

SRS-WA: Smart Resume Screening Web Application

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Abstract - The recruitment process often requires screening a large number of resumes, making candidate selection time-consuming and prone to human bias. This paper presents ResumeIQ, a Smart Resume Screening Web Application designed to automate resume analysis and candidate ranking using Artificial Intelligence (AI) and Natural Language Processing (NLP). The proposed system provides separate modules for students and recruiters. Students can evaluate their resumes through an ATS simulation system, identify missing skills, and receive improvement suggestions, while recruiters can upload job descriptions and multiple resumes for automated screening. The system extracts candidate information, performs keyword and semantic similarity matching, and generates ranking scores based on job relevance. Additional features such as skill-gap analysis, candidate comparison, analytics dashboards, and report generation enhance the recruitment process. Experimental results demonstrate that the system significantly reduces screening time, improves candidate-job matching accuracy, and provides actionable insights for both recruiters and job seekers. The proposed solution offers an efficient, scalable, and user-friendly approach to modern recruitment and resume evaluation.

Key Words: Artificial Intelligence, Natural Language Processing, Resume Screening, ATS, Candidate Ranking, Recruitment Automation

1. INTRODUCTION

In today's competitive job market, organizations receive a large number of applications for every job opening. Manually screening resumes to identify suitable candidates is a time-consuming, repetitive, and often subjective process. Traditional recruitment methods may overlook qualified candidates due to human error, inconsistent evaluation, or the inability to process large volumes of applications efficiently.

To address these challenges, this paper presents **ResumeIQ**, a Smart Resume Screening Web Application that leverages Artificial Intelligence (AI) and Natural Language Processing (NLP) to automate resume analysis and candidate ranking. The system enables recruiters to upload job descriptions and multiple resumes,

automatically extract relevant information such as skills, education, and experience, and evaluate candidates based on keyword matching and semantic similarity techniques. In addition to recruiter-focused features, the platform provides students with an Applicant Tracking System (ATS) simulation tool that evaluates resume quality, identifies skill gaps, and offers personalized recommendations for improvement. By integrating resume parsing, intelligent scoring, candidate ranking, analytics, and AI-assisted feedback into a single platform, the proposed system aims to improve recruitment efficiency, reduce screening time, and support better hiring decisions.

The Smart Resume Screening Web Application serves as a comprehensive solution for both recruiters and job seekers, enhancing the overall recruitment and career development process.

2. LITERATURE REVIEW

Resume screening is a critical stage in the recruitment process, where recruiters evaluate candidate resumes to identify suitable applicants. Traditional manual screening methods are time-consuming, prone to human bias, and difficult to scale when handling large numbers of applications. To overcome these limitations, researchers have proposed various automated resume screening approaches.

Early resume screening systems relied on keyword-based matching techniques, where resumes were ranked according to the occurrence of keywords present in job descriptions. Although effective for simple filtering, these systems often failed to capture the contextual meaning of candidate skills and experiences.

Recent advancements in Natural Language Processing (NLP) and Machine Learning (ML) have significantly improved resume analysis. Techniques such as TF-IDF, cosine similarity, and semantic matching enable systems to evaluate resumes based on both keyword relevance and contextual understanding. Modern AI-based recruitment systems can automatically extract candidate information, identify skill gaps, rank applicants, and provide intelligent recommendations.

The proposed ResumeIQ system builds upon these advancements by combining resume parsing, ATS

simulation, semantic similarity scoring, candidate ranking, and AI-assisted feedback into a unified web platform for both recruiters and job seekers.

3. RESEARCH OBJECTIVES

The primary objective of this research is to develop a Smart Resume Screening Web Application that automates resume analysis and candidate evaluation using Artificial Intelligence (AI) and Natural Language Processing (NLP) techniques.

The specific objectives of the proposed system are:

1. To design and develop a web-based platform that supports separate functionalities for recruiters and job seekers.
2. To implement resume parsing techniques for extracting important information such as skills, education, experience, and contact details from resumes.
3. To develop an ATS (Applicant Tracking System) simulation module that evaluates resume quality and provides improvement suggestions to students.
4. To implement keyword matching and semantic similarity techniques for comparing resumes with job descriptions.
5. To automate candidate ranking based on relevance scores and job requirements.
6. To provide skill-gap analysis and personalized recommendations for improving resume effectiveness.
7. To enable recruiters to process multiple resumes simultaneously and reduce manual screening effort.
8. To generate analytical reports and visualizations that assist recruiters in making informed hiring decisions.
9. To improve the efficiency, accuracy, and fairness of the recruitment process through intelligent automation.

4. METHODOLOGY

The methodology of this project describes the systematic process followed to design, develop, and implement the ResumeIQ: Smart Resume Screening Web Application. The methodology combines software engineering principles, Artificial Intelligence (AI), and Natural Language Processing (NLP) techniques to provide an intelligent and efficient recruitment solution.

1. Research and System Analysis

The first step involved analyzing the challenges faced by recruiters and job seekers in the recruitment process. Manual resume screening was identified as time-consuming, inconsistent, and difficult to scale. A study of existing ATS and recruitment systems was conducted to identify limitations and define the requirements of the proposed system.

2. System Development Model

The project follows the Waterfall Model of software development because it provides a clear and structured approach for academic projects. The stages include:

1. Requirement Analysis – Identify functional and non-functional requirements such as resume upload, ATS evaluation, candidate ranking, and report generation.
2. System Design – Create system architecture, database schema, user interfaces, and workflow diagrams.
3. Implementation – Develop frontend, backend, database integration, and AI-based scoring modules.
4. Testing – Validate system functionality, performance, and usability.
5. Deployment and Maintenance – Deploy the application and perform future enhancements.

3. System Architecture

The proposed system follows a three-tier architecture consisting of:

- **Presentation Layer (Frontend)** – Provides separate dashboards for students and recruiters.
- **Application Layer (Backend)** – Handles authentication, resume parsing, ATS scoring, candidate ranking, and business logic.
- **Data Layer (Database & File Storage)** – Stores user information, resumes, job descriptions, simulation history, and screening results.

Workflow Overview:

1. User logs in as Student or Recruiter.
2. Students upload resumes for ATS evaluation, while recruiters upload job descriptions and resumes.
3. The system extracts text and candidate information from uploaded resumes.
4. NLP techniques process and analyze resume content.

5. Keyword matching and semantic similarity algorithms calculate relevance scores.
6. Candidates are ranked according to job requirements.
7. Results, analytics, and recommendations are displayed on the dashboard.

4. Modules of the System

a. User Module

- Handles registration, login, and role-based authentication.
- Provides secure access to student and recruiter dashboards.

b. Resume Parsing Module

- Supports PDF, DOCX, and TXT files.
- Extracts candidate details such as skills, education, and experience.

c. ATS Simulation Module

- Allows students to compare resumes against job descriptions.
- Generates ATS scores and improvement suggestions.

d. Matching and Ranking Module

- Uses keyword matching and semantic similarity techniques.
- Calculates candidate scores and ranks applicants automatically.

e. Analytics and Reporting Module

- Displays score distributions, skill analysis, and candidate comparisons.
- Supports report generation in PDF and Excel formats.

f. Communication Module

- Enables recruiters to send personalized emails to shortlisted candidates.
- Supports bulk communication through predefined templates.

5. IMPLEMENTATION

The ResumeIQ system was implemented as a full-stack web application that integrates resume parsing, ATS evaluation, candidate ranking, and recruitment management into a unified platform. The implementation consists of frontend, backend, database, and AI-powered processing modules.

1. Technologies Used

The frontend of the application was developed using React.js and Tailwind CSS to provide a responsive and interactive user interface. The backend was built using Node.js and Express.js for handling business logic and API services. MongoDB was used as the database for storing user information, resumes, job descriptions, and screening results. Authentication and authorization were implemented using JSON Web Tokens (JWT) and Bcrypt password hashing.

2. Student Module Implementation

The Student Module allows users to upload resumes in PDF, DOCX, or TXT formats. The system extracts resume information, including skills, education, and experience, and displays ATS-readiness feedback. Students can compare their resumes against a target job description, receive ATS scores, identify missing skills, and obtain recommendations for improvement. Simulation history is maintained to help users track their progress over time.

3. Recruiter Module Implementation

The Recruiter Module enables recruiters to create job descriptions and upload multiple resumes through ZIP files. The system automatically extracts candidate information, evaluates resumes against job requirements, and generates ranking scores. Recruiters can compare candidates, view analytics dashboards, export reports, and send personalized emails to shortlisted applicants.

4. Resume Parsing and NLP Implementation

Resume parsing is performed using document processing libraries capable of extracting text from PDF, DOCX, and TXT files. Natural Language Processing (NLP) techniques such as tokenization, stop-word removal, and skill extraction are applied to identify relevant candidate information. Extracted skills are categorized and stored for further analysis.

5. ATS Scoring and Ranking Implementation

The ATS scoring mechanism combines keyword matching and semantic similarity techniques to evaluate resume relevance. The total score is calculated using a weighted formula:

Total Score = $0.6 \times \text{Keyword Score} + 0.4 \times \text{Semantic Score}$

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Candidates are ranked according to their final scores, enabling recruiters to identify the most suitable applicants efficiently.

6. Database Implementation

MongoDB is used to manage application data through multiple collections, including Users, Job Descriptions, Simulations, and Screening Batches. The database stores user profiles, parsed resume information, ATS results, candidate rankings, and historical screening records.

7. Analytics and Reporting Implementation

The system provides visual analytics such as score distributions, candidate comparisons, and skill analysis charts. Recruiters can export screening results in PDF and Excel formats for documentation and decision-making purposes. These features enhance the usability and effectiveness of the recruitment process.

6. RESULTS AND DISCUSSION

The proposed ResumeIQ system was successfully developed and tested for both student and recruiter functionalities. The application was able to process resumes in PDF, DOCX, and TXT formats, extract relevant candidate information, and generate ATS evaluation scores based on job requirements.

The Student Module successfully analyzed uploaded resumes and provided ATS scores, missing skill identification, resume improvement suggestions, and simulation history tracking. Users were able to compare their resumes against specific job descriptions and receive actionable feedback for enhancing employability.

The Recruiter Module effectively automated the resume screening process by processing multiple resumes simultaneously. The system extracted candidate information, calculated matching scores using keyword matching and semantic similarity techniques, and ranked candidates according to job relevance. This significantly reduced the time required for manual screening and improved candidate shortlisting efficiency.

The analytics dashboard provided visual insights into candidate performance through charts, score distributions, and skill analysis. Features such as candidate comparison, report generation, and bulk email communication further enhanced recruiter productivity.

Experimental evaluation demonstrated that the proposed system provides accurate resume-job matching, reduces recruitment effort, and offers valuable guidance for both recruiters and job seekers. The integration of ATS evaluation, NLP-based resume analysis, and automated

ranking contributes to a more efficient and intelligent recruitment process.

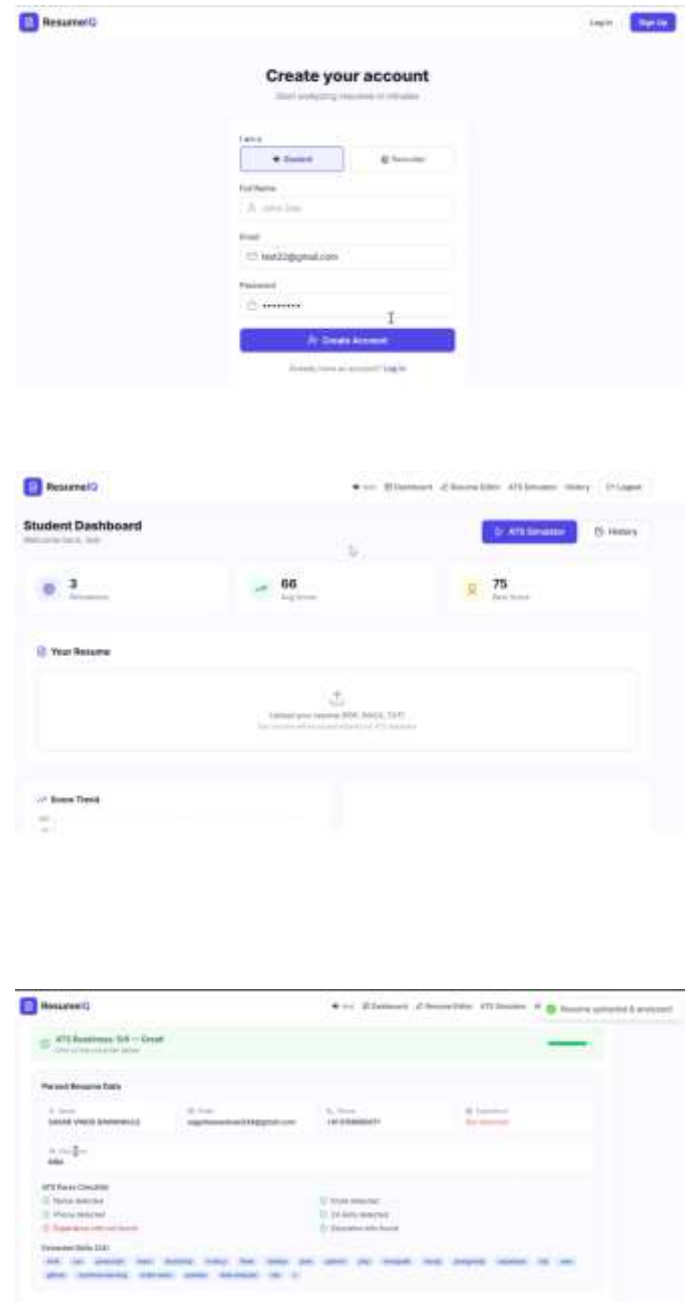


Table 1: Candidate Ranking Based on ATS Scores

Candidate	Keyword Score	Semantic Score	Total Score
Candidate A	90	85	88
Candidate B	82	80	81
Candidate C	75	72	74

enables faster candidate shortlisting and more efficient hiring decisions.

In conclusion, ResumeIQ provides an intelligent, user-friendly, and scalable approach to recruitment automation. Future enhancements may include advanced AI models, improved semantic analysis, and cloud-based deployment for large-scale applications.

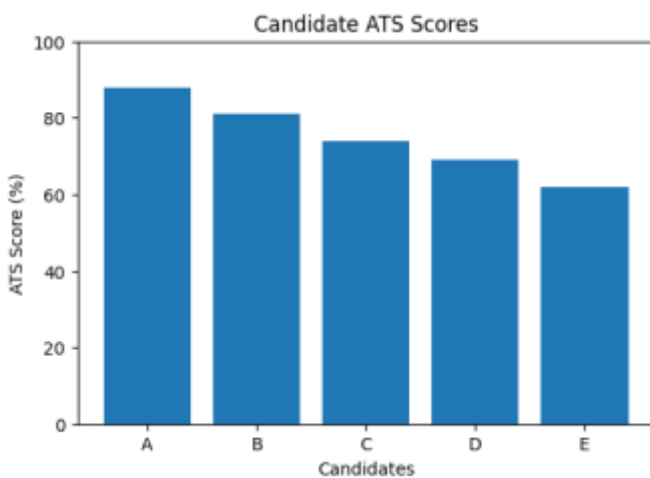


Fig. 1: Candidate ATS Score Distribution

3. CONCLUSIONS

The ResumeIQ: Smart Resume Screening Web Application demonstrates the effective use of Artificial Intelligence (AI) and Natural Language Processing (NLP) in automating resume evaluation and candidate selection. The system simplifies the recruitment process by performing resume parsing, ATS scoring, candidate ranking, and skill-gap analysis.

The proposed solution benefits both recruiters and job seekers by reducing manual effort, improving screening accuracy, and providing valuable feedback for resume improvement. Experimental results show that the system

REFERENCES

- Devlin, J., Chang, M. W., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding. Proceedings of NAACL-HLT, 4171–4186.
- Reimers, N., & Gurevych, I. (2019). Sentence-BERT: Sentence Embeddings using Siamese BERT-Networks. Proceedings of EMNLP-IJCNLP, 3982–3992.
- Kumar, M., Sharma, A., & Singh, P. (2020). Resume Ranking System using TF-IDF and Cosine Similarity for Recruitment Automation. International Journal of Computer Applications, 176(25), 15–20.
- Smart Hiring System using Artificial Intelligence. International Journal of Engineering Research & Technology (IJERT), 2022.