

# International Journal of Innovative Research in Computer and Communication Engineering

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# Automated Candidate Shortlisting System Based on AI

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**ABSTRACT:** The rapid increase in job applications has made traditional resume screening processes inefficient, time-consuming, and prone to human bias. Recruiters often face difficulty in manually analyzing thousands of resumes, leading to delays and inconsistent hiring decisions. To overcome these challenges, this project presents an AI-based Automated Candidate Shortlisting System that assists recruiters by intelligently analyzing, classifying, and ranking resumes using Natural Language Processing (NLP) and Machine Learning (ML) techniques.

The proposed system includes an automated resume parsing module that extracts key candidate information such as personal details, skills, education, work experience, projects, certifications, and languages from resumes. The system supports multi-language resumes, enabling accurate processing of documents written in English, Hindi, and other supported languages. An AI-driven skill matching mechanism compares candidate profiles with job requirements to generate a match score and identify missing skills.

To promote fair hiring practices, the system incorporates bias analysis by minimizing the influence of irrelevant attributes during evaluation. Based on experience analysis, candidates are automatically classified as Fresher, Mid-level, or Senior. The system further automates recruitment workflows by shortlisting candidates into Selected, Rejected, or Review Required categories. Overall, this project demonstrates how artificial intelligence can enhance recruitment efficiency, reduce bias, and enable data-driven hiring decisions in real-world recruitment processes

## I. INTRODUCTION

Recruitment is one of the most important processes in any organization, as selecting the right candidate directly impacts productivity and growth. With the rise of online job portals and digital applications, recruiters receive a large number of resumes for a single job opening. Manually reviewing these resumes is time-consuming and often leads to inconsistency and human bias. Traditional resume screening methods depend heavily on human judgment, which can vary from person to person. Recruiters may overlook suitable candidates due to fatigue, time constraints, or unconscious bias. As a result, organizations require an automated and intelligent system that can efficiently analyze resumes and shortlist candidates based on objective criteria. Recent advancements in Artificial Intelligence and Machine Learning have made it possible to automate complex decision-making processes. NLP techniques enable computers to understand and process textual information from resumes. By combining AI with resume analysis, recruitment systems can perform faster, more accurate, and unbiased candidate evaluation. This project focuses on developing an AI-based automated candidate shortlisting system that simulates real-world HR screening processes. The system improves hiring efficiency, reduces manual workload, and ensures fair candidate evaluation.

## II. PROBLEM STATEMENT

Manual resume screening is a slow, repetitive, and biased process that becomes inefficient when handling large volumes of job applications. Recruiters struggle to consistently evaluate resumes while matching skills with job requirements. Existing systems lack intelligence, fairness, and automation, leading to poor hiring decisions. Therefore, there is a need for an automated AI-based system that can accurately analyze resumes, reduce bias, and shortlist candidates efficiently.



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### III. OBJECTIVES OF THE PROJECT

The main objectives are:

- To develop an AI-based system for automatic resume screening
- To extract important information from resumes (skills, education, experience)
- To match candidate profiles with job descriptions
- To rank candidates based on suitability
- To reduce manual effort in recruitment
- To improve accuracy and efficiency in hiring
- To provide a user-friendly interface for recruiters

### IV. LITERATURE REVIEW

With the advancement of Artificial Intelligence and Natural Language Processing (NLP), automated resume screening systems have become an important area of research. Traditional recruitment methods are time-consuming and often affected by human bias, which has led to the development of intelligent systems for efficient candidate evaluation. Many existing systems use NLP techniques to extract information from resumes, such as skills, education, and experience. These techniques convert unstructured resume data into structured format, making it easier to analyze and process candidate profiles. In addition, machine learning approaches such as TF-IDF and cosine similarity are commonly used to compare resumes with job descriptions and calculate similarity scores. Some systems also use classification algorithms to categorize candidates into suitable job roles based on their qualifications. Recent research also focuses on multilingual resume processing, where language detection and translation techniques are used to handle resumes in different languages. This improves accessibility and ensures consistent evaluation across diverse candidates. Furthermore, in government-based recruitment systems, eligibility criteria such as age limits play a crucial role. Some modern systems incorporate rule-based checks to determine whether a candidate satisfies the required age criteria for specific job roles, helping applicants understand their eligibility before applying. The proposed system is based on these concepts and uses NLP for resume parsing, rule-based techniques for skill matching, and includes an age-based eligibility check for government job criteria. It provides an efficient solution for analyzing resumes, calculating eligibility scores, identifying missing skills, and determining whether a candidate meets the required age conditions, while also storing the results in a database for future use.

### V. PROPOSED SYSTEM

Earlier recruitment systems primarily depended on manual resume screening, where HR professionals individually reviewed each resume to identify suitable candidates. While this approach was manageable for small organizations with limited applicants, it became highly inefficient for large organizations receiving thousands of resumes for a single job opening. Manual screening consumed significant time and effort, increased operational costs, and was highly prone to human errors, fatigue, and unconscious bias, often leading to inconsistent hiring decisions.

To overcome these limitations, rule-based recruitment systems were introduced. These systems filtered resumes based on predefined rules and keyword matching, such as specific skills, qualifications, or years of experience. Although rule-based systems reduced manual effort and improved screening speed, they lacked semantic understanding. As a result, many qualified candidates were rejected due to variations in resume formats, synonyms, or unconventional skill descriptions. The rigid nature of rules made these systems inflexible and unsuitable for dynamic job requirements.

With advancements in computing and data availability, Machine Learning-based resume screening systems emerged. These systems learned patterns from historical hiring data and were able to predict candidate suitability with better accuracy than rule-based methods. Machine learning models enabled improved ranking and classification of resumes; however, they required extensive feature engineering, large labeled datasets, and frequent retraining. Additionally, biased historical data could influence the learning process, leading to unfair hiring outcomes.

Recent developments in Artificial Intelligence, Natural Language Processing (NLP), and deep learning have significantly transformed resume screening systems. Modern AI-based systems can understand contextual meaning, identify relationships between skills, experience, and job roles, and perform intelligent skill matching. Deep learning models provide superior semantic understanding and adaptability, resulting in accurate candidate ranking, fair



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evaluation, and reduced bias. These systems also support automation, scalability, and real-time processing. This project builds upon these recent advancements by integrating AI and NLP techniques to develop an Automated Candidate Shortlisting System that offers improved efficiency, accuracy, fairness, and scalability. The proposed solution aims to overcome the limitations of traditional recruitment methods and closely simulate real-world HR screening processes

### VI. SYSTEM ARCHITECTURE



Figure 1: System Architecture of candidate shortlisting with AI

#### Description:

The Automated Candidate Shortlisting System Based on AI is a smart recruitment solution designed to simplify and speed up the hiring process using Artificial Intelligence. In traditional hiring, recruiters manually review a large number of resumes, which is time-consuming and may lead to errors or bias. This system automates that process by analyzing candidate resumes and matching them with job requirements efficiently.

The system works by allowing recruiters to upload job descriptions and candidates to submit their resumes through an online platform. It then uses Natural Language Processing (NLP) to read and understand the content of each resume, extracting key details such as skills, qualifications, and work experience. After processing the data, the system compares candidate profiles with the job requirements using intelligent algorithms.

Based on this comparison, each candidate is given a score, and the system ranks them accordingly. The most suitable candidates are then shortlisted and presented to the recruiter for further selection. This approach not only reduces manual effort but also improves accuracy and ensures fair and unbiased decision-making.

Overall, the system enhances the efficiency of recruitment by saving time, handling large volumes of applications, and helping organizations select the best candidates quickly and effectively.

### VII. METHODOLOGY

The methodology of the Automated Candidate Shortlisting System Based on AI describes the complete workflow of how the system collects, processes, analyzes, and evaluates candidate resumes, and finally provides intelligent shortlisting along with personalized feedback. The system integrates Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP) techniques to automate and enhance the recruitment process. This methodology not only focuses on selecting the best candidates but also introduces an innovative Candidate Review and



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Feedback Mechanism, which guides applicants on how to improve their resumes and increase their chances of selection in the future.

### 1. Resume Upload:

The user uploads the resume in PDF or DOCX format through the application interface. This acts as the input for the system.

### 2. Resume Parsing:

The system extracts text from the uploaded resume using parsing libraries. The extracted text is cleaned and prepared for further analysis.

### 3. Information Extraction:

Important details such as name, email, phone number, skills, and experience are extracted from the resume using pattern matching techniques.

### 4. Job Role Selection:

The user selects a specific job role. Each role has predefined required skills stored in the system.

### 5. Skill Matching:

The system compares candidate skills with the required job skills. A match score is calculated based on the number of matching skills.

### 6. Missing Skills Detection:

The system identifies skills required for the job role but not present in the resume. This helps candidates understand improvement areas.

### 7. Candidate Evaluation:

Based on the match score, the candidate is classified as Selected, Review, or Rejected.

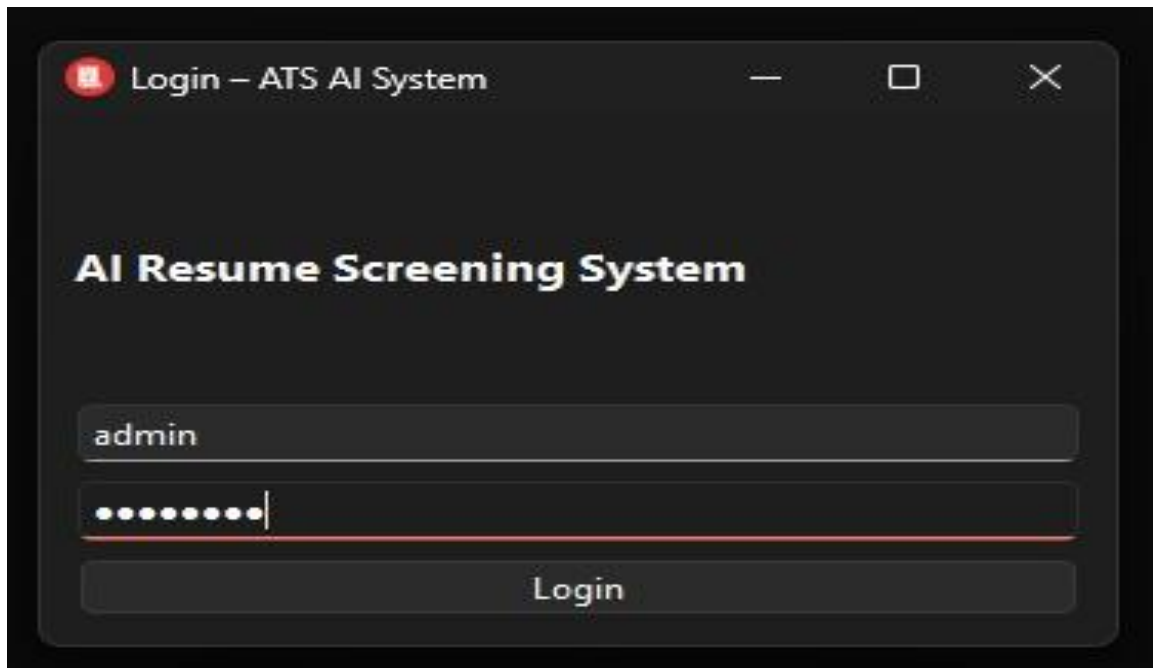
### 8. Result Display:

The system displays candidate details, match score, status, and graphical analysis in a user-friendly dashboard.

### 9. Data Storage:

All candidate information and results are stored in a MySQL database for future use and analysis.

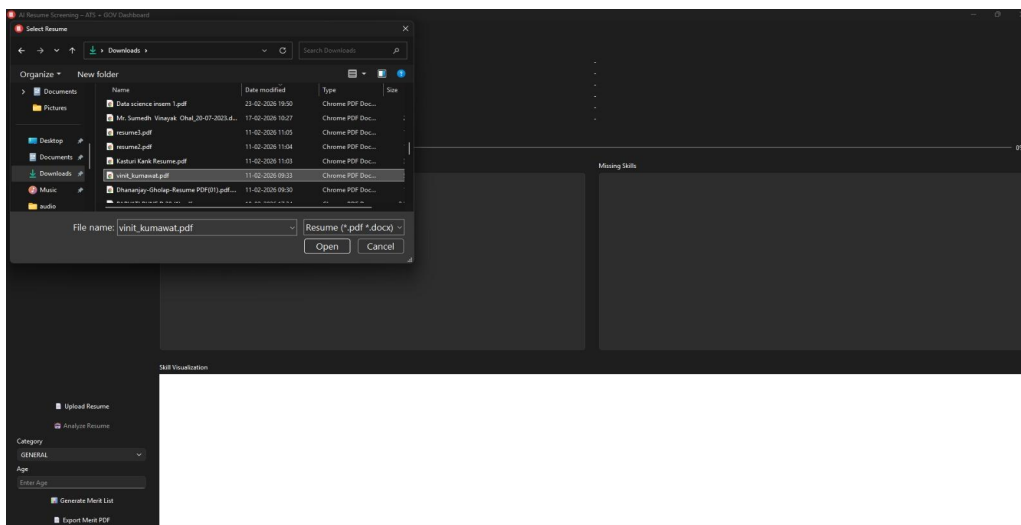
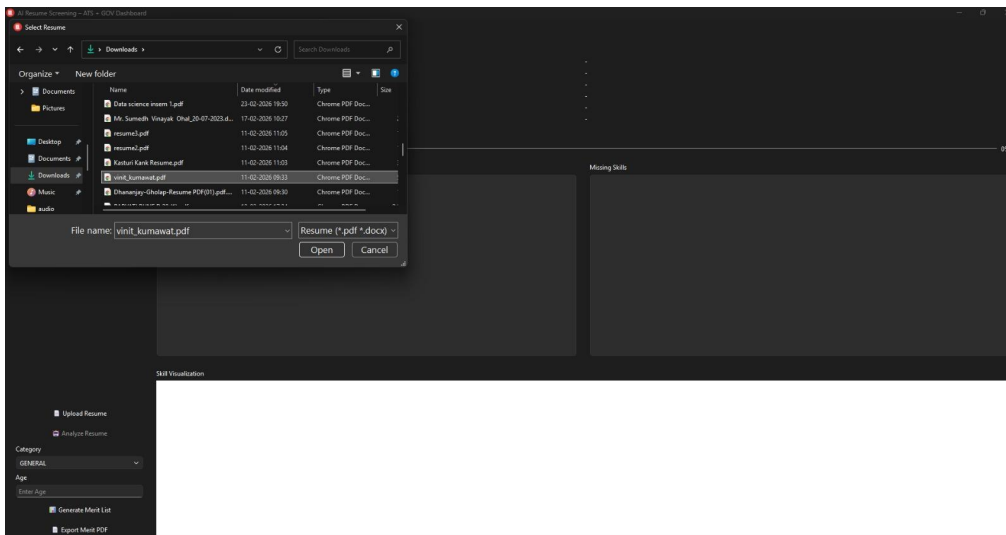
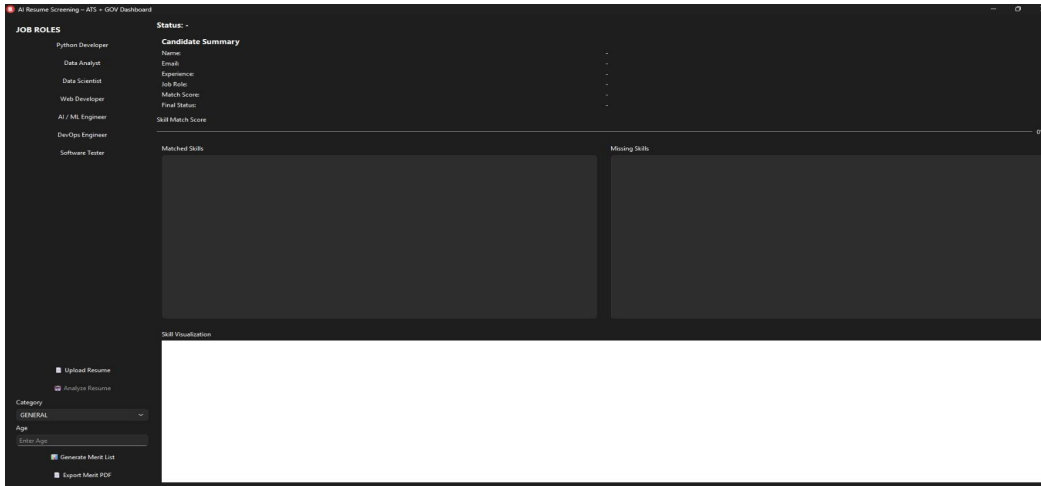
## VIII. RESULT





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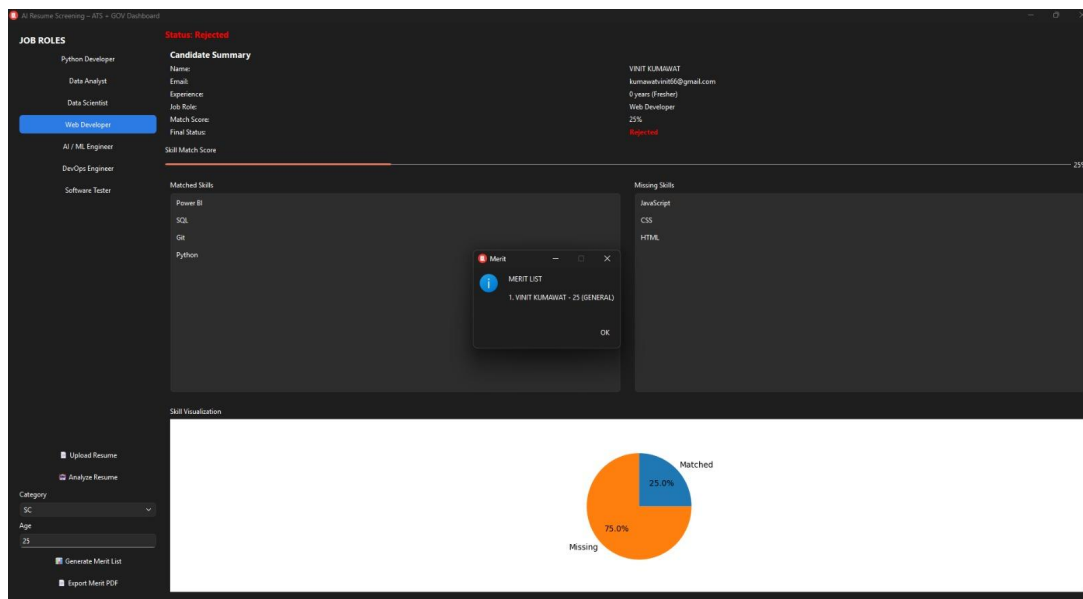
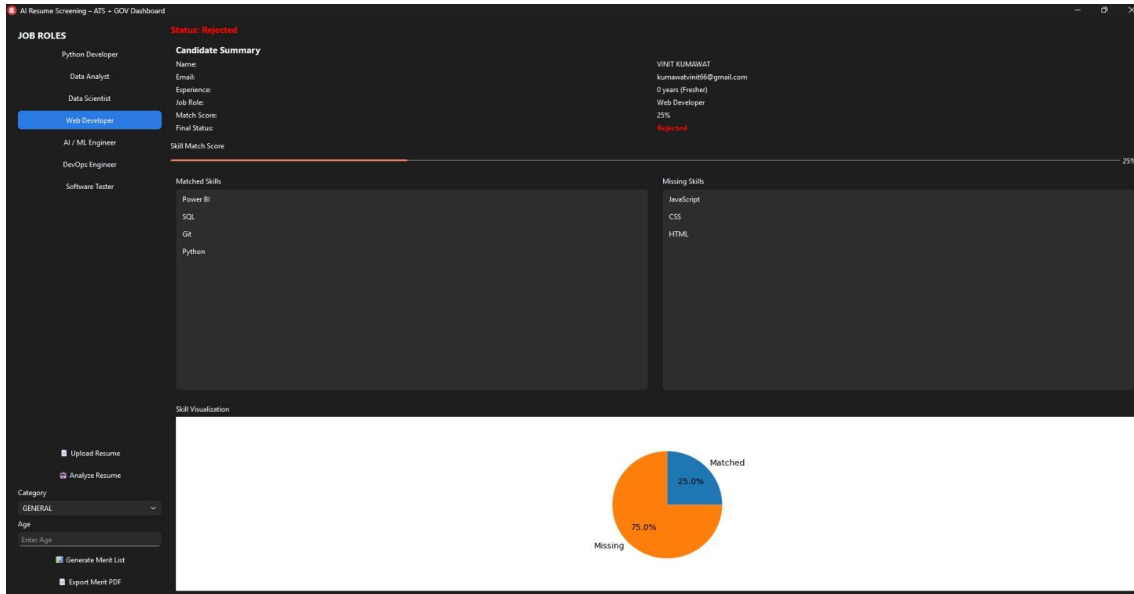
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## IX. CONCLUSION

The Automated Resume Screening System successfully demonstrates how Artificial Intelligence and Natural Language Processing can be used to simplify and improve the recruitment process. The system efficiently analyzes resumes by extracting important information such as skills, experience, and personal details, and matches them with predefined job role requirements. It calculates a match score to determine candidate eligibility and identifies missing skills, providing useful feedback to users. The inclusion of multilingual support further enhances the system by allowing resumes in different languages to be processed uniformly. In addition, the system incorporates a government-based eligibility feature by checking age criteria, enabling candidates to understand whether they meet the required conditions for specific job roles. All processed data is stored in a database for efficient management and future reference. Overall, the system reduces manual effort, improves accuracy, and provides a faster and more reliable solution for resume screening, making it a valuable tool for both recruiters and job applicants.



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### X. FUTURE SCOPE

The proposed system has significant potential for further enhancement and real-world implementation. In the future, several advanced features and improvements can be integrated to make the system more powerful and intelligent. One important improvement is the integration with popular job portals such as LinkedIn and Naukri, allowing automatic fetching of candidate profiles and real-time shortlisting. The system can also be enhanced by incorporating deep learning models to improve the accuracy of resume understanding and candidate matching. The feedback system can be further improved by providing personalized learning recommendations, such as online courses, certifications, and career paths based on the candidate's profile. Multi-language support can also be added to make the system accessible to users from different regions. In addition, the system can be developed into a real-time recruitment platform with cloud integration, allowing organizations to process large volumes of applications instantly. Features like bias detection and fairness analysis can also be included to ensure ethical and transparent hiring practices.

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