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AI Powered Career Guidance System with Intelligent Job Recommendation

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Abstract: ***The AI Resume Analyzer System is an intelligent application designed to assist students and job seekers in improving their employability by analyzing re- sumes using advanced Artificial Intelligence techniques. This system evaluates resumes based on key parameters such as skills, keywords, specialization, and formatting, and provides meaningful insights to enhance the overall quality of the resume. The proposed system automatically extracts important information from uploaded resumes and compares it with industry-relevant keywords and job requirements. It identifies missing skills, suggests improvements, and cate- gorizes candidates based on their suitability for different job sectors, including both government and private jobs. The system also provides personalized recommendations to help users align their resumes with specific job roles. In addition, the platform includes predefined resume templates, enabling users to create professional resumes easily. All user data and analysis results are securely stored in the backend for future reference. The system presents results through visual indicators such as score meters, bar charts, and performance analytics, making it easy for users to understand their strengths and areas for improvement.***

By leveraging AI and Natural Language Processing (NLP), this system simplifies the resume evaluation process and empowers users to build stronger resumes, ultimately increasing their chances of securing suitable job opportunities.

Index Terms: AI Resume Analyzer, Career Guidance, NLP, Job Recommendation, Skill Gap Analysis, ATS, Machine Learning, Resume Parsing, Job Classification.

I. INTRODUCTION

In the modern competitive job market, students and job seekers often face challenges in tailoring their resumes to meet specific industry standards and appli- cant tracking system (ATS) requirements. Traditional resume screening methods are time-consuming and often fail to provide actionable feedback. To address this gap, this project proposes the development of an AI Resume Analyzer, a comprehensive web-based platform designed to assist students in optimizing their resumes for both government and private sector opportunities.

In today's competitive job market, creating an ef- fective and professional resume is a critical step for students and job seekers to secure employment opportunities. Many candidates face difficulties in identify- ing the right skills, keywords, and formatting required to match industry standards. As a result, resumes often fail to pass initial screening processes, especially with the increasing use of automated Applicant Tracking Systems (ATS) by companies. This creates a need for an intelligent system that can guide users in building optimized and job-oriented resumes.

The AI Resume Analyzer System is developed to address this challenge by utilizing Artificial Intelli- gence (AI) and Natural Language Processing (NLP) techniques to evaluate and enhance resumes. The system allows users to upload their resumes, after which it automatically analyzes the content to extract key information such as skills, education, experience, and specialization. Based on this analysis, the system compares the resume with industry requirements and identifies missing keywords and areas of improvement. One of the key features of this system is its ability to provide personalized recommendations. It suggests relevant skills, highlights gaps, and guides users to improve their resumes according to specific job categories, including both government and private sector jobs. Additionally, the system offers predefined resume templates, enabling users to create professional resumes with ease. The system also includes a visual representation of results, such as score meters, bar charts, and perfor- mance indicators, which help users clearly understand their strengths and weaknesses. All data and analysis results are stored securely in the backend, allowing users to track their progress over time.

By integrating AI-driven analysis with user-friendly features, the AI Resume Analyzer System simplifies the resume-building process and enhances the chances of job selection. This project aims to bridge the gap between candidates' skills and industry expectations, ultimately supporting students in achieving better ca- reer opportunities.

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II. LITERATURE SURVEY

A. AI-Based Resume Screening and Candidate Selec- tion System

Author: Sarah Johnson (2023)

In "AI-Based Resume Screening and Candidate Se- lection System," Sarah Johnson explores the trans- formative role of artificial intelligence in automat- ing the initial stages of recruitment. The research highlights how traditional resume screening methods are often plagued by human bias, inconsistency, and inefficiency, leading to qualified candidates being over- looked. Johnson's work focuses on the development of machine learning models capable of parsing resumes, extracting relevant skills, and ranking candidates based on job description compatibility. The paper examines various NLP techniques such as tokenization, named entity recognition, and semantic similarity matching to improve the accuracy of candidate-job alignment. Additionally, the study addresses the ethical impli- cations of AI in recruitment, emphasizing the need for transparency and fairness in algorithmic decision- making.

B. Keyword Extraction Techniques for Resume Parsing Using Natural Language Processing

Author: David Kim and Priya Sharma (2023)

In "Keyword Extraction Techniques for Resume Parsing Using Natural Language Processing," Kim and Sharma investigate the critical role of keyword iden- tification in automated resume analysis. The authors evaluate multiple NLP approaches, including TF-IDF, word embeddings, and transformer-based models like BERT, to determine their effectiveness in identifying domain-specific keywords from unstructured resume data. The research also explores the challenges posed by variations in terminology, such as synonyms, ab- breviations, and industry-specific jargon, and proposes techniques for normalization and context-aware extraction.

C. Visual Analytics for Career Guidance: A Data- Driven Approach

Author: Michael Chen (2024)

In "Visual Analytics for Career Guidance: A Data- Driven Approach," Michael Chen explores the ap- plication of data visualization techniques to support career decision-making processes. Chen's work in- vestigates the effectiveness of various visualization tools, including meter charts, bar graphs, and radar diagrams, in conveying resume strength, skill gaps, and job suitability scores to users. The findings reveal that users are more likely to act upon recommendations when results are presented through interactive visual elements that clearly indicate areas for improvement.

D. Classification of Job Sectors: Government Versus Private Recruitment Patterns

Author: Anita Deshpande (2022)

In "Classification of Job Sectors: Government Ver- sus Private Recruitment Patterns," Anita Deshpande examines the distinct recruitment criteria employed by government and private sector employers. The research highlights that government job applications typically emphasize formal qualifications, standard- ized test scores, and hierarchical position structures, whereas private sector recruitment prioritizes technical skills, soft skills, work experience, and cultural fit. Deshpande's work proposes a classification framework that can automatically categorize job descriptions and candidate profiles using machine learning algorithms such as SVM and random forests.

E. Automated Resume Template Generation Using Machine Learning

Author: Rajiv Menon and Lisa Wong (2023)

In "Automated Resume Template Generation Using Machine Learning," Menon and Wong address the often-overlooked aspect of resume presentation. The research explores the development of an intelligent system that analyzes resume content and recommends or generates optimized templates tailored to specific job sectors, experience levels, and cultural contexts. The paper examines layout structures, typography, section ordering, and visual hierarchy, and how these factors influence recruiter perceptions and ATS com- patibility.

F. Backend Architecture for Scalable Resume Analyt- ics Platforms

Author: James O'Connor (2024)

In "Backend Architecture for Scalable Resume An- alytics Platforms," James O'Connor investigates the infrastructure requirements for building robust, scal- able, and secure resume analysis systems. The research explores various database technologies, API design principles, and security considerations, including data encryption, secure file storage, and compliance with data protection

regulations.

G. Natural Language Processing for Skill Gap Anal- ysis in Recruitment

Author: Elena Martinez (2023)

In "Natural Language Processing for Skill Gap Analysis in Recruitment," Elena Martinez focuses on applying NLP techniques to identify discrepancies between a candidate's existing skills and the require- ments of target job roles. Martinez's work evaluates contextual embeddings and dependency parsing to accurately extract skills from resumes and compare them against job description corpora.

H. User Experience Design in Career Development Applications

Author: Thomas Wright and Neha Kapoor (2022)

In "User Experience Design in Career Develop- ment Applications," Wright and Kapoor examine the principles of designing intuitive interfaces for career- focused software tools. The paper explores interac- tion elements, including progress indicators, visual dashboards, guided workflows, and personalized rec- ommendations, and evaluates their impact on user satisfaction and engagement.

I. Machine Learning Models for Resume-to-Job Matching

Author: Robert Taylor (2024)

In "Machine Learning Models for Resume-to-Job Matching," Robert Taylor explores predictive algo- rithms assessing the compatibility between candidate resumes and job opportunities. The paper introduces a multi-stage matching framework that first performs coarse filtering based on essential criteria, followed by fine-grained semantic matching using transformer- based models.

J. Security and Privacy Considerations in AI-Powered Recruitment Platforms

Author: Maria Santos (2023)

In "Security and Privacy Considerations in AI- Powered Recruitment Platforms," Maria Santos ad- dresses the critical security challenges associated with collecting, processing, and storing sensitive candidate data. The research examines security frameworks in- cluding end-to-end encryption, secure authentication, role-based access control, and audit logging to protect data integrity and confidentiality.

III. SYSTEM ANALYSIS

A. Existing System

The current landscape of resume analysis and job matching tools consists of various platforms and methodologies that attempt to assist job seekers in optimizing their applications. Existing systems pri- marily include traditional ATS used by recruiters, generic resume builder websites, and basic keyword- matching tools available online. Many universities and career counseling centers utilize standard resume re- view services that rely on manual evaluation or simple checklist-based assessments.

Popular platforms such as LinkedIn, Indeed, and various job portals offer resume upload features that provide limited feedback, typically focusing on basic formatting issues or missing sections rather than in- depth content analysis. Some existing systems employ rule-based algorithms that scan resumes for predefined keywords extracted from job descriptions, generating match percentages without providing contextual in- sights or actionable recommendations.

Furthermore, most existing systems lack intelligent template generation capabilities. While numerous re- sume builder websites offer templates, these selections are typically based on aesthetic preferences rather than data-driven recommendations derived from the user's profile and target job sector.

Data persistence is another significant limitation in existing systems. Many tools operate on a session- based model where user data, analysis history, and progress tracking are not maintained. This prevents users from monitoring their improvement over time or comparing different versions of their resumes.

1) Disadvantages of Existing System:

- Limited Keyword Analysis – Existing systems rely on basic keyword matching without under- standing semantic context or hierarchical impor- tance of different skills.
- No Sector-Specific Categorization – Most sys- tems provide generic feedback that does not dif- ferentiate between government and private sector job requirements.

- Poor Visual Representation – Results are typ- ically presented as plain text scores without in- tuitive visual elements like meter charts or bar graphs.
- Lack of Intelligent Template Recommenda- tions – Existing resume builders offer templates based on visual preferences rather than AI-driven recommendations.
- No Backend Data Storage – Many tools operate without persistent data storage, requiring users to re-upload resumes for each session.
- Absence of Skill Gap Analysis – Current sys- tems identify what keywords are present but rarely provide comprehensive skill gap analysis.
- Limited Job Preference Filtering – Users cannot easily filter job recommendations based on pref- erences for government or private sector roles.
- Inconsistent Accuracy – Rule-based systems of- ten produce inconsistent results due to the ab- sence of advanced machine learning models.
- Security and Privacy Concerns – Many free tools lack robust security measures such as en- cryption and secure authentication.
- No Self-Owned Template Creation – Users are limited to pre-designed templates offered by the platform.

B. Proposed System

The proposed AI Resume Analyzer is a compre- hensive, intelligent web-based platform designed to address the limitations of existing systems by leverag- ing artificial intelligence, natural language processing, and modern web technologies. This system aims to provide students and job seekers with an end-to-end solution for resume optimization, job matching, and career guidance.

The proposed system incorporates advanced NLP al- gorithms to perform deep semantic analysis of resume content, extracting not only explicit keywords but also contextual skills, implicit competencies, and hierarchi- cal relationships between qualifications. Unlike exist- ing systems that rely on simple keyword matching, the proposed solution utilizes transformer-based models such as BERT to understand the semantic meaning of content.

A distinctive feature of the proposed system is its dual categorization mechanism that intelligently clas- sifies users into government or private job pathways based on their resume content, skills, and preferences.

The system maintains separate analysis frameworks for each sector, recognizing that government job applica- tions require emphasis on formal qualifications, while private sector applications prioritize technical expertise and soft skills.

The system delivers analysis results through an intuitive visual dashboard featuring virtual meter dis- plays and bar charts. These visual elements provide users with immediate, easily understandable feedback on their resume strength, keyword match percentage, sector-specific suitability scores, and skill gap areas.

The proposed system incorporates a robust backend architecture that securely stores all user data, including uploaded resumes, analysis history, template prefer- ences, and progress tracking. This persistent storage enables users to compare different resume versions, monitor improvement over time, and receive continu- ous personalized recommendations.

1) Advantages of Proposed System:

- Advanced AI-Powered Keyword Analysis – Utilizes transformer-based NLP models like BERT to perform contextual semantic analysis.
- Dual Job Sector Categorization – Intelligent fil- tering mechanism classifies users into government or private job pathways.
- Interactive Visual Results – Presents analysis outcomes through virtual meter displays and bar charts.
- AI-Driven Template Recommendations – Rec- ommends and generates optimized resume tem- plates based on user profile and target job sector.
- Self-Owned Template Creation – Allows users to create, store, and manage their own custom templates.
- Secure Backend Data Storage – Implements robust backend architecture with encryption and secure authentication.
- Comprehensive Skill Gap Analysis – Identifies missing critical competencies and provides ac- tionable suggestions.
- Predictive Job Matching – Employs machine learning models to filter and recommend suitable job opportunities.
- Progress Tracking Over Time – Maintains his- torical analysis records allowing users to compare resume versions.
- Enhanced Data Security and Privacy – Incor- porates encryption protocols and compliance with data protection regulations.
- User-Friendly Interface – Designed with intu- itive user experience principles for non-technical users.
- Continuous Learning and Improvement – Ma- chine learning models continuously improve rec- ommendation accuracy.
- Time and Cost Efficiency – Automates the resume analysis and optimization process.
- Holistic Career Guidance – Provides end-to-end support from resume analysis to job matching and application guidance.

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IV. SYSTEM REQUIREMENTS

A. Software Requirements

- Operating System: Windows 7 or Above
- Frontend: HTML, CSS, JavaScript
- Backend: PHP
- Database: MySQL
- IDE/Workbench: Visual Studio

B. Hardware Requirements

- Processor: i3 or Above
- Hard Disk: Minimum 5 GB
- Memory: 2 GB RAM or Above

V. SYSTEM DESIGN

A. System Architecture

The AI Resume Analyzer System Architecture is designed as a multi-layered structure that integrates user interaction, data processing, artificial intelligence analysis, and result visualization. The system ensures efficient resume evaluation, secure data storage, and meaningful output generation.

B. System Architecture

The AI Resume Analyzer System Architecture is designed as a multi-layered structure...and meaningful output generation.

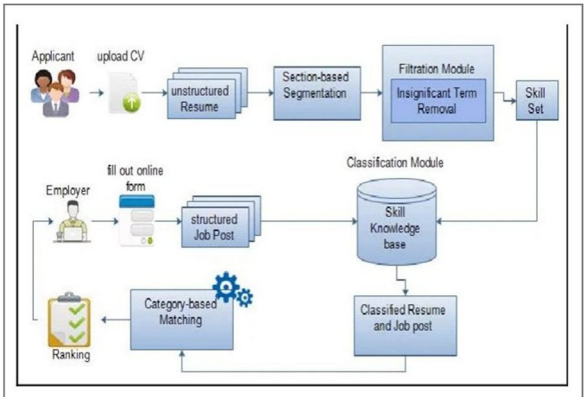


Fig. 1. System Architecture

The architecture follows a client-server model where the frontend (HTML, CSS, JavaScript) handles the user interface, while the backend (PHP + MySQL) manages data processing, AI analysis, and secure storage. The AI engine, powered by NLP models, sits at the core of the backend, responsible for extracting information from resumes, computing scores, detecting skill gaps, and generating recommendations.

C. Data Flow Diagram

The Data Flow Diagram (DFD) represents how data moves through the AI Resume Analyzer System, showing the interaction between users, processes, and data storage. It helps in understanding how input data (resume) is transformed into meaningful output (analysis and suggestions).

1) External Entity: User (Student/Job Seeker) – Uploads resume, selects job category, receives results.

2) Context Level DFD: The user submits a resume to the system, which processes it through the AI analysis engine and returns analysis results, recommendations, and a visual score report.

3) User Level DFD: At the user level, the system accepts the uploaded resume, parses its content, applies NLP-based keyword extraction, computes a suitability score, and returns categorized job recommendations alongside a skill gap report.

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D. Use Case Diagram

The use case diagram maps out two primary actors: the Student/User and the Admin. Students can upload resumes, view analysis results, access job recommendations, browse resume templates, create custom templates, and track progress over time. Admins can manage users, update job keyword datasets, monitor system performance, and control system operations.

E. Class Diagram

The class diagram shows the core data model. The User class owns Resume objects and creates AnalysisSession and SavedTemplate instances. Resume has associated ParsedContent, SkillProfile, and JobRecommendation objects. The SkillProfile produces ScoreReport records. AnalysisSession holds AnalysisResult entries with visual output payloads for chart responses.

VI. MODULE DESCRIPTION

The AI Resume Analyzer System is divided into several functional modules to ensure smooth operation, scalability, and efficient processing of resumes. Each module performs a specific task in the overall system workflow.

A. User Interface Module

This module acts as the interaction point between the user and the system. It allows users to upload resumes in PDF or DOCX format, provides options to select job category (Government / Private), displays analysis results, scores, and suggestions, and offers resume templates for easy creation.

B. Resume Input and Management Module

This module handles resume data input and storage. It accepts and validates resume files, stores resumes in the database, manages user data and history, and ensures secure handling of uploaded files.

C. Resume Parsing Module

This module extracts useful information from resumes. It converts PDF/DOCX into text, extracts sec- tions such as skills, education, and experience, re- moves unwanted characters through data cleaning, and prepares structured data for analysis.

D. NLP and Keyword Extraction Module

This module processes text using Natural Language Processing. It identifies important keywords and skills, performs tokenization and text preprocessing, matches keywords with predefined datasets, and detects missing or weak areas in the resume.

E. AI Analysis and Scoring Module

This is the core intelligence of the system. It compares the resume with job requirements, calcu- lates resume score and match percentage, classifies resumes into job categories, and identifies skill gaps and strengths.

F. Recommendation Module

This module provides improvement suggestions. It suggests missing skills, recommends course or skill improvements, provides resume enhancement tips, and suggests suitable job roles aligned with the user's profile.

G. Visualization Module

This module presents results in an easy-to- understand format. It displays a score meter showing performance level, shows bar charts and graphs, high- lights keyword match percentage, and provides visual insights into strengths and weaknesses.

H. Database Module

This module manages all system data. It stores user details and resumes, saves analysis results and reports, maintains job datasets and keywords, and supports data retrieval for future use.

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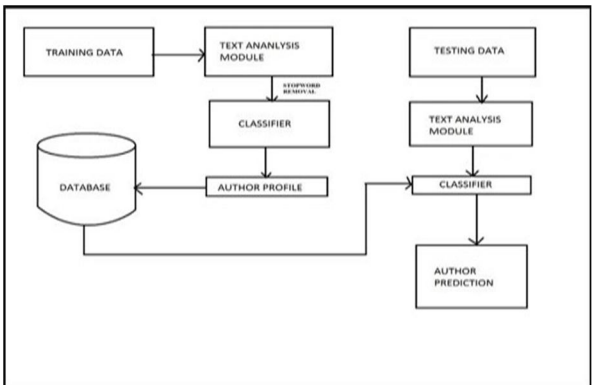


Fig. 2. Context Level Data Flow Diagram

I. Admin Module

This module is used for system management. It manages users and data, updates job keyword datasets, monitors system performance, and controls system operations.



Fig. 3. User Level Data Flow Diagram

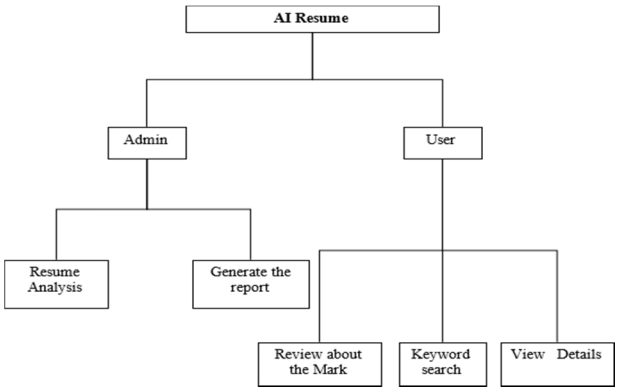


Fig. 4. Admin Level Data Flow Diagram

VII. CONCLUSION AND FUTURE ENHANCEMENT

A. Conclusion

The AI Resume Analyzer System is an innovative solution designed to simplify and improve the resume evaluation process for students and job seekers. By integrating Artificial Intelligence (AI) and Natural Language Processing (NLP), the system effectively analyzes resumes, extracts relevant information, and evaluates them based on industry standards and job requirements.

The system helps users identify their strengths and weaknesses by providing a detailed score, keyword analysis, and skill gap detection. It also offers per- sonalized suggestions to improve resume quality and align it with specific job roles in both government and private sectors. The inclusion of predefined templates further assists users in creating professional and well- structured resumes. Additionally, the use of visual representations such as score meters and charts enhances user understanding and engagement. The backend data storage ensures that user information and analysis results are securely maintained for future reference.

Overall, this project bridges the gap between job seekers and employer expectations by providing a smart, efficient, and user-friendly platform. It signif- icantly increases the chances of resume selection and helps users prepare better for career opportunities.

B. Future Enhancement

The system can be further improved by incorporat- ing the following advanced features:

1) Real-Time Job Integration – Integrate with job portals such as LinkedIn and Naukri to provide real-time job recommendations based on resume analysis.
2) Advanced AI Models – Implement deep learning models for more accurate skill detection and better resume classification.
3) Multilingual Support – Enable support for mul- tiple languages (Tamil, Hindi, etc.) to make the system accessible to a wider audience.
4) Voice-Based Resume Analysis – Allow users to upload or create resumes using voice input for improved accessibility.
5) ATS Compatibility Check – Add Applicant Tracking System (ATS) scoring to ensure resumes pass automated screening.
6) Personalized Learning Recommendations – Suggest online courses and certifications to im- prove missing skills.
7) Mobile Application Development – Develop an Android/iOS app for easy access and usability.
8) Interview Preparation Module – Include mock interview questions and AI-based feedback.
9) Cloud Integration – Store data securely on cloud platforms for scalability and remote access.
10) Real-Time Feedback System – Provide instant suggestions while users are creating or editing resumes.

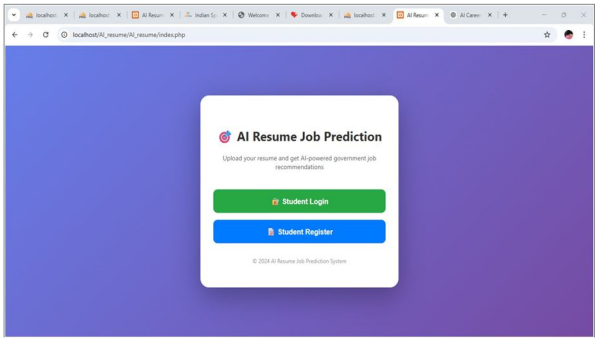


Fig. 5. Home Page

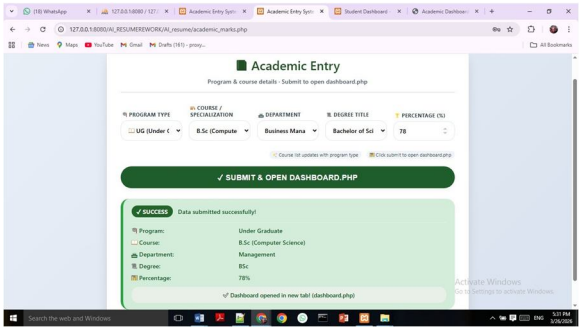


Fig. 6. Entry page

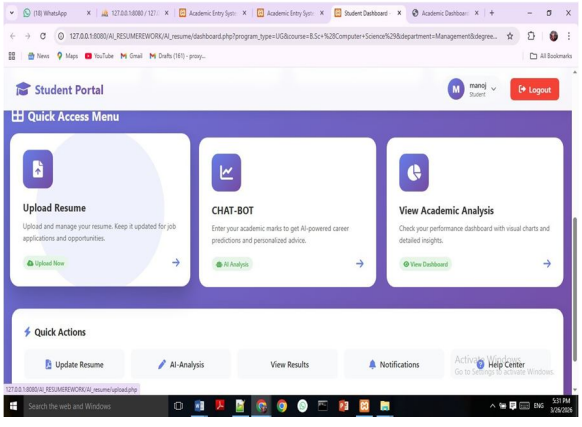


Fig. 7. Portal page

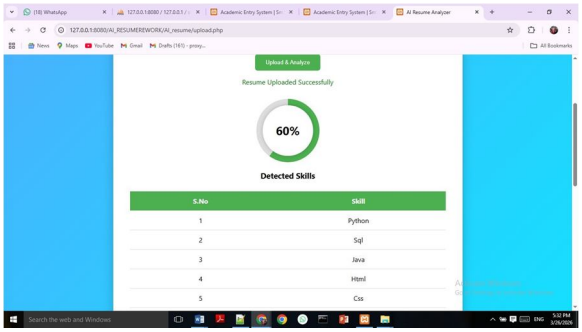
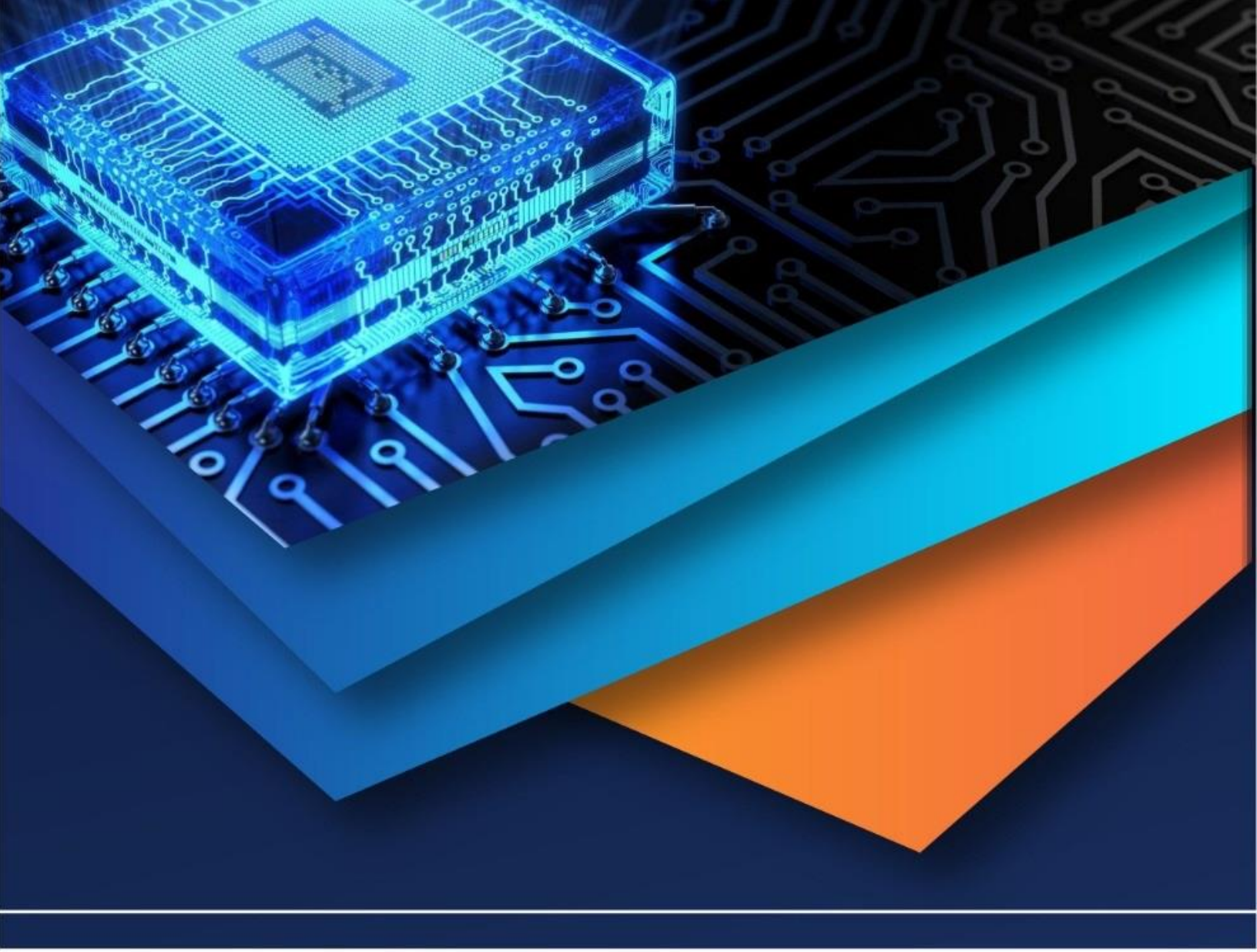


Fig. 8. Analysis Resume

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