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SensAI: An Intelligent Career Guidance and Resume Analysis System

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Abstract -We developed a system called SensAI, an AI-based career direction system designed to help students make knowledgeable and educated career decisions. The system combines four main modules: Resume Analyzer, Job Interview Preparation, Career Roadmap Generator, and Market Insights Engine. The Resume Analyzer uses Natural Language Processing (NLP) with a dual-metric approach integrating Jaccard similarity and heuristic evaluation to give simple and understandable feedback. The Interview Preparation module assesses responses applying semantic similarity and sentiment analysis, while the Career Roadmap Generator creates customized learning paths established on user goals. The Market Insights Engine analyzes sector trends to identify in-demand competencies. By unifying these components into an integrated platform, SensAI delivers exhaustive and inclusive, explainable, and real-time career direction for students.

Keywords: Artificial Intelligence, Career Guidance System, Natural Language Processing, Resume Analysis, Semantic Similarity, Explainable AI, Career Roadmap Generation, Market Insights

I. INTRODUCTION

With the growth of online platforms and changing job market have made choosing the right career has become more difficult for students. Many struggle to identify domains aligned with their skills and interests, often leading to inefficient preparation and missed opportunities.

Current tools for resumes, interviews, and job search are separate and not connected, forcing users to navigate fragmented systems. Additionally, resume analysis tools either rely on basic keyword matching or complex black-box models, resulting in limited contextual understanding or lack of transparency.

SensAI addresses these challenges by integrating four core modules:

- Resume Analyzer
- Job Interview Preparation
- Career Roadmap Generator
- Market Insights Engine

The Resume Analyzer combines NLP techniques with Jaccard similarity and heuristic scoring to ensure explainable evaluations. The Interview module enhances readiness through semantic and sentiment analysis. The Career Roadmap module generates personalized learning paths using large language models, while the Market Insights module provides data-driven recommendations.

By combining these functionalities, SensAI provides a unified and intelligent career guidance system.

II. RELATED WORK

Career guidance and resume analysis systems have gained significant attention as the need for structured support in student career decisions continues to grow. Early approaches relied on keyword- and rule-based techniques, where resumes were evaluated using simple matching against predefined criteria. Studies such as Khan et al. [1] and Patel and Rana [2] used keyword frequency and lexical matching, but these methods lacked semantic understanding and failed to capture context in skills and experience.

To address these limitations, recent work has incorporated Natural Language Processing (NLP) and semantic similarity techniques. For example, Guo et al. [3] combined Jaccard similarity with TF-IDF to improve matching accuracy, while other studies applied machine learning models for skill classification [4]. Although these methods enhanced performance, they often depend on large labeled datasets, which can introduce bias and limit adaptability to diverse and evolving student profiles.

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Similarly, interview preparation systems have evolved from static question banks to more adaptive solutions using large language models for generating role-specific questions [5][6]. Career planning research has explored roadmap generation and recommendation systems [7][8], while market analysis studies have focused on identifying in-demand skills through job data mining [9][10]. However, most existing approaches treat these functionalities separately. SensAI addresses this gap by integrating resume analysis, interview preparation, career planning, and market insights into a unified, student-focused platform.

III. PROPOSED SYSTEM ARCHITECTURE

The proposed system follows a modular full-stack architecture in which individual components operate independently while communicating through a centralized backend. This design ensures scalability, maintainability, and efficient data flow across modules.

A. Resume Analyzer Module

The Resume Analyzer module is responsible for extracting and evaluating relevant information from user resumes. Initially, resumes are uploaded in PDF format and undergo text extraction followed by Natural Language Processing (NLP) techniques such as tokenization and lemmatization.

Subsequently, feature extraction is performed to identify key elements, including hard skills, soft skills, achievements, and contact information. These extracted features are then compared with job profile requirements.

To quantify the similarity between the candidate's skills and job requirements, the system employs the Jaccard similarity coefficient:

$$J(A,B) = \frac{|A \cap B|}{|A \cup B|}$$

where "A" represents the set of skills extracted from the resume and "B" represents the set of skills required for the job profile. This metric provides an interpretable similarity score for resume evaluation.

B. Job Interview Preparation Module

The Job Interview Preparation module generates role-specific interview questions using predefined templates and AI-based techniques. User responses are evaluated using semantic similarity measures to assess relevance and sentiment analysis to evaluate confidence and tone.

Based on this analysis, the system provides structured and actionable feedback to improve candidate performance.

C. Career Roadmap Module

The Career Roadmap module generates personalized learning paths tailored to user goals and current skill levels. It recommends required skills, tools and technologies, certifications, and project ideas.

This module leverages Large Language Models (LLMs) to dynamically generate structured and context-aware career plans.

D. Market Insights Module

The Market Insights module analyzes job market data to identify current trends. It extracts information such as trending roles, in-demand skills, and emerging technologies using frequency-based and similarity-based analysis techniques.

This enables users to align their career paths with industry demands.

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E. Integrated Architecture

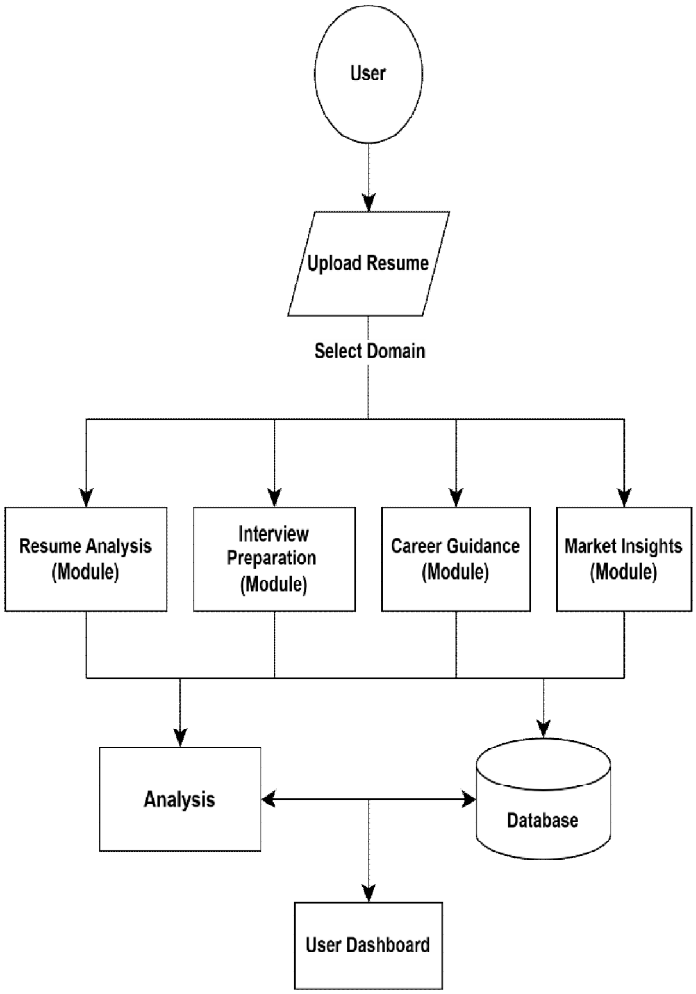


Fig. 3.1 System Architecture Diagram of SensAI

The overall system integrates multiple layers, including:

- Frontend: Handles user interaction and visualization
- Backend: Manages APIs, processing, and data flow
- NLP Engine: Performs resume parsing and text analysis
- Database: Stores user data, extracted features, and results

All modules communicate through the backend, ensuring seamless integration and efficient system performance.

IV. SYSTEM MODULES

The proposed system is composed of multiple modules that collectively support user interaction, data processing, and administrative control. Each module is designed to ensure scalability, usability, and efficient system operation.

A. User Authentication

JWT-based authentication is employed to manage user sessions securely. This approach enables stateless communication between the client and server, ensuring efficient session handling and enhanced security.

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B. Service Layer

The service layer is divided into user-facing functionalities and administrative controls.

1) User Area

The user interface provides several features to support career development, including profile management, resume upload and analysis, interview practice, career roadmap generation, and a feedback system. These features allow users to track progress, improve skills, and receive personalized recommendations.

2) Admin Area

The administrative module enables system management functionalities such as adding or removing courses, managing lecture content, and monitoring system analytics. This ensures that the platform remains updated and relevant.

C. Database

The system utilizes a database to store and manage structured and unstructured data, including user profiles, extracted resume features, job descriptions, and analysis results. This centralized storage supports efficient data retrieval and processing.

D. Hardware Requirements

The system requires a minimum of an Intel Core i3 processor (or equivalent), at least 4 GB of RAM, and a stable internet connection to support real-time processing and user interaction.

E. Software Requirements

The system is developed using a modern full-stack technology stack. It supports multiple operating systems, including Windows, Linux, and macOS. The backend is implemented using Node.js and Express.js, while MongoDB is used for database management. The frontend is developed using React.js to provide a responsive user interface. The system is accessible through standard web browsers such as Chrome and Firefox.

- JWT → stateless authentication
- MongoDB → flexible schema for resume data
- React → component-based UI

V. IMPLEMENTATION AND EVALUATION

A. Implementation Details

The proposed system is implemented using a combination of Natural Language Processing (NLP) techniques and modern full-stack technologies to ensure efficient processing and scalability. The Resume Analyzer module is developed using Python and the spaCy library for text extraction, tokenization, and lemmatization. A publicly available resume dataset from Kaggle (Resume/CV Skills Extraction Dataset) is utilized during the training phase to identify domain-specific skill patterns. Based on this dataset, a domain-wise skill repository is constructed, which serves as a reference for matching candidate resumes with job role requirements. Skill extraction is performed using NLP-based keyword identification and pattern matching techniques, and the extracted skills are compared with job descriptions using the Jaccard similarity coefficient to compute a matching score.

The Interview Preparation module is implemented using NLP-based techniques, including keyword detection, semantic similarity, and sentiment analysis, to evaluate candidate responses and provide structured feedback. The Career Roadmap module generates structured learning paths based on predefined templates and user inputs, ensuring relevant recommendations for skill development, tools, certifications, and project ideas. These modules collectively support users in improving their interview performance and planning their career progression effectively.

The Market Insights module processes job-related data and applies frequency-based and similarity-based analysis to identify trending roles, in-demand skills, and emerging technologies. The insights are presented through an interactive dashboard to assist users in aligning their career paths with industry demands. The overall system is deployed using a full-stack architecture, where Node.js and Express.js handle backend services, MongoDB manages database operations, and React.js provides a responsive frontend interface.

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B. Dataset and Training Setup

The Resume Analyzer module utilizes the Resume/CV Skills Extraction Dataset obtained from Kaggle as a training resource. The dataset consists of categorized resume text across multiple professional domains. This dataset is used to extract domain-specific skills and construct a structured skill repository. The repository enables efficient and context-aware matching between candidate resumes and job profiles.

In addition to the resume dataset, the Market Insights module utilizes a publicly available job market dataset from GitHub, which contains structured information about job roles, required skills, and industry trends. This dataset is used to analyze skill demand patterns, identify trending roles, and perform frequency-based analysis for extracting in-demand technologies. The data is preprocessed and aggregated to generate meaningful insights that guide users in aligning their career paths with current market requirements.

C. Evaluation Results

Evaluation Results

1) Resume Analyzer

The Resume Analyzer module demonstrates strong performance in extracting and matching relevant skills. The system achieves a precision ranging from 0.85 to 0.88 and a recall between 0.83 and 0.92, resulting in an overall accuracy of 87.2%.

The average processing time per resume is approximately 0.84 seconds, indicating efficient real-time performance suitable for practical applications.

2) Interview Preparation Module

The Interview module effectively evaluates candidate responses using NLP techniques. The keyword detection component achieves an accuracy of 92%, while sentiment analysis achieves an accuracy of 90%.

The response evaluation process is completed within 1 to 2 seconds, ensuring a smooth and interactive user experience.

3) Career Roadmap Module

The Career Roadmap module generates structured and relevant learning paths based on user inputs. The recommendations include required skills, tools, certifications, and project ideas.

The outputs are observed to be highly relevant and well-structured, aligning with industry expectations. The average generation time is approximately 2 seconds.

4) Market Insights Module

The Market Insights module successfully identifies trending roles, in-demand skills, and emerging technologies using job data analysis. The system provides accurate and meaningful insights, with a processing time of less than one second.

Feature Category	Precision	Recall	F1-Score	Accuracy
Hard Skills Extraction	0.85	0.89	0.87	—
Soft Skills Extraction	0.76	0.83	0.79	—
Achievements Detection	0.88	0.92	0.90	—
Contact Information	—	—	—	0.91
Overall System	—	—	—	87.2%

Evaluation Parameter	Result
Question Relevance Accuracy	High
Keyword Detection Consistency	92%
Semantic Similarity Reliability	89%
Sentiment Classification Accuracy	90%
Average Response Evaluation Time	1–2 sec

Evaluation Parameter	Result
Trending Skill Detection Accuracy	High
Role Popularity Identification	Accurate
Skill Frequency Alignment	Strong
Insight Generation Time	<1 sec

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VI. DISCUSSION

The experimental results demonstrate that the proposed SensAI system provides an effective and interpretable approach to career guidance. Unlike traditional systems that rely solely on keyword matching, the proposed method integrates similarity-based scoring with heuristic evaluation, enabling a more comprehensive assessment of candidate profiles. The integration of multiple modules, including resume analysis, interview preparation, career roadmap generation, and market insights, allows the system to support users across different stages of their career development.

The Resume Analyzer module achieves a balanced performance in terms of precision and recall, indicating reliable skill extraction and matching capabilities. The Interview module effectively evaluates user responses using semantic and sentiment-based analysis, while the Career Roadmap and Market Insights modules generate relevant and structured recommendations aligned with current industry trends. Additionally, the system demonstrates efficient processing time, making it suitable for real-time applications.

However, the system has certain limitations. The reliance on predefined skill dictionaries may restrict the ability to capture emerging or domain-specific skills. Furthermore, the Market Insights module depends on static job datasets, which may not fully reflect real-time industry dynamics.

Future work can focus on improving the adaptability and scalability of the system. Incorporating semantic embeddings and advanced NLP techniques can enhance contextual understanding and skill extraction accuracy. In addition, integrating real-time job data sources can improve the relevance and timeliness of market insights, making the system more robust and dynamic.

VII. CONCLUSION

This paper presents SensAI, an AI-powered platform designed to support career development by combining resume analysis, interview preparation, career roadmap generation, and market insights into a single system. Unlike traditional tools that only rely on keyword matching, SensAI uses a more complete and transparent approach. The Resume Analyzer applies NLP with a combined scoring method using Jaccard similarity and heuristic evaluation to give clear and understandable results. The interview module helps users practice with role-specific questions and evaluates their answers using semantic and sentiment analysis. The career roadmap feature creates personalized learning paths based on user goals, while the market insights module analyzes industry trends to suggest in-demand skills. The system is built with a modular design, ensuring it is scalable, efficient, and performs well in real time. Overall, SensAI brings together evaluation, preparation, and guidance into one platform, making it a comprehensive and practical career assistance solution.

The system ensures:

- Explainability
- Real-time performance
- Scalability

It transforms traditional recruitment tools into a comprehensive career assistance ecosystem.

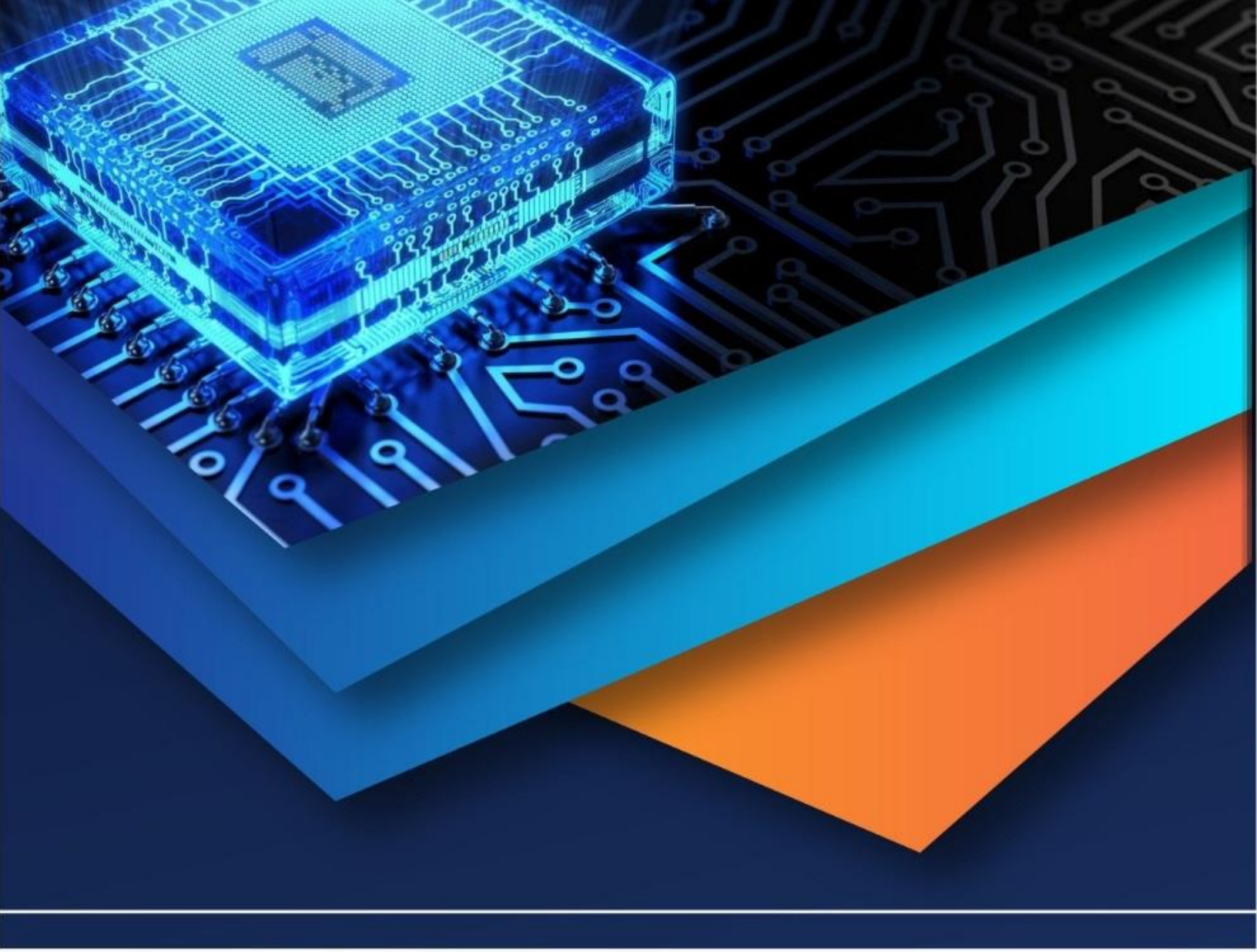
REFERENCES

[1] S. Nandhini, S. Gomathi, and S. Lavanya, "Automated Resume Screening Using Natural Language Processing," International Journal of Advanced Research in Computer Science and Software Engineering, vol. 11, no. 6, pp. 45–52, 2021.
[2] P. Roy, S. Chaudhary, and R. Bhatia, "A Machine Learning Approach for Resume Recommendation System," International Journal of Current Science, vol. 13, no. 2, pp. 112–118, 2024.
[3] J. Guo, Y. Zhang, and H. Li, "Resume Screening Using Natural Language Processing Techniques," Alphanumeric Journal, vol. 12, no. 1, pp. 23–31, 2024.
[4] A. Bhatt, K. Patel, and R. Shah, "Resume Analysis Using NLP and Applicant Tracking System Algorithm," International Journal of Latest Technology in Engineering, Management & Applied Science, vol. 10, no. 4, pp. 78–84, 2021.
[5] A. Singh, R. Mehta, and P. Verma, "A Review of Machine Learning Ranking Systems: Methods, Applications, and Challenges," Journal of Contemporary Education Theory and Artificial Intelligence, vol. 4, no. 1, pp. 1–12, 2025.
[6] Y. Zhao and X. Li, "Job-Candidate Classification and Ranking Using Machine Learning Techniques," International Journal of Advanced Computer Science and Applications, vol. 13, no. 9, pp. 410–418, 2022.
[7] Y. Zhao, M. Liu, and H. Chen, "AI-Driven Career Roadmap Generation Using Knowledge Graphs," IEEE Access, vol. 11, pp. 65780–65792, 2023.
[8] Q. Liu and J. Wang, "Personalized Curriculum Recommendation Using Collaborative Filtering and Content-Based Methods," Expert Systems with Applications, vol. 184, pp. 115–129, 2021.
[9] L. Chen, Y. Sun, and K. Wang, "Analyzing Job Market Skill Demand Using Large-Scale Job Postings," IEEE Transactions on Computational Social Systems, vol. 9, no. 3, pp. 742–753, 2022.
[10] J. Li and X. Chen, "Explainable Artificial Intelligence in Talent Recruitment: A Systematic Literature Review," Journal of Big Data, vol. 12, no. 1, pp. 1–25, 2025.

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[11] N. Bhaliya, J. Gandhi, and D. K. Singh, "NLP-Based Extraction of Relevant Resume Information Using Machine Learning," Procedia Computer Science, vol. 189, pp. 389–396, 2021.
[12] S. Ahmed, R. Kumar, and T. Das, "Automated Resume Screening System Using Machine Learning and Natural Language Processing," International Journal of Medical Informatics, vol. 178, pp. 105–114, 2024.
[13] M. Holzinger et al., "Explainable AI and Human-Centered Machine Learning: A Survey," ACM Computing Surveys, vol. 56, no. 2, pp. 1–38, 2024.
[14] A. Bansal and S. Kaur, "Natural Language Processing in Recruitment Processes: A Comprehensive Review," arXiv preprint arXiv:2403.01245, 2024.
[15] R. Sharma and P. Malhotra, "Resume Parsing and Information Extraction Using Python-Based NLP Techniques," International Journal on Recent and Innovation Trends in Computing and Communication, vol. 11, no. 5, pp. 66–73, 2023.

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