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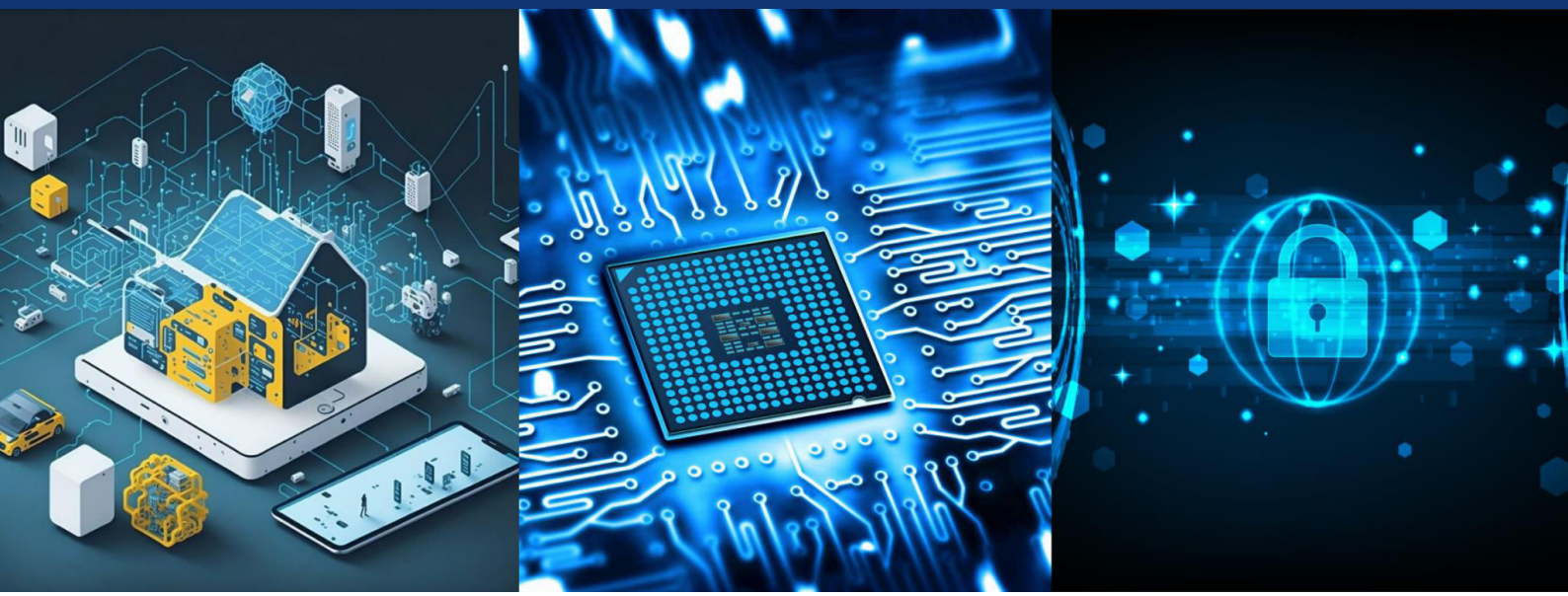

# International Journal of Innovative Research in Computer and Communication Engineering

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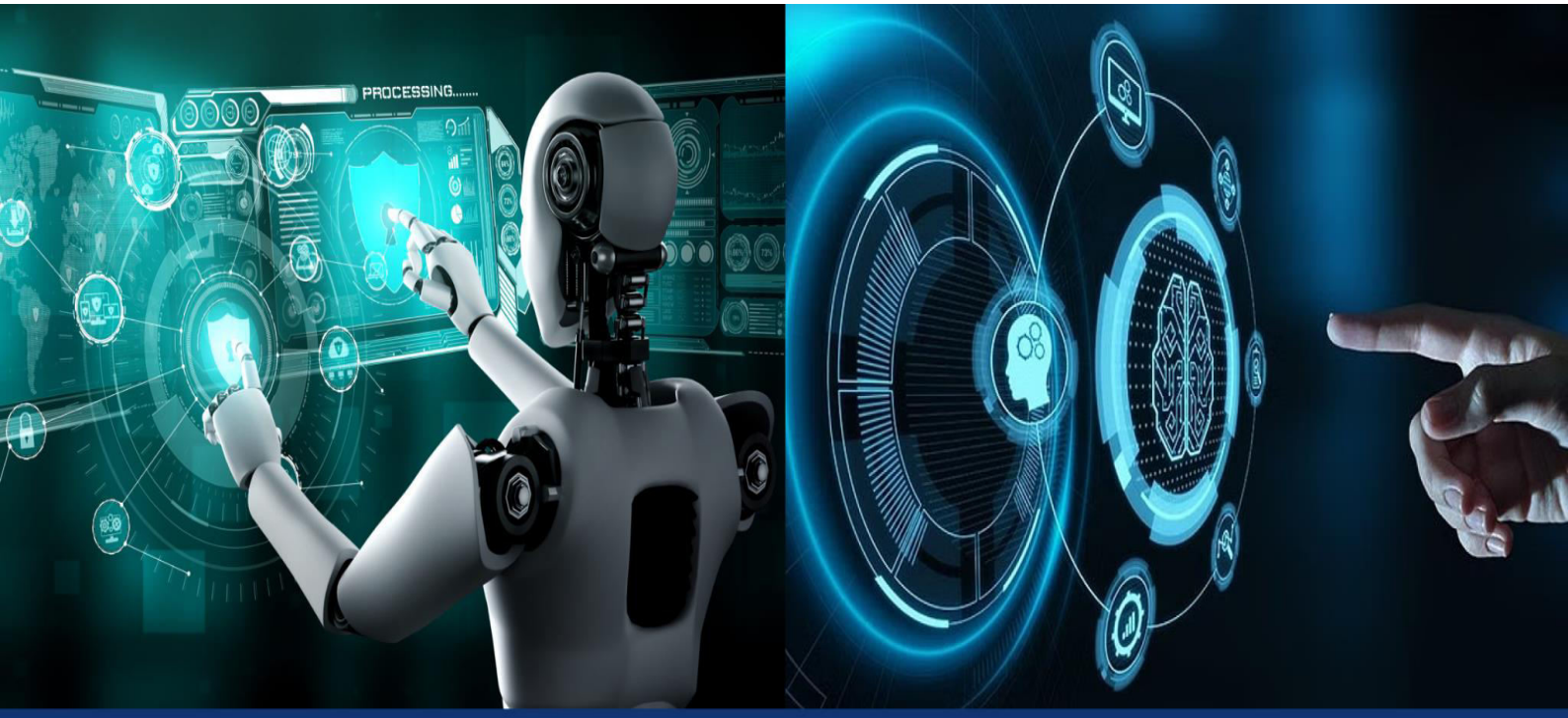


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# AI Resume Screening System

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**ABSTRACT:** Recruiters often face the challenge of screening a large volume of resumes manually, which is both time-consuming and prone to bias. Traditional Applicant Tracking Systems (ATS) rely heavily on keyword matching and lack the contextual understanding required for accurate candidate evaluation. This paper presents an AI-based resume screening system that leverages Natural Language Processing (NLP) and Machine Learning (ML) to intelligently analyze and rank resumes against job descriptions. The proposed system enhances fairness, reduces hiring time, and improves the quality of candidate-job matching. The model incorporates bias mitigation techniques and real-time feedback to help applicants improve their resumes. Evaluation metrics demonstrate the system's effectiveness in automating and optimizing the recruitment process while maintaining data privacy and integrity

**KEYWORDS:** Natural Language Processing, Machine Learning, Candidate Ranking, Bias Mitigation, Job Matching, Automated Recruitment

## I. INTRODUCTION

In the digital age, recruitment processes have undergone a significant transformation with the integration of automation and artificial intelligence. However, the initial stage of hiring—resume screening—still poses a ajor bottleneck. Human recruiters often need to evaluate hundreds or thousands of resumes for a single job opening, which makes the process slow, inconsistent, and prone to bias. While conventional systems such as keyword-based Applicant Tracking Systems (ATS) offer partial automation, they often fail to assess resumes in a context-aware and holistic manner.

Artificial Intelligence (AI), particularly techniques involving Natural Language Processing (NLP) and Machine Learning (ML), has shown tremendous potential in solving this challenge. AI-based resume screening systems go beyond surface-level keyword matching by understanding the semantics and context of both job descriptions and candidate profiles. These systems aim to deliver more accurate candidate-job matches, reduce hiring time, and eliminate unconscious bias in the hiring process.

This paper introduces a comprehensive AI-powered resume screening system that evaluates candidates based on their experience, skills, and alignment with job requirements. The system also incorporates fairness and transparency through real-time feedback to applicants and includes secure mechanisms to protect candidate data. This intelligent system represents a step toward a more efficient, inclusive, and data-driven recruitment process.

## II. RELATED WORK

Several studies have been conducted to improve the efficiency and fairness of resume screening through the use of AI and NLP technologies. In [1], the authors developed a resume classification system using NLP techniques to extract candidate skills and experiences and compared them with job requirements. The study highlighted how traditional keyword-based systems overlook contextual relevance and suffer from high false-positive rates.

In [2], a machine learning-based ranking model was introduced, which scored resumes by analyzing features such as education level, experience, and skill similarity to the job description. The model demonstrated higher accuracy in shortlisting candidates compared to rule-based systems.

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Another approach in [3] proposed the use of named entity recognition (NER) to identify key components in resumes such as names, institutions, degrees, and technologies, which enhanced the precision of resume parsing. However, it lacked integration with real-time candidate feedback mechanisms.

In [4], the researchers introduced a bias mitigation model in resume screening by anonymizing personal identifiers and applying fairness-aware ranking algorithms. The study emphasized the need to address discrimination in AI hiring tools, especially concerning gender, ethnicity, and age.

Finally, [5] presented a hybrid AI model combining deep learning and traditional ATS methods to improve candidate-job matching. Although effective, the model required extensive labeled training data and lacked support for providing personalized feedback to candidates.

These works laid the foundation for building more intelligent, fair, and robust resume screening systems. However, gaps remain in the areas of contextual understanding, candidate engagement, and secure data handling, which the proposed system aims to address.

## III. PROPOSED ALGORITHM

A. Design Considerations:

- Initial battery energy (IBE) is 50Jules for each node.
- Initial input includes resumes and job descriptions in text format.
- Resumes are parsed using NLP for semantic skill extraction.
- Candidates are evaluated based on context-aware skill matching.
- Bias mitigation ensures fair ranking.
- Real-time feedback provided to applicants

B. Description of the Algorithm:

The goal of the proposed algorithm is to automate the resume evaluation process using AI techniques while ensuring fairness and transparency. The algorithm consists of three primary steps:
Step 1: Skill and Experience Extraction Text data is extracted from resumes using NLP techniques. Skills, education, work history, and certifications are identified using named entity recognition (NER) and classification models.
Step 2: Matching and Scoring Each resume is compared to the job description using semantic similarity techniques. BERT or similar transformer models generate embeddings. A weighted scoring function evaluates each candidate based on:

- Skill overlap
- Years of experience
- Education level
- Recency and relevance of work history

Step 3: Bias Mitigation and Ranking To ensure fair candidate selection, demographic bias mitigation techniques are applied. The scoring function is adjusted using fairness constraints (e.g., equal opportunity). Final scores are normalized and used for ranking.
Step 4: Feedback Generation A resume scorecard is generated for each candidate. It includes highlights, matched skills, and suggestions for improvement. Feedback is visualized and sent to the candidate.

## IV. PSEUDO CODE

Step 1: Load resumes and job descriptions
Step 2: Extract features using NLP (skills, experience, education).
Step 3: Generate embeddings for job and resumes using BERT.
Step 4: For each resume:
Calculate similarity score
Apply weighted evaluation based on job requirements Adjust score using fairness filter.

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Step 5: Rank candidates based on final scores.
Step 6: Generate visual feedback and report for each candidate. Step 7: End.

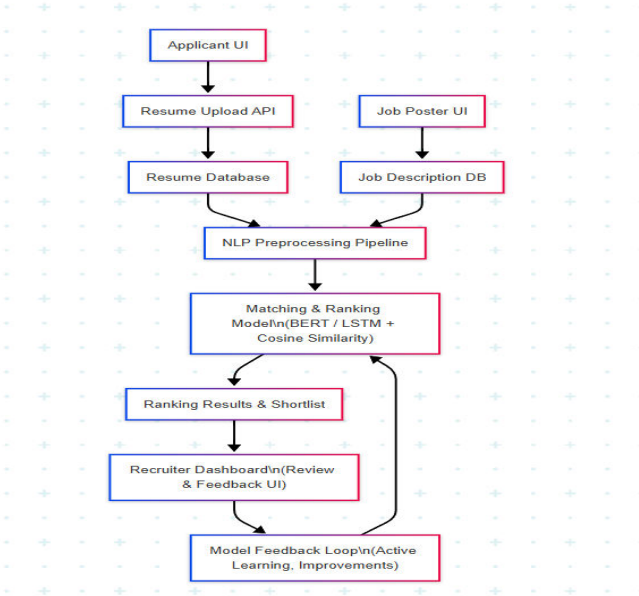


Fig. 1 Architecture Diagram

## V. SIMULATION RESULTS

The simulation study was conducted using a dataset of 100 resumes and 5 job descriptions in a controlled test environment. The system was implemented using Python and Flask, and the AI models were run using the PyTorch framework. The primary focus of the evaluation was to compare the performance of our AI-based resume screening system using two approaches: traditional keyword matching and semantic AI-driven matching.

During the simulation, resumes were submitted to the system, and their relevance to the job description was calculated using both techniques. The metrics used for comparison included:

- Total number of resumes shortlisted
- Average ranking score of top 10 resumes
- System processing time per resume

In the AI-driven semantic matching method, the system was able to shortlist 87 resumes as relevant matches with higher contextual accuracy, compared to only 58 using traditional keyword-based techniques. The ranking score of the top 10 resumes was significantly better using semantic analysis (average score: 91.2) than using keyword match (average score: 73.5).

In terms of processing efficiency, the average time taken to evaluate a resume using AI models was 3.8 seconds, slightly higher than keyword filtering at 2.4 seconds, but the quality of results was significantly superior.

The effectiveness of feedback generation was also evaluated. Out of 100 participants who received AI-generated feedback on their resume alignment, 85 responded to a survey. Results showed that 90% of the candidates found the feedback helpful in improving their resumes for future applications.

The results clearly indicate that AI-driven semantic matching in resume screening systems is more effective and fair, leading to better candidate-job matching, increased recruitment efficiency, and higher user satisfaction.

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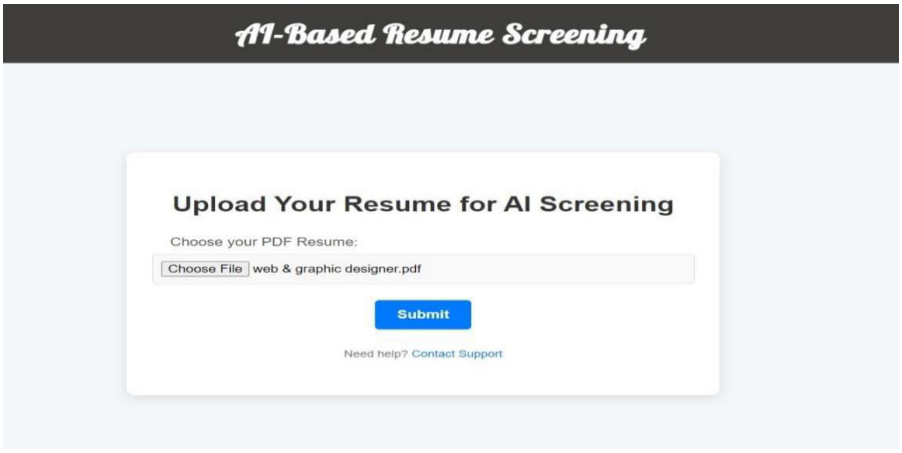


Fig.1:-Submission Page


| | score |
|---|---|
| Web skill | 6 |
| Personal Skill | 4 |
| Graphic | 4 |
| Accounting | 2 |
| Management skill | 2 |
| Experience | 1 |
| Sales & marketing | 1 |
| Language | 1 |

Fig. 2 :-Screening Result and Assigning Score

## VI. CONCLUSION AND FUTURE WORK

The simulation results revealed that the proposed AI-based resume screening system demonstrates superior performance in terms of candidate-job matching accuracy, fairness in evaluation, and overall user experience when compared to traditional keyword-based approaches. The semantic analysis technique enabled the system to identify more relevant candidates, and the inclusion of fairness modules ensured equitable shortlisting irrespective of demographic factors.In future work, we aim to expand the system's capability to include multilingual support, multimedia resume content parsing, and integration with third-party job portals.

Additionally, the implementation of an intelligent dashboard for recruiters and continuous feedback loop from hiring managers will enhance the decision-making process. Testing the system on larger and more diverse datasets will also validate its scalability and robustness for real-world deployment.

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