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Intelligent Resume Screening and Job Role Recommendation System

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***Abstract*-- In today's competitive job market, many candidates find it difficult to create resumes that match specific job requirements and often fail to understand the reasons behind application rejection. To address this issue, the proposed AIpowered Resume Screening and Ranking System is designed as a user-friendly platform developed using the Flask framework. The system helps candidates evaluate and improve their resumes by providing intelligent, data-driven feedback. Users can upload their resumes in PDF format and enter a target job description for comparison. The platform uses Large Language Models (LLMs) and Natural Language Processing (NLP) techniques to perform detailed semantic analysis rather than relying only on keyword matching. Based on this analysis, the system generates a resume-job matching score, highlights relevant and missing skills, and suggests suitable job roles according to the candidate's profile. This enables applicants to clearly understand their strengths and improvement areas before applying.**

The system also includes an integrated resume builder with guided forms and customizable templates to create professionally structured resumes optimized for modern screening systems. Additionally, a dynamic dashboard provides updated job market news and industry trends to improve user awareness. Overall, the proposed solution acts as a smart career support tool that simplifies resume creation, enhances job-role matching, and increases the chances of successful job applications while reducing manual effort and uncertainty.

***Keywords*--Artificial Intelligence (AI); Resume Screening; Machine Learning; Natural Language Processing.**

I. INTRODUCTION

The recruitment landscape of 2026 is characterized by an unprecedented volume of digital applications, compelling organizations to rely heavily on automated Applicant Tracking Systems (ATS). While these systems enhance organizational efficiency, they have inadvertently created a "transparency gap" for job seekers, as traditional ATS frequently utilize rigid keyword-matching algorithms that fail to recognize semantic nuance or transferable skills.

This technical barrier often results in the premature rejection of highly qualified candidates who may lack specific terminology but possess the requisite competencies. Consequently, there is a critical need for candidate-centric technologies that equalize the hiring process by providing job seekers with the same analytical capabilities traditionally reserved for recruiters. Current research in Natural Language Processing (NLP) has shifted significantly toward Large Language Models (LLMs), which offer superior contextual understanding compared to legacy TF-IDF or frequency-based models. However, most existing applications of LLMs in recruitment remain employer-oriented, focusing on shortlisting efficiency rather than applicant preparation. This paper addresses this imbalance by proposing an AI-Powered Resume Screening and Ranking System, a comprehensive platform developed using the Flask framework. The proposed system integrates LLMs to provide a bi-directional analysis: evaluating a user's existing resume against specific job descriptions while simultaneously offering generative tools for document optimization. The core contribution of this research lies in its multilayered approach to career readiness. By combining an automated resume builder with a semantic ranking engine, the system enables users to quantify their alignment with a role through an objective "match score" and identify specific skill gaps through deep-text analysis. Furthermore, the integration of a real-time dashboard—displaying industry-specific job market news—ensures that the candidate's strategy remains aligned with current market volatility and shifting skill demands. Ultimately, this study demonstrates how the democratization of LLM-driven insights can reduce application guesswork, mitigate the "black box" effect of modern hiring, and foster a more equitable transition from candidate to employee in the digital economy.

II. LITERATURE REVIEW

The integration of AI into resume screening has shifted the job application process from a narrative exercise into a strategic optimization challenge.

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Candidates now navigate a digital environment where their professional identity is first "read" and reconstructed by Natural Language Processing (NLP) algorithms, creating a reliance on standardized, ATSfriendly templates that prioritize machine readability over creative design. This transition has birthed the "Match Rate" culture, where users utilize AI-powered feedback tools to achieve a specific numerical score against job descriptions before submission, effectively engaging in an "AI arms race" to ensure their profile bypasses automated gatekeepers. While this offers some users a sense of technical agency and immediate feedback, it simultaneously introduces significant "Black Box" anxiety, as applicants often feel alienated by a lack of transparency regarding why they were filtered out. Furthermore, the psychological shift toward "keyword mirroring" and "semantic alignment" risks a loss of authentic self-expression, as the user's primary goal shifts from impressing a human recruiter to satisfying the mathematical constraints of a vector based similarity model.

Initial approaches to text processing and information retrieval were based on statistical methods such as term frequency and inverse document frequency (TFIDF), which played a crucial role in evaluating the relevance of textual data [3], [6]. Later, machine learning techniques were introduced to improve classification and prediction tasks in recruitment systems. The development of NLP libraries and frameworks, such as those discussed in [5], further enabled the processing of unstructured textual data like resumes.

In recent years, deep learning models such as Word2Vec [1] and BERT [2] have revolutionized text understanding by capturing contextual and semantic meaning. These advancements have made it possible to design intelligent resume screening systems that go beyond keyword matching and provide more accurate and meaningful candidate evaluation.

III. Architecture

The diagram represents the working architecture of an AI-Powered Resume Screening and Matching System, divided into three main stages: Input, AI Processing, and Output. In the input stage, the user provides the required data by uploading a resume and a job description. This stage acts as the starting point of the system, where all candidate information and job requirements are collected in digital form. The uploaded resume contains details such as skills, education, and experience, while the job description defines the expectations and qualifications needed for a specific role. Collecting both inputs together allows the system to perform a meaningful comparison.

In the AI processing stage, the uploaded documents are passed to an AI Match Engine based on a Large Language Model (LLM). This engine analyzes the text content of both the resume and the job description using Natural Language Processing techniques. It extracts important keywords, identifies relevant skills, compares experience levels, and understands the context of job requirements. The AI engine then evaluates how closely the resume aligns with the job description and calculates matching factors. This automated analysis replaces manual resume screening and makes the evaluation faster, more consistent, and more accurate. 2 In the output stage, the processed results are presented to the user through a dashboard interface.

The dashboard displays a resume match percentage score (0–100%), which shows how well the candidate's profile fits the job role. Along with the score, the system provides personalized feedback and identifies skill gaps so users can understand what improvements are needed. The output section also includes a resume builder with templates to help users enhance or recreate their resumes based on the suggestions. Additionally, features like a real-time news or update feed can provide users with relevant career or industry information. All these outputs together aim to improve job search success by guiding users to optimize their resumes and align better with job requirements. Overall, the diagram illustrates a complete flow where user inputs are intelligently processed by AI and transformed into practical, user-friendly insights and tools.

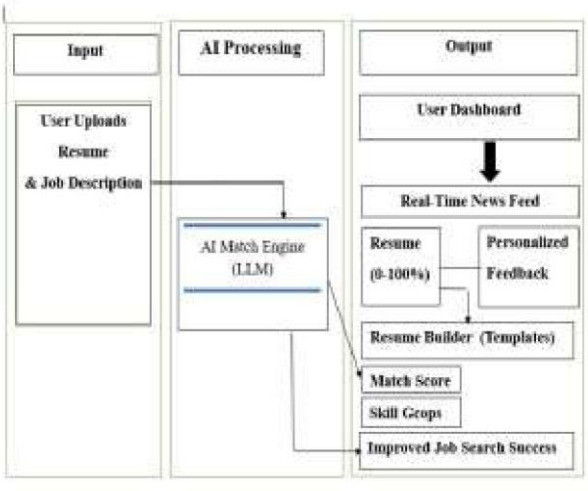

Fig 1. Architecture

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IV. Technologies Used

1.Evolution of AI in Recruitment

Early Applicant Tracking Systems (ATS) primarily functioned as keyword-matching databases, filtering resumes based on predefined criteria. However, with the rise of advanced AI techniques, modern systems now use ML algorithms to predict candidate suitability by analyzing historical hiring data. Studies indicate that ML-based models improve screening efficiency and reduce time-to-hire by identifying patterns associated with successful employees. The integration of NLP enables systems to interpret unstructured text within resumes, extracting entities such as skills, experience, education, and certifications. Techniques such as tokenization, named entity recognition (NER), and semantic similarity modeling allow AI to "understand" contextual meaning rather than relying solely on exact keyword matches.

2.Natural Language Processing and Semantic Matching:

NLP has been central to transforming resume screening into a semantic evaluation task. Modern systems use vector-based similarity models and word embeddings (e.g., transformerbased architectures) to compare resumes against job descriptions. This process supports:

- Semantic alignment instead of exact keyword repetition.
- Context-aware skill matching.
- Experience weighting based on relevance

However, literature highlights that semantic modeling may encourage "keyword mirroring," where applicants strategically adapt their resumes to mirror job description language. While this improves machine compatibility, it risks reducing authentic self-expression and professional diversity.

3.Machine Learning and Predictive Hiring Models:

Machine learning models—such as supervised classification algorithms—are trained on past hiring outcomes to predict candidate success. These models assess variables including skill frequency, experience duration, education level, and role similarity. Research identifies several benefits: Increased efficiency in high-volume recruitment

- Standardization of evaluation criteria
- Reduced manual workload

Yet, concerns arise regarding algorithmic bias. If historical data reflects systemic bias, ML systems may replicate or amplify these patterns.

Transparency and fairness auditing have therefore become major research themes in AIbased recruitment.

4.Large Language Models (LLMs) and AI Feedback Tools:

The emergence of Large Language Models has introduced a new phase in resume optimization. LLM-based tools provide:

- Resume rewriting suggestions.
- Keyword optimization guidance.
- "Match Rate" scoring systems
- Real-time feedback against job descriptions.

This development has created what researchers describe as an "AI arms race," where applicants strategically optimize resumes to bypass automated filters. The focus shifts toward maximizing algorithmic compatibility rather than human storytelling.

Although LLMs enhance accessibility by offering immediate feedback and technical agency, they also contribute to "Black Box" anxiety. Many applicants feel uncertain about how screening algorithms interpret their profiles, leading to mistrust and psychological stress.

V. Methodology

The methodology section of the AI Resume Analyzer system encompasses multiple phases in the creation and execution of the system. This section aims to elucidate the research framework, methods of data gathering, and analytical processes employed during the development of the AI Resume Analyzer system.

VI. Resume Parsing And NLP Integration

The system implements advanced Natural Language Processing (NLP) techniques for indepth parsing of uploaded resumes, enabling the extraction of critical information such as skills, certifications, and work history. By utilizing techniques like Named Entity Recognition (NER), the AI identifies specific professional attributes within unstructured text. This accurate resume analysis is foundational for precise user categorization and the provision of highly relevant job recommendations.

VII. Machine Learning For User Categorization

A core component involves the development and training of machine learning models using labeled datasets to categorize users as either "freshers" or "experienced" professionals based on their resume content.

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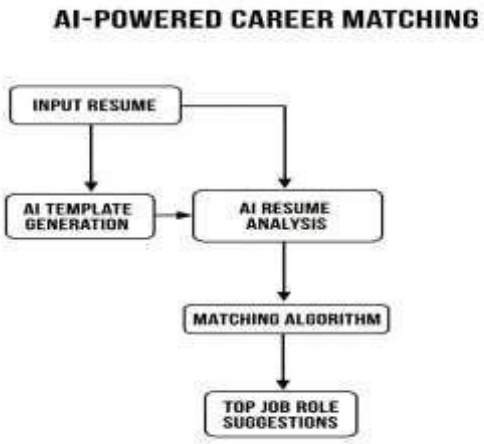
These models analyze the depth of the "Experience" section and the complexity of the skills listed. Accurate user categorization 4 forms the bedrock for the generation of personalized job recommendations, ensuring the alignment of users with suitable career opportunities.

VIII. Dynamic Job Recommendation And Role Prediction

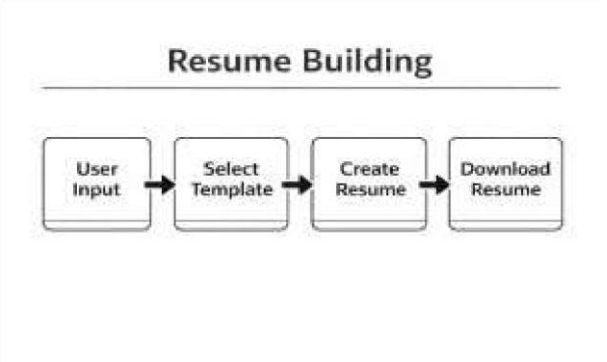
The system features a dynamic recommendation engine that utilizes collaborative filtering, content-based filtering, and hybrid recommender systems. By comparing the vectorized representation of a resume against current market job descriptions, the engine predicts the most suitable job roles for the user. This engine is designed to be the cornerstone of the system, delivering job opportunities tailored to each user's unique skills and experience, thus enhancing the overall job-seeking process while continuously adapting to the evolving job market landscape.



IX. Intelligent Resume Building And Optimization

To assist the user further, the framework incorporates an intelligent resumebuilding module.

This phase uses generative AI to help users draft professional summaries and format their experience in an ATS-friendly manner. The system suggests relevant keywords and industry-standard phrasing based on the user's predicted job role. This ensures that the final document is not only professional in appearance but also optimized to pass through automated company filters.



X. Data Security And Privacy Measures

The methodology prioritizes the implementation of stringent data security measures, encompassing encryption, access controls, and compliance with global data protection regulations to safeguard user information. Since resumes contain sensitive personal data, these security and privacy measures are of utmost importance for fostering user trust and ensuring adherence to legal and ethical standards.

XI. User Data Analysis For Continuous Enhancement

The final phase involves analyzing user data to gain insights into behavior and preferences. Data analytics techniques are utilized to iteratively refine the recommendation engine and enhance the overall user experience. This continuous data analysis facilitates system improvement and the delivery of more relevant and timely job recommendations, ensuring the AI remains accurate as industry trends shift over time.

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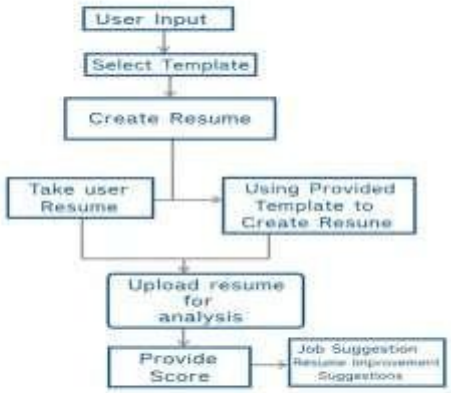

XII. Future Scope

Advanced Natural Language Processing (NLP): Future systems can use improved NLP techniques to better understand resume content, context, and semantic meaning instead of relying only on keyword matching.

Machine Learning Model Improvement:-The screening system can be enhanced with advanced machine learning and deep learning algorithms to improve accuracy in candidate selection and ranking.

Bias Detection and Fair Hiring:-Future research can focus on developing algorithms that detect and reduce bias in recruitment to ensure fair and unbiased hiring decisions.

Predictive Candidate Performance Analysis:-AI models can be trained to predict candidate performance and job success by analyzing historical recruitment and employee performance data.

*Integration with Job Portals and HR Systems:*The system can be integrated with job portals and Human Resource Management Systems (HRMS) to automate the entire recruitment process.

Multilingual Resume Analysis:-Future AI systems may support multiple languages, enabling organizations to screen resumes from candidates worldwide.

Real-Time Resume Feedback for Applicants:-The system could provide instant suggestions to job seekers on improving their resumes to increase their chances of being shortlisted.

XIII. Advantage

1. *High Time Efficiency:* Processes resumes in seconds, speeding up recruitment and reducing timeto-hire.
2. *Automation & Reduced Manual Effort:* Automates tedious tasks like resume parsing, freeing up recruiters to focus on strategic work like interviews and candidate engagement.
3. *Improved Accuracy & Consistency:* Uses algorithms and NLP to evaluate resumes consistently, reducing human errors and biases in initial screening.
4. *Handles Large Data Volumes:* Efficiently processes hundreds or thousands of resumes, making it ideal for high-volume hiring.
5. *Reduces Human Bias:* Selects candidates based on skills, qualifications, and relevance, promoting fair and objective hiring practices.
6. *Faster Decision-Making:* Quickly ranks candidates, enabling recruiters to shortlist and move forward with top talent faster.
7. *User-Friendly Interface:* Designed for ease of use, allowing recruiters to upload resumes, input job descriptions, and view results without needing technical expertise.
8. *Cost Effective:* Saves operational costs by reducing manual effort, HR workload, and potentially speeding up hiring cycles.
9. *Scalable:* Easily handles increasing numbers of users, resumes, and job postings, making it suitable for growing organizations.
10. *Data Organization & Storage:* Stores resumes, job descriptions, and results in a structured database for easy retrieval, analysis, and future reference.

XIV. Limitations

Dependence on Resume Format:-The system may struggle to accurately analyze resumes that have unusual formats, complex layouts, or non-standard structures**.**

Keyword Dependency:-Some AI screening systems still rely heavily on keyword matching, which may overlook qualified candidates whose resumes use different terminology**.**

Limited Understanding of Context:-Although AI can process large amounts of text, it may not fully understand the context, creativity, or soft skills described in resumes**.**

Data Bias in Training Models:-If the training data contains biased hiring patterns, the AI system may unintentionally replicate those biases in its screening results**.**

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Difficulty in Evaluating Soft Skills:-Important qualities such as communication, leadership, and teamwork cannot be easily evaluated through resumes alone.

Privacy and Data Security Concerns:-Handling personal candidate data requires strict privacy protection, and improper management may lead to security risks.

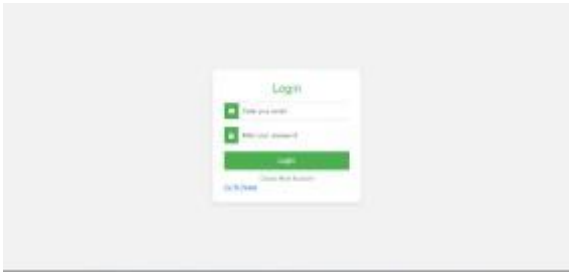
Dependence on Quality Training Data:-The accuracy of the AI model largely depends on the quality and quantity of the training dataset used for building the system..

XV. Discussion

The results indicate that the AI-powered Resume Screening System can effectively streamline the recruitment process by automatically analyzing and ranking resumes based on job requirements. By leveraging Machine Learning, Natural Language Processing (NLP), and intelligent scoring techniques, the platform improves candidate-job matching, reduces manual effort, and minimizes bias in the selection process. It enables recruiters to make faster and more informed hiring decisions while providing applicants with constructive feedback to enhance their resumes. The discussion highlights that such a system can serve as a scalable and efficient solution for modern recruitment, helping organizations manage large volumes of applications and adopt data-driven hiring practices.

Home Page 1

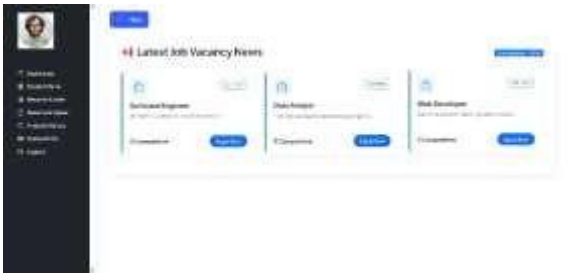
Home Page 1.2



Login Page 1.3

Registration Page 1.4

Admin login page 1.5



Dashboard 2

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Student Info page 3

Resume analysis history 4.5

Resume builder 4

User contact information 4.6

Resume Template 4.2

Admin dashboard 5.1

Resume Analyzer 4.3

History 5.2

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Admin contact information 5.3

XVI. CONCLUSION

The AI-Powered Resume Screening and Ranking System represents a modern and efficient approach to handling resume evaluation and job-role matching through intelligent automation. The proposed system focuses on simplifying the overall screening process from the user's perspective by providing features that allow candidates to upload or create resumes, automatically analyze their content, and compare it with specific job descriptions. Through this process, users receive match scores, keyword analysis, and relevant job role suggestions, which help 6 them better understand how well their profile aligns with industry requirements. This not only improves transparency in resume evaluation but also guides candidates in enhancing their resumes strategically. By integrating Artificial Intelligence and Natural Language Processing techniques, the system is capable of extracting meaningful information from resumes, identifying skill sets, qualifications, and experience patterns, and mapping them effectively against job criteria. This significantly reduces the dependency on manual screening methods, which are often time-consuming, inconsistent, and prone to human bias. Automation ensures faster processing, standardized evaluation, and improved matching accuracy, making the system highly scalable and suitable for handling large volumes of resumes efficiently. In addition, the ranking and recommendation components of the system add practical value by prioritizing resumes based on relevance and suggesting suitable job roles according to candidate profiles. This supports not only recruiters but also job seekers, making the platform mutually beneficial. From an implementation standpoint, the project demonstrates how AI-driven tools can be successfully applied to real-world recruitment challenges and career preparation workflows.

Overall, the proposed system delivers a reliable, time-saving, and intelligent solution for smart resume analysis and job alignment. It highlights the growing importance of AI-based decisionsupport systems in recruitment and showcases a strong foundation for future enhancements such as deeper semantic analysis, adaptive learning models, and personalized career guidance features..

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