

CareerMate – Job Application Tracker System Using NLP & ML

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Abstract— In today's competitive job market, most of the candidates apply to multiple job roles across different platforms, which makes it difficult to track applications and assess their own progress. This paper presents CareerMate, an intelligent AI job application tracking system which utilizes Natural Language Processing (NLP) and lightweight Machine Learning (ML) techniques to refine their job search process.

This system draws out related information from resumes and job descriptions to calculate a Resume-Job Match Score using text similarity techniques. It also identifies missing skills through a skill gap analysis module and forecasts interview probability using supervised learning models. Moreover, a centralized dashboard provides valuable visual insights into application status and performance.

The proposed system improves efficiency, enhances decision-making, and provides data-driven career guidance. The study shows how AI-based tools can considerably optimize job tracking and improve employability.

Index Terms—Resume Analyzer, NLP, Machine Learning, Recruitment Automation, Resume Matching, Skill Gap Analysis

1. INTRODUCTION

Nowadays, highly competitive job market, candidates frequently apply to multiple positions on various websites, such as Naukri, LinkedIn, and corporate career portals. Manually managing and tracking these applications becomes tough, leading to missed deadlines, neglected follow-ups, and disorganized data.

Finding jobs and submitting applications are the main goals of current job platforms, but they don't have efficient systems for managing and tracking applications centrally. As a result, many applicants use spread sheets or manual notes, which are time-consuming and error-prone.

To solve these problems, this paper proposes a job application tracker system called CareerMate that makes use of natural language processing (NLP) and lightweight machine learning (ML). It provides a centralized dashboard for useful tracking, automatically gathers related information from the candidate's uploaded resumes and job descriptions, and sorts application status.

This system aims to speed up the job application process by increasing user productivity, reducing manual work, and expanding organization. It is designed to be lightweight, simple to use, and suitable for students and job seekers who require efficient systems.

2. LITERATURE REVIEW

A number of studies have checked automation in hiring and resume analysis. As they rely on rule-based systems and keyword filtering, conventional ATS tools often ignore contextual meaning.

Recent studies show that NLP techniques like Named Entity Recognition (NER) and semantic embedding's significantly improve information extraction from resumes. Machine learning models have also been

used to predict candidate-job fit based on historical hiring data.

Transformer-based models, like BERT, have proven to perform well in document similarity tasks. However, these models have a high computational cost. Lightweight techniques that make use of TF-IDF, cosine similarity, and classical classifiers provide efficient alternatives for real-time systems.

Current solutions are primarily focused on the needs of employers.

3. SYSTEM ARCHITECTURE AND DESIGN

The following are the main modules of the CareerMate system:

- Module for Uploading Resumes
- Module for Uploading Job Descriptions
- The NLP Processing Engine
- Module for Resume-Job Matching
- Analyzer of Skill Gaps

- Probability Predictor for Interviews
- Dashboard for Application Tracking

A client-server architecture is used. While the backend uses NLP and ML models to process data, the frontend interface lets users manage applications.

Flask for web services, SQLite/MySQL for data storage, and Python for backend processing are important technologies. Text processing is done by NLP libraries like NLTK and SpaCy, and machine learning operations are supported by Scikit-learn.

4. IMPLEMENTATION

The following technologies were used to build the system:

- Frontend: HTML, CSS, and JavaScript
- Python with Flask on the back end
- NLP Libraries: NLTK and SpaCy
- Scikit-learn for machine learning

Database: MySQL or SQLite Document parsing techniques turn resumes that have been uploaded as PDFs into text. Tokenization, stop word removal, and lemmatization are all parts of NLP preprocessing. TF-IDF vectorization and Sentence-BERT embeddings are used to extract features. Cosine similarity tells you how similar the meaning of the resume content is to the job descriptions. A supervised learning model, like Logistic Regression or Random Forest, uses things like match score, skill coverage, and past application outcomes to guess how likely it is that you will get an interview call.

The dashboard displays:

- Application status tracking
- Match scores
- Skill gap insights
- Visual analytics

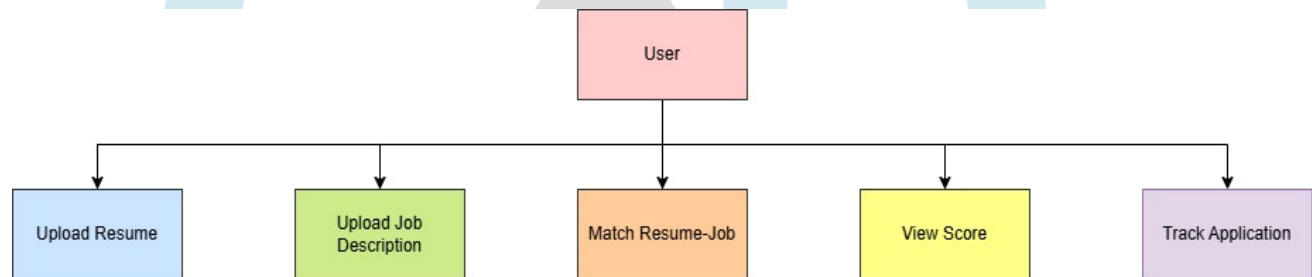


Fig. 1 Use Case Diagram

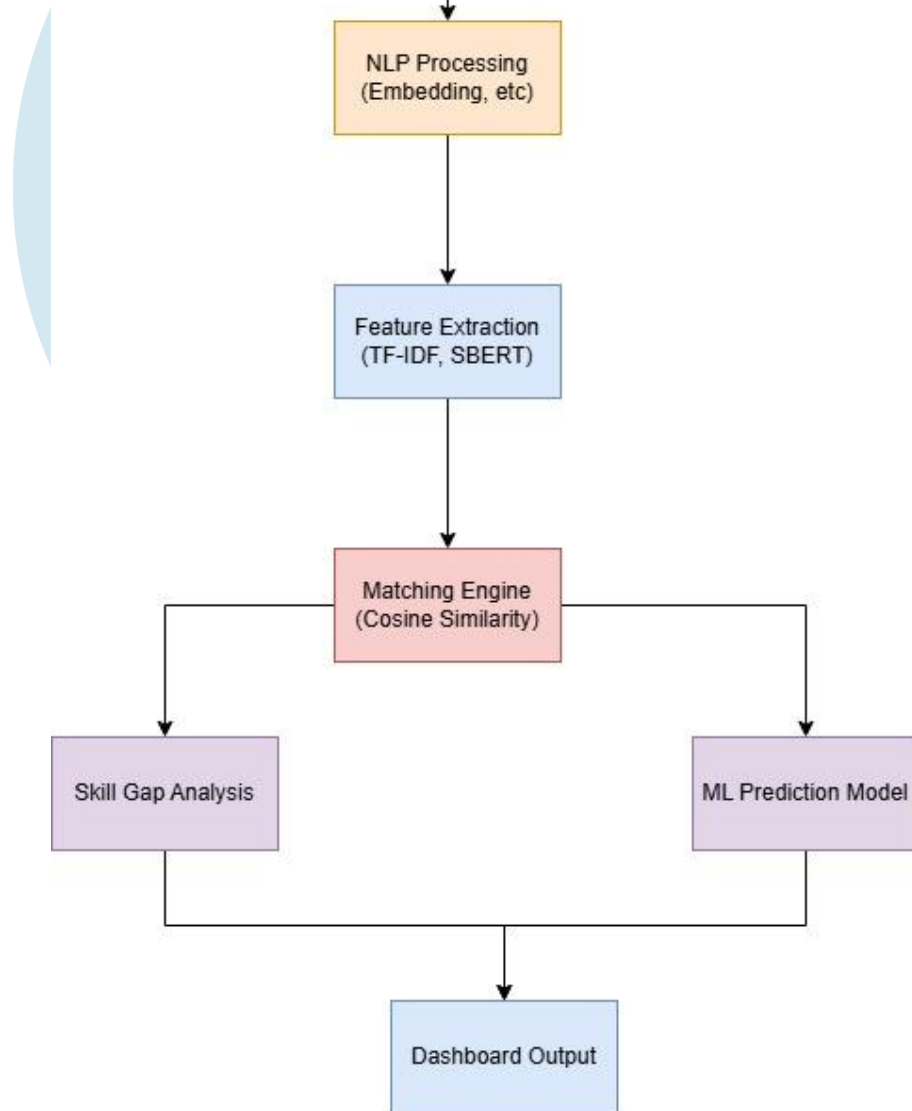


Fig. 2 Data Flow Diagram

Job Application Tracker System Using NLP and ML

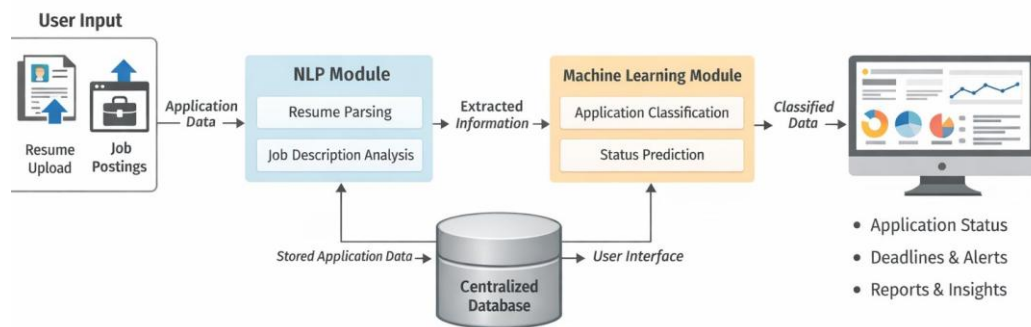


Fig. 3 System Architecture Diagram

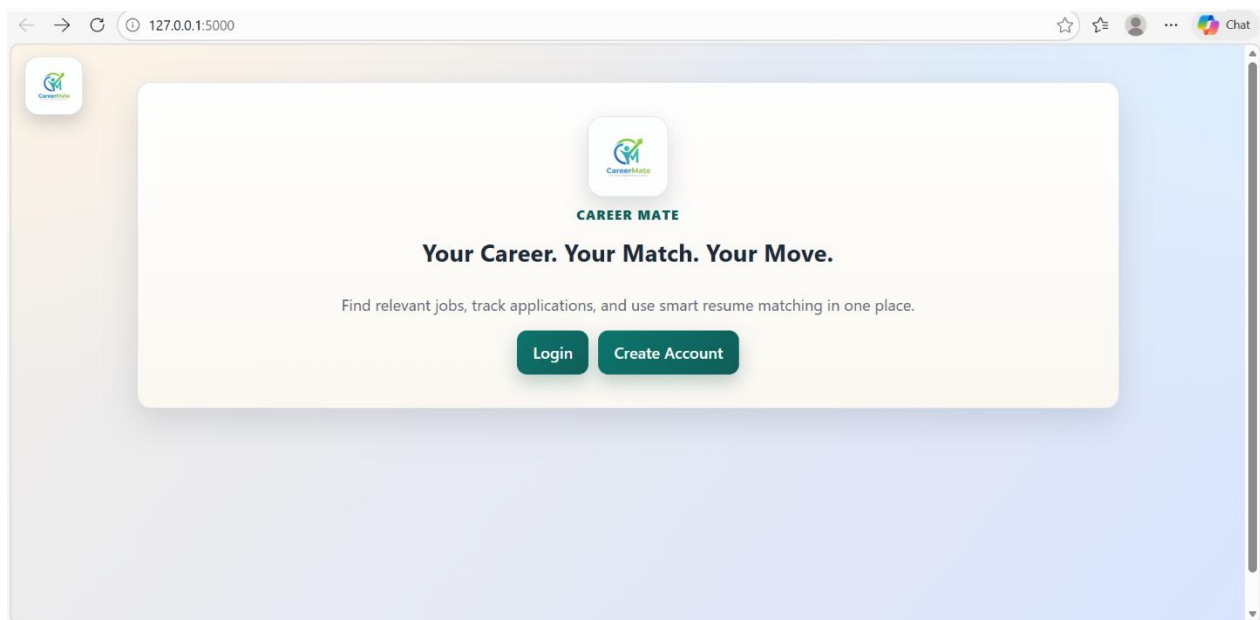


Fig. 4 Homepage

127.0.0.1:5000/register

Summarize

Chat

Create Career mate Account

Career mate Login

Name:

Email:

nisha@hr.com

Password:

Role:

Recruiter

Job Seeker

Recruiter

Fig.5 Register Page

127.0.0.1:5000/jobs

Summarize

Chat

Career mate Jobs

Dashboard Jobs Messages (1) Applications

Search by title, company, skill Location Any Type Experience (e.g. 2-4 Years) Search

AI/ML Engineer

ImpactQA

noida | Full-Time | 3-5 years

Salary: 9

Skills: Required Skills & Qualifications: Strong understanding of Software Testing and QA processes Knowledge of Machine Learning concepts (supervised/unsupervised learning, NLP, CV basics) Experience with Python and data analysis libraries (Pandas, NumPy, Scikit-learn) Familiarity with AI testing techniques: bias testing, adversarial testing, model validation Experience with automation tools and CI/CD pipelines Understanding of data validation, data drift, and model monitoring Knowledge of API testing and cloud platforms (AWS, Azure, GCP) is a plus Strong analytical, problem-solving, and communication skills Preferred Experience: Experience with MLOps tools Exposure to Responsible AI, explainability tools, and ethical AI practices Experience testing GenAI systems (LLMs, chatbots, prompt validation, hallucination checks).

[View Job Description](#)

Fig.6 Available Jobs Posted for Candidate on this page

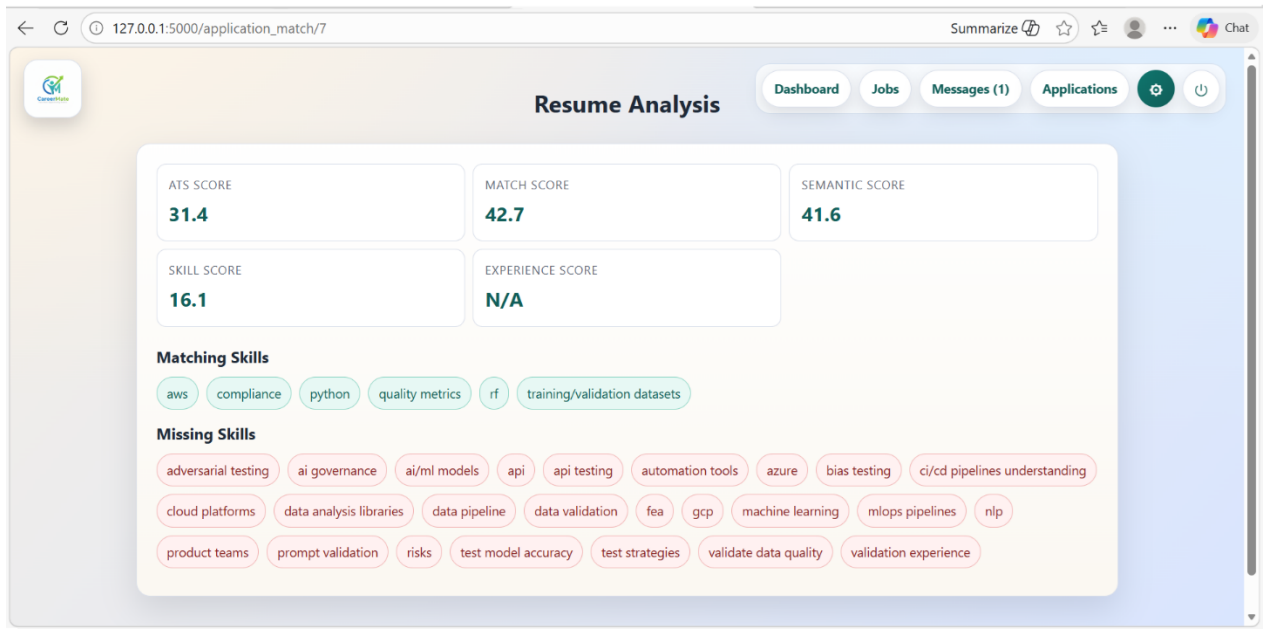


Fig.7 Candidate ATS score shown along with matched and missing qualifications.

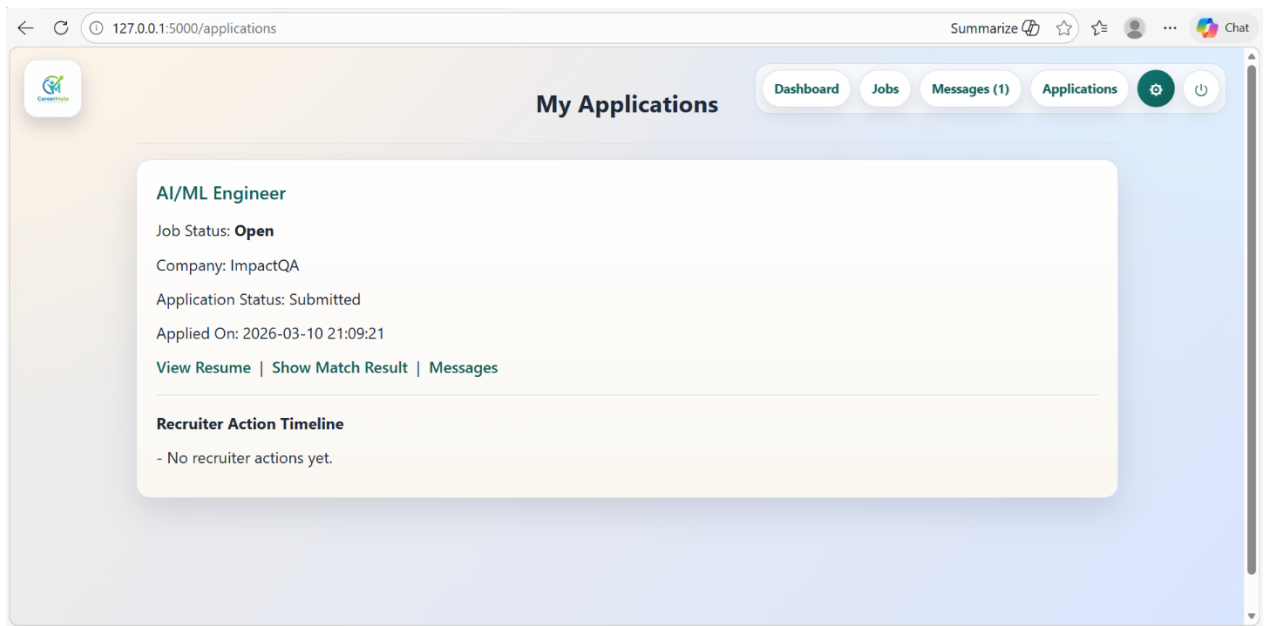


Fig. 8 Candidate Applied applications

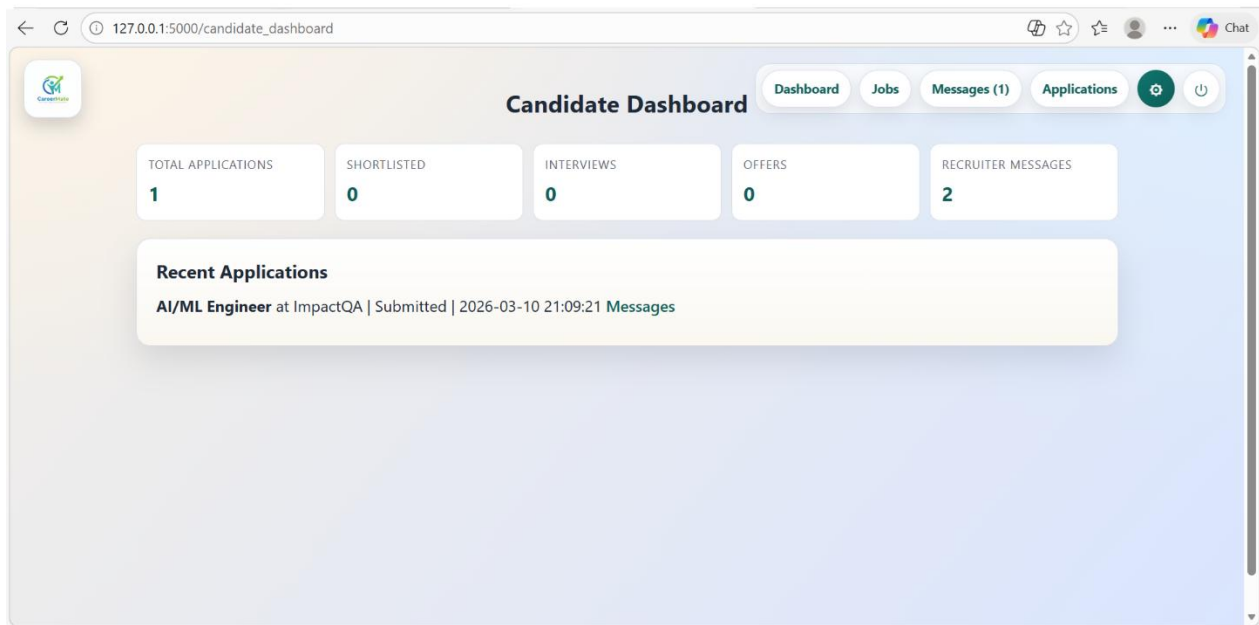


Fig.9 Candidate Dashboard

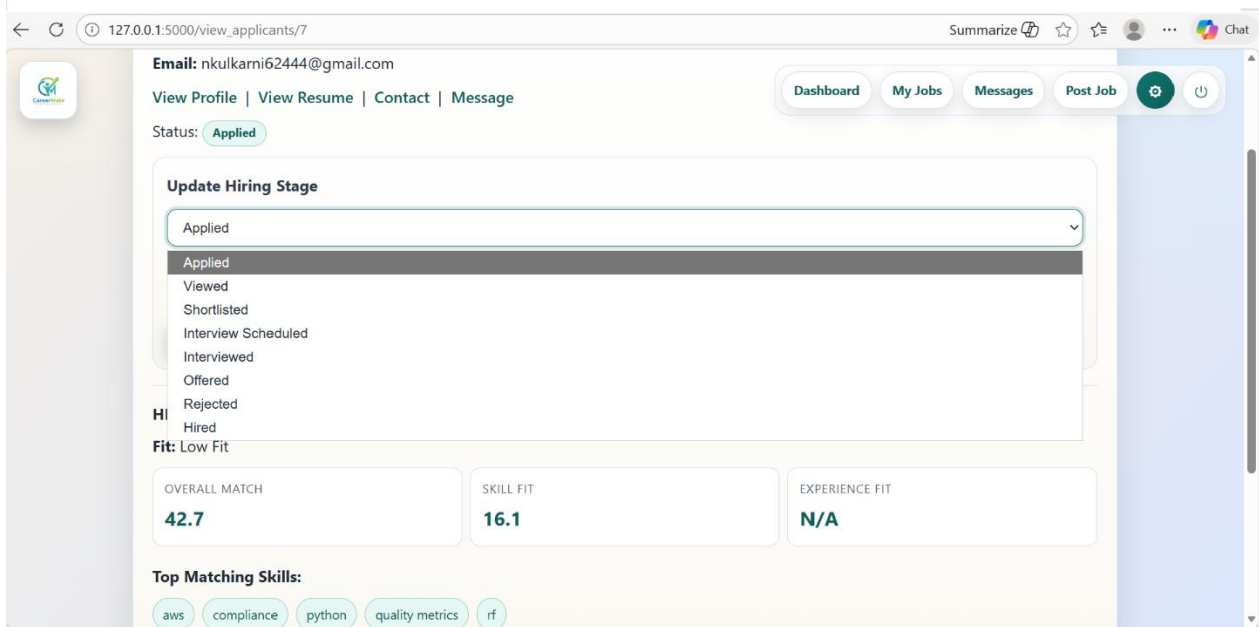


Fig. 10 HR dashboard for applied candidates

5. RESULTS AND ANALYSIS

We used a set of sample resumes and job descriptions to test the system. The prediction model's performance metrics were accuracy, precision, recall, and F1 score. The results show that semantic matching makes compatibility assessment much better than just keyword filtering. Our project mainly focuses on centralized application tracking, for eg. LinkedIn, Naukri, Indeed, etc only track applications made on their platform. Whereas, CareerMate

provides a single unified dashboard to track applications from multiple platforms which eliminates the need for manual tracking making it easier. We can directly communicate with the company's HR as well unlike other platforms where you can communicate only via email or phone calls which are limited. CareerMate also shows the candidates ATS score to both the job seeker and HR along with qualifications required or missing, which is shown as skill gap.

6. CONCLUSION AND FUTURE WORK

In order to enhance job search management, this paper presents CareerMate, an AI-powered job application tracker that makes use of machine learning and natural language processing. The system provides job seekers with all the assistance they require by automatically analysing resumes,

determining skill gaps, assessing job compatibility, and forecasting the likelihood of an interview.

The suggested system demonstrates how AI-powered tools can improve career development's effectiveness, personalization, and success.

7. REFERENCES

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