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Resume Analyser Using NLP

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Abstract: Resume Analyser Using Natural Language Processing (NLP) is an intelligent system developed to automate resume screening and candidate evaluation. The system extracts important details such as skills, education, projects, certifications, and experience from resumes and compares them with job descriptions using Machine Learning and NLP techniques. TF-IDF vectorization and cosine similarity are used to calculate ATS scores and identify matching and missing skills. The proposed system improves recruitment efficiency, reduces manual effort, and helps candidates improve resume quality for better job opportunities.

I. INTRODUCTION

Recruitment is one of the most important processes in organizations, where recruiters must evaluate large numbers of resumes to identify suitable candidates. Traditional resume screening methods are manual, time-consuming, and prone to human error. Applicant Tracking Systems (ATS) are widely used in modern recruitment, but many systems depend only on keyword matching and fail to provide accurate analysis.

Natural Language Processing (NLP) and Machine Learning techniques have improved automated recruitment systems significantly. The proposed Resume Analyser Using NLP automatically extracts resume content, compares resumes with job descriptions, calculates ATS scores, identifies missing skills, and provides intelligent suggestions for improvement. The system helps both recruiters and job seekers by improving hiring efficiency and resume quality.

II. RELATED WORK

Several research works have focused on AI-based recruitment and resume analysis systems. Existing systems use Machine Learning, NLP, BERT embeddings, TF-IDF vectorization, and cosine similarity for candidate evaluation. Recent studies also focus on explainable AI and deep learning-based resume screening systems. These methods improve recruitment accuracy and reduce manual effort.

III. PROBLEM FORMULATION

Traditional recruitment systems require recruiters to manually screen resumes, which consumes significant time and may result in inconsistent candidate selection. Existing ATS systems mainly depend on keyword matching and do not provide detailed feedback to job seekers. The proposed system aims to automate resume analysis using NLP techniques and generate ATS scores, skill analysis, and resume improvement suggestions.

IV. PROPOSED SYSTEM ARCHITECTURE

The proposed system consists of multiple modules including resume upload, text extraction, preprocessing, skill extraction, ATS scoring, candidate ranking, and visualization. The uploaded resumes are processed using NLP techniques, and semantic similarity between resume and job description is calculated using TF-IDF vectorization and cosine similarity.

The system architecture includes:

1. Presentation Layer
2. 2. Application Layer
3. 3. Data Processing Layer
4. 4. Visualization Layer
5. 5. Output Layer

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V. METHODOLOGY

The methodology of the proposed system includes the following steps:

1. Resume Upload: Users upload resumes in PDF format.
2. Text Extraction: PyPDF2 extracts textual data from resumes.
3. Text Preprocessing: NLP preprocessing techniques such as tokenization, stop-word removal, and cleaning are applied.
4. Skill Extraction: Technical and soft skills are identified using a predefined skill database.
5. TF-IDF Vectorization: Resume and job description texts are converted into numerical vectors.
6. Cosine Similarity: Semantic similarity between resume and job description is calculated.
7. ATS Score Calculation: Scores are generated based on skill matching, keyword relevance, and resume quality.
8. Visualization: Results are displayed using charts, gauges, and word clouds.

VI. IMPLEMENTATION DETAILS

The system is implemented using Python and Streamlit. Scikit-learn is used for Machine Learning operations such as TF-IDF vectorization and cosine similarity. NLTK is used for Natural Language Processing tasks. Plotly and Matplotlib are used for visualization, while Pandas and NumPy are used for data processing.

VII. RESULTS AND DISCUSSION

The proposed system successfully analyzes resumes and compares them with job descriptions. ATS scores are generated accurately, and the system identifies matching and missing skills effectively. Multiple resume comparison and candidate ranking features improve recruitment efficiency. Visualization dashboards help users understand analysis results clearly.

VIII. FUTURE SCOPE

Future enhancements include deep learning integration, GPT-based resume analysis, OCR support for image-based resumes, cloud deployment, and integration with real-time recruitment portals. The system can also be extended to support multilingual resume analysis.

IX. CONCLUSION

The Resume Analyser Using NLP provides an intelligent solution for automated recruitment systems. By integrating NLP and Machine Learning techniques, the system improves hiring accuracy, reduces recruiter workload, and helps candidates improve their resumes for better ATS compatibility. The proposed system is efficient, scalable, and highly relevant for modern recruitment industries.

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Snapshots and Results

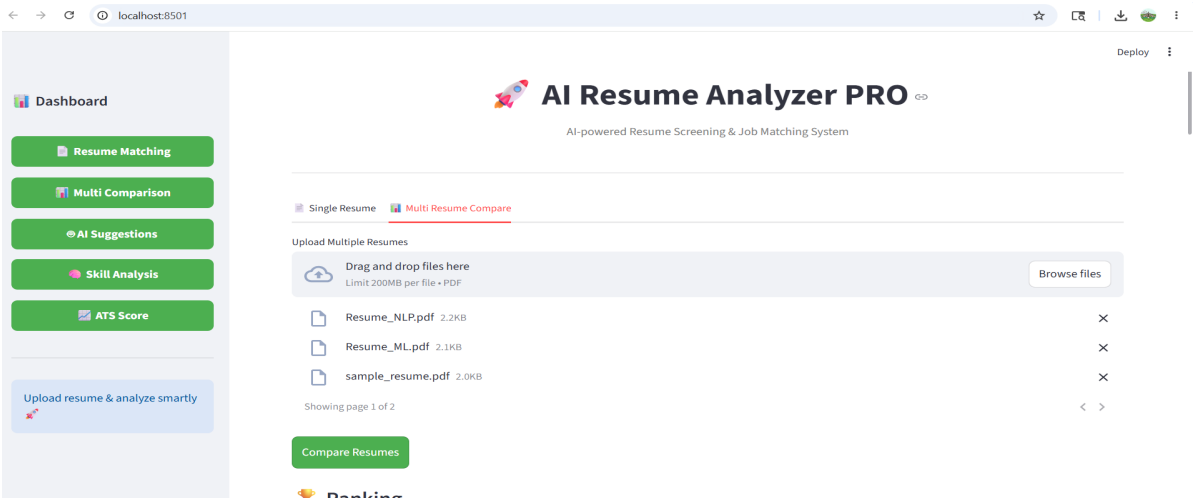


Figure 1: Multi Resume Upload

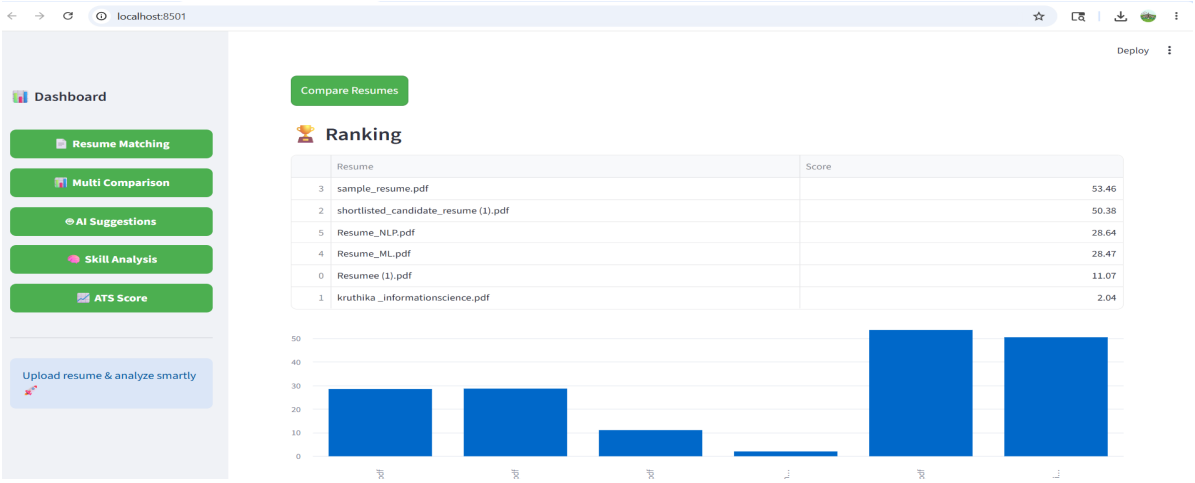


Figure 2: Resume Ranking

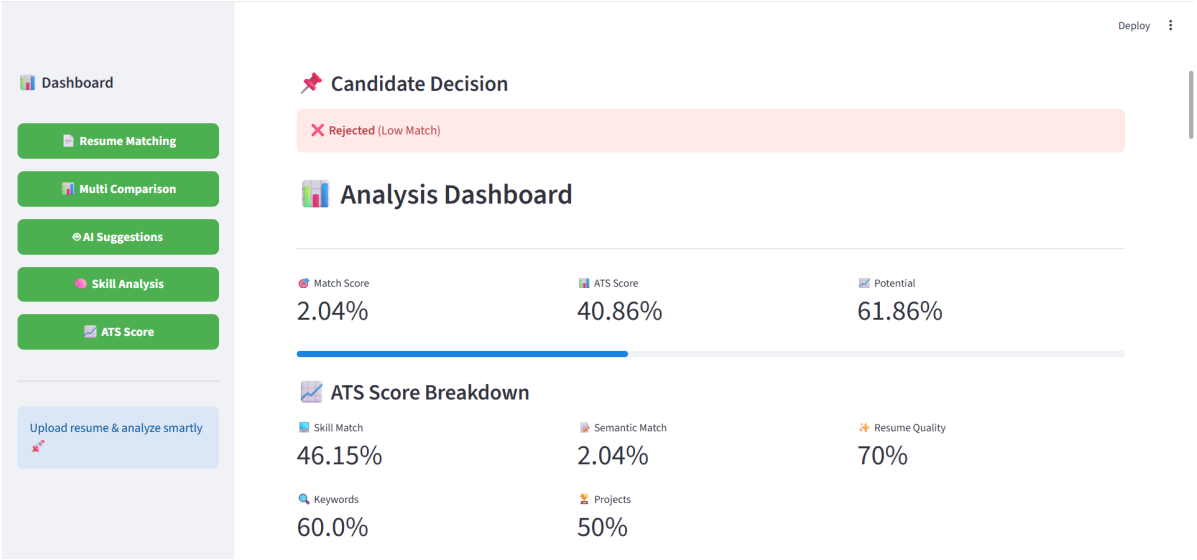


Figure 3: Candidate Decision Dashboard

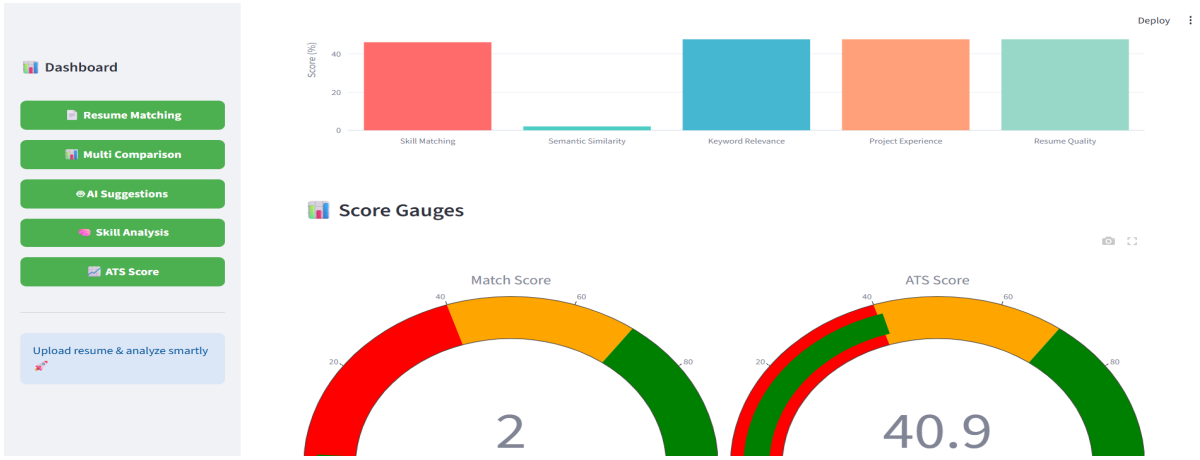


Figure 4: ATS Score Gauges

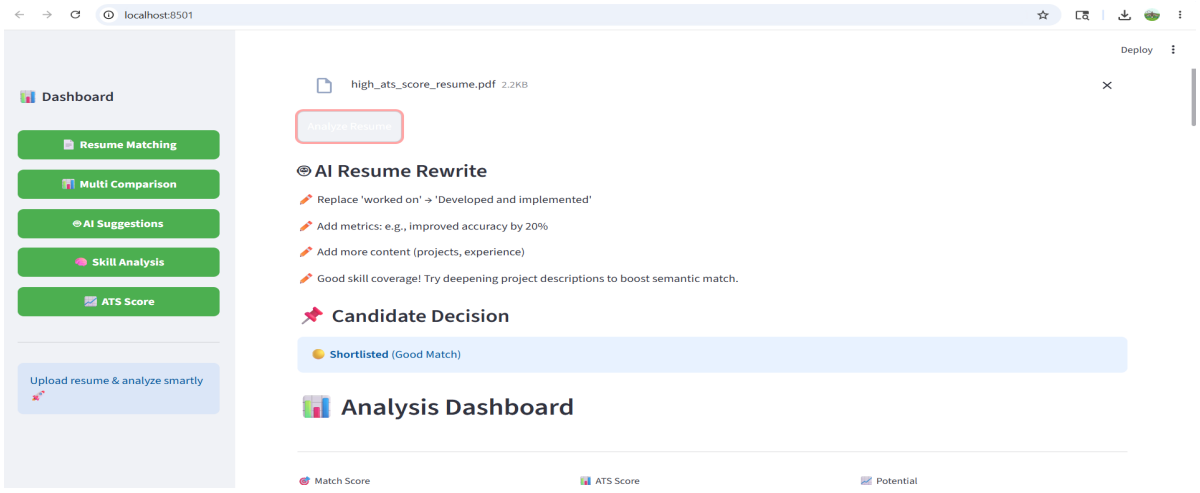


Figure 5: AI Resume Rewrite Suggestions

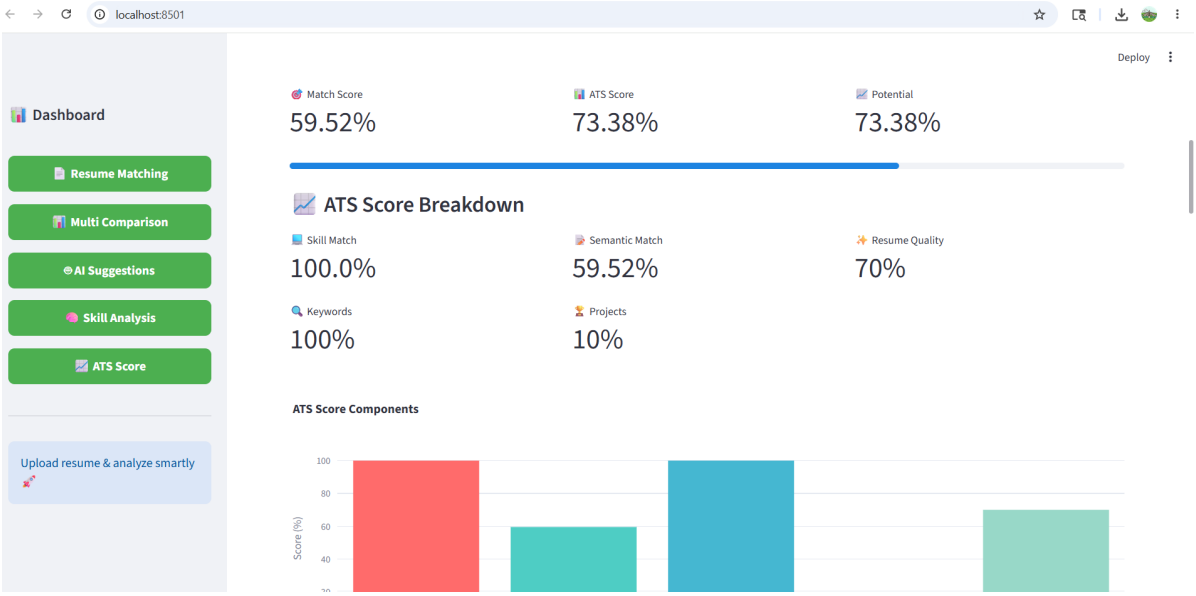


Figure 6: ATS Score Breakdown

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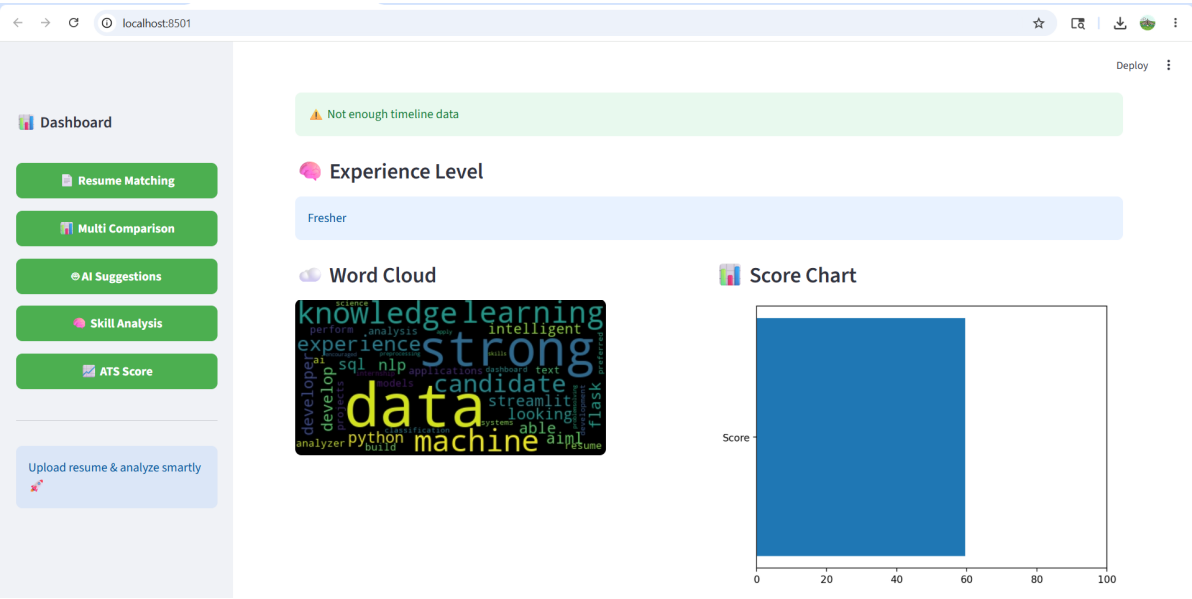


Figure 7: Word Cloud and Score Chart

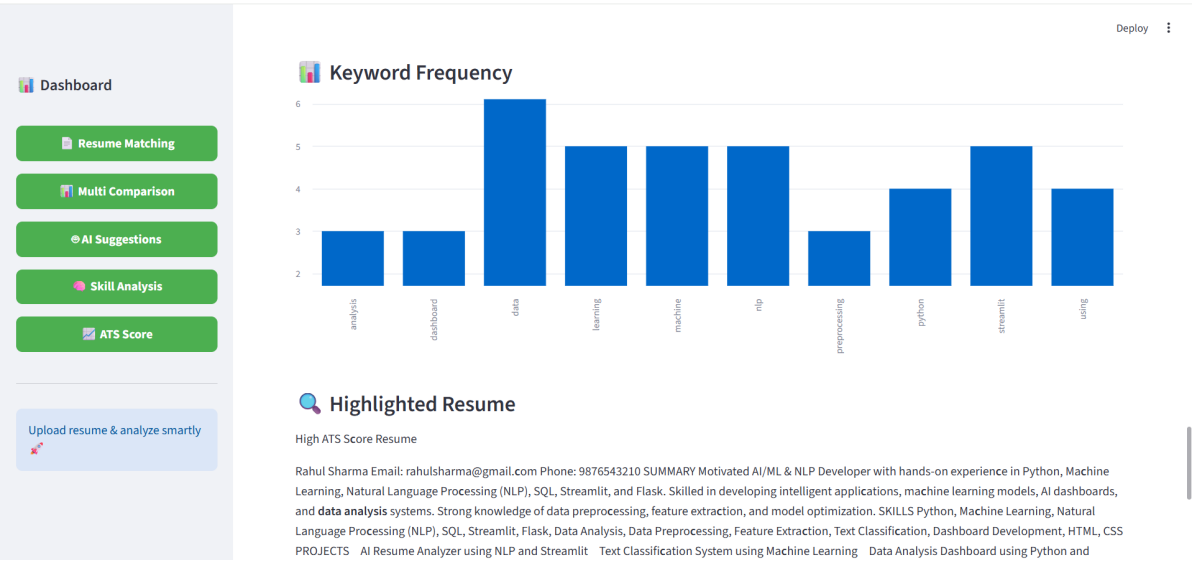
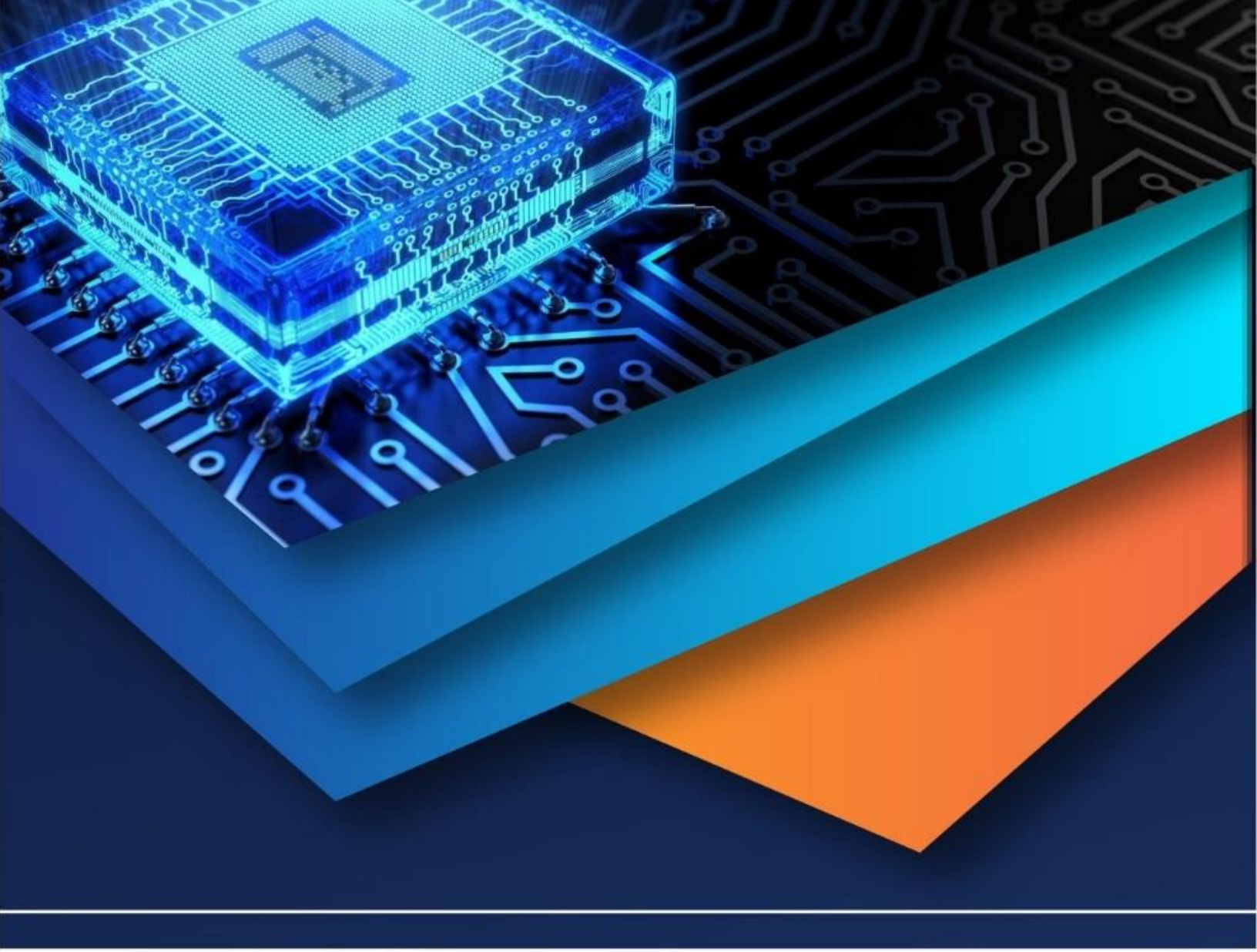


Figure 8: Keyword Frequency and Highlighted Resume

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