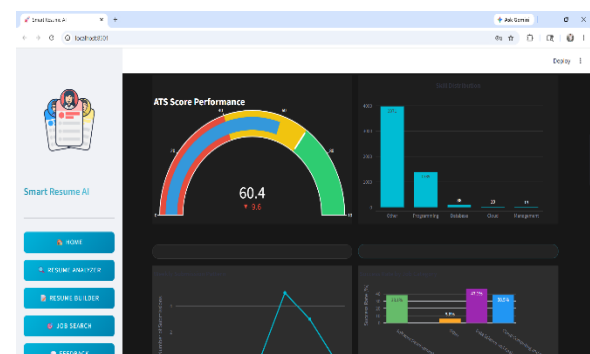
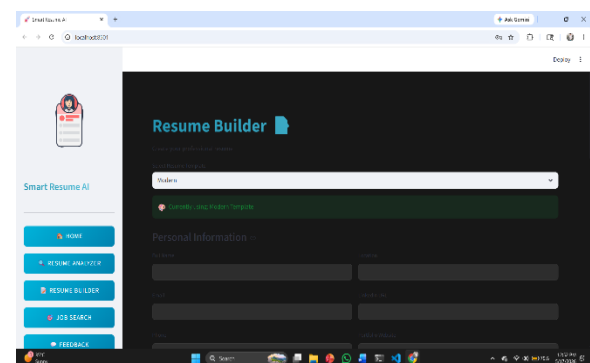
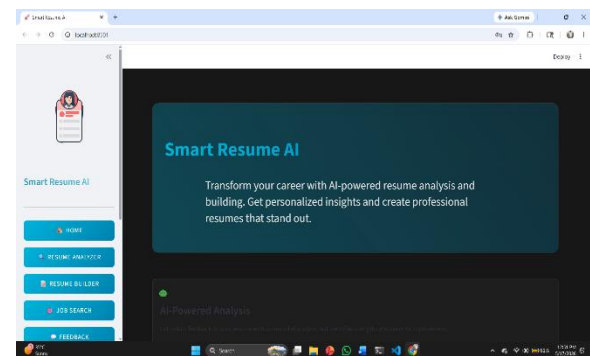
Finally, the system analyzes user intention and generates the re-ranked results, displaying the most suitable candidates at the top of the list for the recruiter. This workflow helps automate the recruitment process, reduce manual screening effort, improve hiring accuracy, and provide faster and smarter candidate selection. education, certifications, and work experience. The extracted details are then compared with job descriptions to calculate a matching score and rank candidates based on their suitability. Finally, the system displays candidate summaries, skill analysis, and recommendations through visualization tools, while a knowledge base containing job descriptions and skill repositories improves the overall accuracy and efficiency of recruitment decisions.

V. PUBLICATION PRINCIPLES

The publication of this research work follows standard academic and ethical principles to ensure originality, accuracy, and reliability of the proposed system. All information, methodologies, algorithms, and results presented in the study are properly

analyzed and documented to maintain research integrity. The research avoids plagiarism by using original content and appropriate references wherever required. Data used for testing and evaluation is handled responsibly while maintaining privacy and confidentiality. The study aims to contribute to the field of Artificial Intelligence, Natural Language Processing (NLP), and automated recruitment systems by providing a practical and efficient solution for resume screening and candidate selection. The publication also ensures that the proposed work can be further extended for future research and real-world recruitment applications.V

VI. OUTPUT'S



VII. CONCLUSION

The NLP-Based Intelligent Resume Screening System successfully demonstrates how Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML) can automate and improve the recruitment process. The system efficiently analyzes resumes, extracts important candidate information, and matches it with job requirements to identify suitable applicants. By reducing manual effort and screening time, the proposed solution improves the accuracy, consistency, and efficiency of candidate selection while minimizing human bias in recruitment. The system also provides resume scoring and personalized suggestions to help candidates improve their resumes according to industry standards. Overall, the project highlights the effectiveness of AI-driven recruitment technology in making hiring processes faster, smarter, and more reliable for both recruiters and job seekers.

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