iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** III **Month of publication:** March 2026

DOI: https://doi.org/10.22214/ijraset.2026.78735

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue III Mar 2026- Available at www.ijraset.com

ResuScan AI-Based Resume Parser with ATS Score

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Abstract: ***In the current scenario of the job market, hundreds of resumes come in for a single position, and it is practically impossible to get the best candidates manually. ResuScan is an AI-driven system that automates this process using Natural Language Processing and Machine Learning. The system extracts important details, such as skills, education, and experience from resumes, compares them with job requirements, and generates an ATS score. It aids recruiters in shortlisting candidates more precisely and rapidly. Along with resume screening, ResuScan performs AI-driven skill assessments of candidates pertaining to practical skills. One of the strongest features of this system is its ability to provide personalized feedback to rejected candidates, suggesting other job roles or companies that would be a good fit for their skillset. The system recommends learning pathways to help users upgrade and become job-ready. Therefore, ResuScan simplifies automation by including intelligent feedback, reducing manual effort, increasing fairness in hiring, and bridging the gap in recruitment for companies and candidates in a transparent manner.***

Keywords: Artificial Intelligence (AI), Natural Language Processing (NLP), Applicant Tracking System (ATS), Resume Parsing, Keyword Extraction and Matching, Machine Learning (ML), Candidate Scoring and Ranking, AI-Based Feedback Generation, Skill Evaluation and Recommendation, and Recruitment Automation.

I. INTRODUCTION

In today's competitive job market, hundreds of resumes flow in for one particular job opening, and the job of reviewing and shortlisting them becomes cumbersome and time-consuming for recruiters. Traditional screening methods often lead to biased decisions and overlooked talent because resumes may not perfectly match job descriptions or include the right keywords.

ResuScan is an AI-driven system for resume parsing and scoring that was developed to address the challenges discussed above. It employs AI and NLP to automatically extract the most relevant details from resumes, such as the skills, education, and experience. It further assesses these details against the requirements of a particular job and generates an applicant tracking system score, which indicates how well a candidate fits a specific role.

Unique to ResuScan is its candidate-centric approach: it not only offers ranking and shortlisting of candidates but also provides personalized feedback and skill improvement suggestions for applicants. This not only helps recruiters find the right talent quickly but also assists candidates in understanding and enhancing their profiles for future opportunities.

By combining automation, transparency, and equity, ResuScan offers both employers and job seekers an opportunity for smarter and more effective recruitment based on data-driven decisions and unbiased evaluations.

II. OBJECTIVES

To develop an AI-based system that can read and comprehend resumes automatically.
To extract relevant information from resumes, such as names, contacts, skills, education, and experience,
To compare the resume content with a job description and calculate an Applicant Tracking System (ATS) score.
To assist job seekersin improving their resumes for better job matching.
Shortlisting suitable candidates to help recruiters.
This candecrease manual effort and save time in the screening process of candidate resumes.
To increase fairness and accuracy in candidate selection through AI technology.

III. LITERATURE SURVEY

The advancement of Artificial Intelligence (AI) and Natural Language Processing (NLP) has significantly transformed the recruitment landscape. Several studies have focused on automating the resume screening process through AI-driven systems, enabling faster and more reliable candidate evaluation.

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D. Tiwari et al. [1] developed an AI-based resume analyzer capable of structuring candidate information such as educational background, technical skills, and professional experience. Their system utilized NLP for converting unstructured text into machine-readable data; however, its accuracy was restricted by variations in resume templates. ReSuScan extends this idea by incorporating a robust preprocessing mechanism that enhances performance across diverse formats.

S. Amin et al. [2] proposed a web-based resume screening application integrating AI-based keyword matching to automate candidate filtering. While their work demonstrated efficiency in preliminary shortlisting, it lacked contextual understanding. The ReSuScan system improves upon this by introducing semantic keyword extraction and relevance-based evaluation using NLP.

J. Nanajkar et al. [3] implemented an NLP-powered Applicant Tracking System (ATS) that computed similarity between job descriptions and candidate profiles. Their approach emphasized bias reduction through automated ranking. ReSuScan builds further by combining keyword-based and context-based analysis to achieve multidimensional candidate scoring.

M. B. Gunjal et al. [4] presented a comprehensive review of AI-enabled resume parsers and highlighted challenges in handling non-standardized datasets. Their analysis revealed that most systems perform well with structured input but degrade with real-world data. ReSuScan addresses this limitation through adaptive NLP pipelines capable of normalizing irregular resume structures.

M. S. K. S. Shinan et al. [5] introduced a machine-learning-based model for resume classification, categorizing applicants according to skills and experience. ReSuScan integrates this idea with feedback generation, enabling dynamic recommendations for alternate roles and upskilling paths.

V. Mohod et al. [6] proposed an AI feedback system that provided improvement suggestions to candidates. This inspired the ReSuScan feedback module, which produces detailed performance insights and targeted learning recommendations.

K. O. V. Anusha et al. [7] explored personality-oriented candidate shortlisting using ML and NLP. Their findings emphasized the potential of soft-skill analysis in recruitment. ReSuScan incorporates similar principles to expand beyond technical evaluation and consider holistic candidate attributes in its future scope.

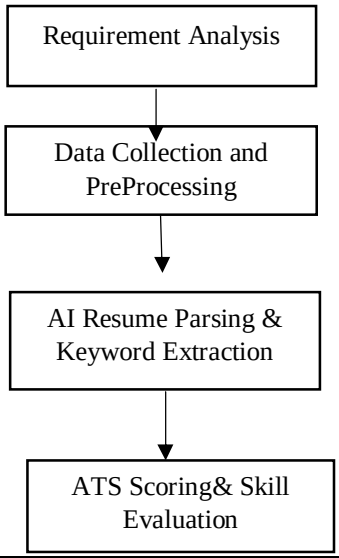
Recent advances in transformer-based language models such as BERT [8] have further enhanced contextual understanding in resume analysis. By leveraging semantic embeddings and contextual similarity metrics, systems like ReSuScan can achieve higher precision in skill–job matching, leading to more equitable and data-driven hiring outcomes.

Summary:

The reviewed literature indicates that while prior research has successfully applied AI and NLP for resume automation, persistent challenges remain in adaptability, context comprehension, and candidate feedback mechanisms. ReSuScan addresses these limitations through a hybrid design that combines ATS scoring, semantic NLP, and AI-guided feedback for a more transparent and intelligent recruitment system.

IV. METHODOLOGY

The proposed system ResuScan applies Artificial Intelligence (AI) and Natural Language Processing (NLP) to automate the process of resume screening and evaluation. The methodology consists of several structured phases that ensure efficient and accurate recruitment automation.



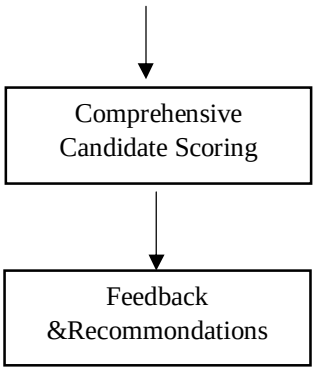


Fig.1.: System Architecture

1) Requirement Analysis - This phase identifies the pitfalls in traditional workflows of recruitment, such as delays in manual screening and biases in candidate selection. Similarly, the system's requirements are outlined in terms of resume evaluation automation, fairness in scoring, and actionable insights for both recruiters and applicants.

2) Data Collection and Preprocessing - Different formats of resumes are gathered: PDF, DOCX, and so on. Preprocessing involves text normalization, removal of special symbols, case conversion, and tokenization. The objective is to establish data uniformity so that feature extraction will be consistent across heterogeneous structures.

3) Resume Parsing and Keyword Extraction - The advanced NLP techniques in this system extract key entities, including contact details, education, skills, certifications, and work experience. It includes a variety of techniques such as Named Entity Recognition (NER) and part-of-speech tagging. The extracted entities are then matched to the job description by way of semantic similarity analysis, which allows the contextual alignment rather than just keyword frequency counting.

4) ATS Scoring and Skill Evaluation - An ATS-based scoring mechanism evaluates resumes on three dimensions:

- Skill relevance: how well the candidate's skills align with the requirements of the job.
- Experience correlation: contextual similarity between prior roles and target position.
- Keyword importance: weighted importance of key technical and soft skills.

The system also incorporates a topic-based assessment module, which tests practical proficiency through quizzes or coding tests. The combination of these results yields a more reliable candidate performance index.

5) Overall Candidate Score - Scores from both the ATS and assessment results are combined into a single Candidate Proficiency Score (CPS). This provides an unbiased, data-driven ranking of applicants, allowing recruiters to more effectively identify the best candidates.

6) Feedback Generation and Recommendations - Those candidates who do not qualify for the next stage receive AI-generated feedback, which points out areas for improvement, missing skills, or weak keywords.
It will also suggest alternative job roles or companies that are a better fit for the candidates' current skillset and make recommendations on upskilling.

7) Recruiter Dashboard & System Integration - It automatically generates personalized improvement feedback for non-qualified candidates. Then, using the extracted profile and job match data, it suggests other job roles and upskilling resources that are aligned with the existing competencies of the candidate, thus making sure of a constructive and transparent recruitment cycle.

The overall workflow of ResuScan is shown in Fig. 1 (System Architecture).

8) Technologies used

Category	Technologies / Tools
Frontend	Next.js, HTML, CSS, TypeScript
Backend	Python, FastAPI,Framework
Database	Firebase Firestore
AI/NLP Libraries	spaCy, scikit-learn,

	Groq API
Version Control	Git, GitHub
Testing & Deployment	Postman, Heroku,Uvicorn

9) Workflow Summary

- Acquire and preprocess resume datasets.
- Perform entity extraction and semantic keyword mapping.
- Compute ATS and skill-based scores.
- Merge scores to form a composite ranking.
- Generate recruiter insights and candidate feedback.
- Recommend alternative opportunities for improvement.

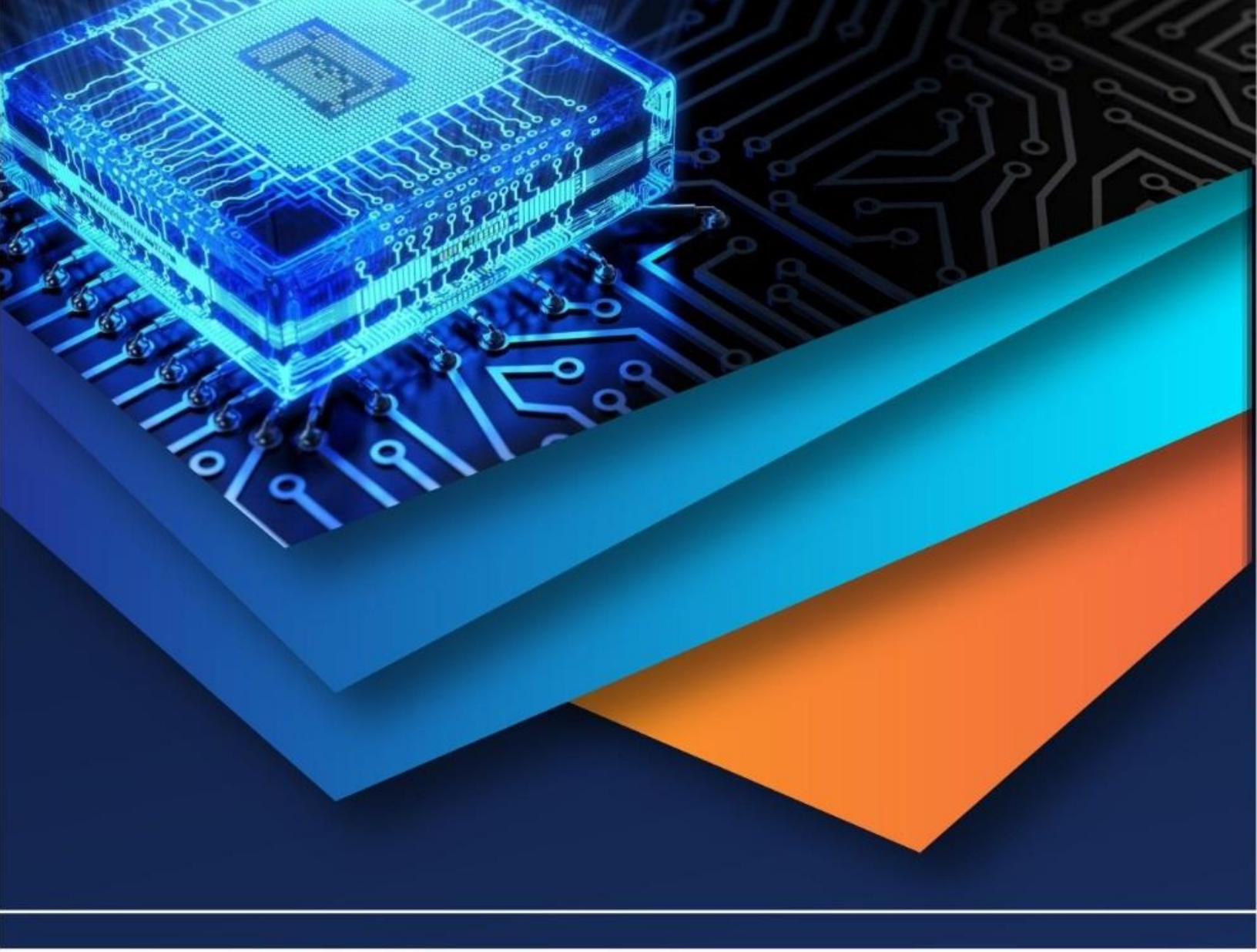
V. CONCLUSION

The AI Resume Analyzer project explains how AI and NLP can make a difference in hiring. It does so by automating the resume-checking process, saving a lot of time and effort for recruiters in an organization. Instead of reading every resume manually, the system quickly analyzes them and generates unbiased, data-based results for every candidate. Making the initial stage of hiring easier and faster, it also provides useful suggestions and insights helpful for both recruiters and job seekers. There is still some scope for improvements regarding different formats of resumes and reduction of bias in the system itself, but that can be achieved over time with updates and new technologies. Al-based ATS automates resume parsing, keyword matching, and candidate ranking to work through thousands of applications and find the most relevant profiles.

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