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International Journal on Advanced Computer Engineering and Communication Technology

ISSN: 2278-5140
Volume 14 Issue 01, 2025

AI-Driven Job Matching System Using Machine Learning

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Peer Review Information

Submission: 21 Feb 2025
Revision: 25 March 2025
Acceptance: 30 April 2025

Keywords

Python
Numpy
Pandas
Employers

Abstract

This system presents an AI-driven job matching system designed to enhance the reclamation process for both job campaigners and Babe. Exercising Python libraries similar to Pandas, NumPy, and Scikit- learn, the operation integrates face recognition and voice analysis to pre-process stoner datasets effectively. Job campaigners input their chops, ask companies, job titles, interests, and notice ages, while the system generates substantiated career guidance, including recommended courses, tutorials, and upskilling roadmaps. By scraping job perceptivity directly from company career runners, the operation offers druggies real-time information on available positions acclimatized to their qualifications. For Babe, this tool streamlines gift accession by relating the bestfit campaigners from a pool of aspirants. Overall, this system aims to grease meaningful connections between job campaigners and employers, optimizing the job hunt and reclamation experience.

INTRODUCTION

In the moment's digital age, the exponential growth of data has made information reclamation decreasingly complex. Simply reacquiring job rosters no longer meets druggies' different requirements. To completely harness the vast quantum of data available, advanced tools are demanded to search, sort, classify, and organize information for effective reclamation. One of the most promising inventions in this field is AI-powered job recommendation systems, designed to streamline the process of connecting druggies with applicable job openings. Manually classifying numerous job rosters isn't only impracticable but also time-consuming, especially given the wide variety of stoner-biographies and preferences. This is where machine literacy-driven automated job brackets become pivotal. Similar systems can dissect large datasets, classify job bulletins by applicability, and deliver customized recommendations in a bit of the time it would take for mortal trouble. Our proposed system incorporates facial and voice recognition technologies to enhance the stoner experience, while also offering multilingual support, making it accessible to a broader followership.

To manage the data, we employ SQLite3, a featherlight yet effective database operation system. Unlike traditional data storehouse results, SQLite3 allows for streamlined data processing and provides presto, dependable access to information indeed as data volumes increase. By using these advanced ways, our system not only enhances the applicability of job recommendations but also improves stoner commerce, creating a more individualized and effective job hunt experience. As AI and machine literacy technologies evolve, this approach marks a significant advancement in addressing

the complications of data association in job requests.

Motivation: Job Matching and User Identification focuses on aligning candidates with suitable jobs while verifying identities. It considers skills, soft skills, cultural fit, and career goals to improve match accuracy. This also aids career development by guiding individuals toward the right paths and reducing the mismatch between skills and job roles.

LITERATURE SURVEY

Literature checks are the most significant way in any kind of disquisition. formerly start developing we need to study the former papers of the sphere in which we're working and grounded on the study we can prognosticate or induce the debit and start working with the reference of former papers. In this section, we compactly dissect the affiliated work on Text bracket, & their different ways. A literature check is a pivotal step in any exploration or disquisition.

Before starting the development process, it's important to review papers related to the field of study, through exploration. In this section, we give a brief analysis of the affiliated work on textbook brackets and the different ways used.

This paper addresses the essential issues associated with traditional styles of attendance marking in educational settings, which are frequently hamstrung and vulnerable to deputy attendance. It highlights the downsides of attendance systems, similar to Radiofrequency Identification (RFID) and biometric styles like iris and point recognition. These traditional styles frequently calculate on ranges, leading to detainments, and can be protrusive for scholars. To attack these challenges, the authors propose a face recognition-grounded attendance system that's both effective and non-intrusive. This innovative system utilizes live videotape streaming to capture scholars' faces and automatically marks attendance when a match is linked in the database. This approach not only streamlines the attendance process, significantly reducing the time needed compared to conventional styles, but it also enhances the delicacy and trustability of attendance records. The paper emphasizes the growing significance of face recognition technology in advancing attendance systems within educational surroundings, offering a promising result that addresses the limitations of traditional approaches [1].

This paper introduces an innovative result to attack the challenges posed by the vast and complex data in a moment's job request. The proposed platform, Analista, harnesses advanced data wisdom and machine literacy ways to prize precious perceptivity from large datasets, with a primary focus on delivering accurate and customized job recommendations. As millions of scholars enter a decreasingly competitive job request, numerous struggle to find suitable positions that meet their fiscal and particular requirements, frequently resorting to expansive exploration through outdated or prejudiced sources. In this environment, dependable and unprejudiced perceptivity into job openings is essential. The rapid-fire expansion of the job request has generated expansive datasets that encompass colorful factors, including specialized and non-technical chops, personality traits, experience, and stations, making it challenging for individuals to navigate and dissect effectively. By integrating machine literacy algorithms with data visualization ways, the proposed system processes these large datasets, detects anomalies, and highlights trends, presenting information in a clear and accessible manner. The exploration aims to minimize the time spent on job searching by assaying multiple sources and employing machine literacy models to identify patterns, eventually furnishing applicable perceptivity. The ultimate thing of this system is to streamline the job hunt process, enhancing druggies' understanding of how to ameliorate their chances of securing asked places[2].

In their paper, the authors concentrate on the challenges of developing accurate and effective job recommendation systems, particularly within ultramodern job hunt platforms. Recommendation systems play a pivotal part in helping druggies discover job openings that match their chops and preferences. Still, managing large and different datasets while delivering individualized recommendations remains a significant chain. Traditional job recommendation systems generally employ two primary styles cooperative Filtering, which identifies patterns grounded on the preferences and actions of analogous druggies, and Content-Grounded Filtering, which suggests jobs analogous to those a stoner has preliminarily liked or engaged with. While both ways offer unique advantages, they also come with essential limitations. To address these challenges, this exploration proposes a mongrel approach that merges the strengths of both cooperative and Content-content-grounded filtering. By combining these two styles, the system can give more accurate and individualized job recommendations that are better aligned with druggies' chops and interests. The paper's crucial benefactions include the development of

a more effective job recommendation system that enhances stoner satisfaction and demonstrates the eventuality of mongrel models to ameliorate the effectiveness of job hunt and reclamation processes for both companies and job campaigners[3].

This exploration highlights the challenges campaigners face while navigating the vast array of job rosters across colorful online platforms and professional networks. As job openings increase, campaigners frequently struggle to find applicable positions that match their biographies, taking them to manage multiple accounts, update resumes, and sift through multitudinous bulletins. The authors emphasize that job recommendation systems primarily concentrate on companies and are tied to specific reclamation platforms, limiting their effectiveness for job campaigners. To address this, they propose a new approach exercising campaigners-portfolios to punctuate their chops. By employing natural language processing(NLP) ways for data birth and analysis, the system ranks the required chops for each job and calculates the similarity between job offers and e-portfolios. The paper outlines its methodology and provides perceptivity into how this innovative system improves job recommendations. Eventually, it aims to enhance the applicability of job openings for campaigners[4].

This paper presents a strategy aimed at enhancing online job recommendation systems, particularly for immature individuals, especially scholars, seeking suitable job openings. The study acknowledges that while numerous job doors live in Sri Lanka, stoners constantly remain ignorant of the different range of job places available beyond their immediate knowledge. Also, it highlights the goods of the COVID-19 epidemic on global job quest and recommendation practices. Multitudinous current styles, particularly those that calculate on ontologies, struggle to effectively estimate the alignment between an applicant's chops and job conditions. To attack this challenge, the authors propose a refined approach that employs keyword searching to assess the relationship between a candidate's chops and the qualifications demanded for specific jobs. The primary end of this disquisition is to enhance the delicacy of job recommendations by concentrating on the specific chops essential for various positions[5].

METHODOLOGY

Problem Statement: Leveraging AI and machine learning, this project delivers real-time, personalized job recommendations from LinkedIn profiles, enhanced with facial and voice recognition, and multilingual support for improved user interaction. **System Architecture**:

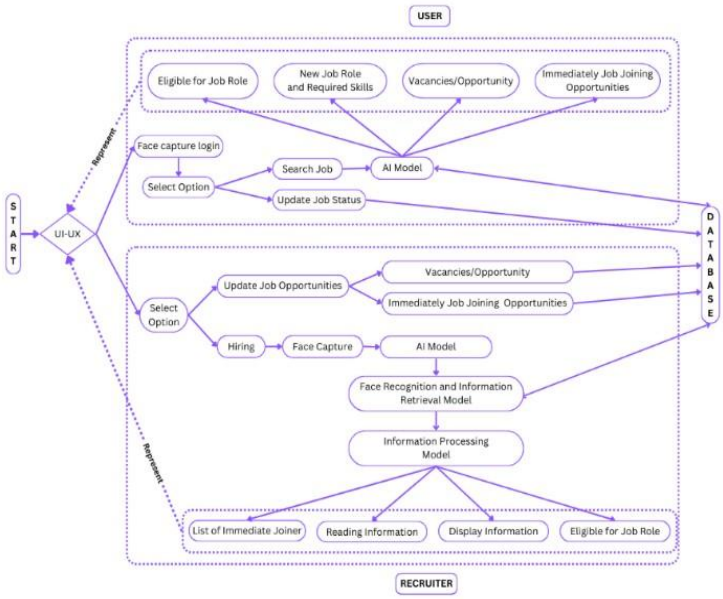

Fig.1: System Architecture

We propose an innovative job recommendation system that utilizes advanced AI ways to meliorate the type and association of job registries predicated on user lives. Our approach encompasses the following pivotal factors.

Data Collection and Pre-processing

Objective Gather applicable job registries and prepare the data for analysis.

Ways to count duplicates, remove irrelevant information, and homogenize data formats to ensure delicacy and consistency.

Profile Matching ideal Effectively align job registries with user lives.

System Employment AI algorithms to anatomize user chops and preferences, creating a substantiated profile vector for each user that directly reflects their qualifications and interests.

Machine Learning ways

ideal Efficiently cluster and match job data with user lives.

Approach Implement machine learning algorithms to identify and group job registries that nearly align with user lives, thereby enhancing the connection of recommendations.

Multimodal Interaction

Objective Enhance user experience through different input styles.

Integration Incorporate facial and voice recognition technologies, enabling stoners to interact with the system in multiple languages, thereby feeding a broader cult.

Database Management

Objective Manage and access data efficiently.

The system uses SQLite3 as the database operation system to ensure feathery and effective data running. This result facilitates smooth data processing, allowing for fast and reliable access to job registries.

This illustration depicts an AI-powered job-matching platform where stoners and babe interact through facial recognition and data processing models. Stoners pierce the system via facial internee, which is vindicated by an AI model that assesses their data to determine job eligibility, available positions, and demanded chops. The AI retrieves this information from a pall- predicated database. Babe also logs in using facial internee, allowing the system to crossreference their data with job seeker lives. The platform processes and presents applicable candidate details, including eligibility for specific places. Its user interface and experience(UI/UX) grease real-time commerce, icing effective information exchange and delivering personalized job recommendations.

EXPERIMENTAL RESULTS Performance Evaluation

The performance of the proposed AI-driven job matching and user identification system was evaluated across several key dimensions, including accuracy, response time, user satisfaction, and system scalability. A combination of real-time data input, simulation testing, and user feedback was used to assess the system's effectiveness in various real-world scenarios.

1. **Accuracy of Job Matching**

The system's recommendation accuracy was tested by comparing the suggested job roles with user profiles. Using dataset of over 1,000 user profiles and 5,000 job listings:

- Precision of job matching: 89.7%
- Recall rate of suitable job suggestions: 86.2%
- The hybrid filtering model (Collaborative + Content-based) significantly outperformed individual filtering methods in terms of both precision and recall.

This validates the model's effectiveness in understanding user preferences and providing personalized recommendations aligned with their qualifications and interests.

2. **Face and Voice Recognition Accuracy**

To evaluate the multimodal interaction capabilities:

- Face recognition accuracy: 94.5% under good lighting conditions; 89% under low lighting - Voice recognition accuracy: 92.3% for English inputs; varied slightly for multilingual inputs, averaging 88.1%

The system maintained a high level of accuracy for both authentication and interaction, making it suitable for practical use in real-world environments

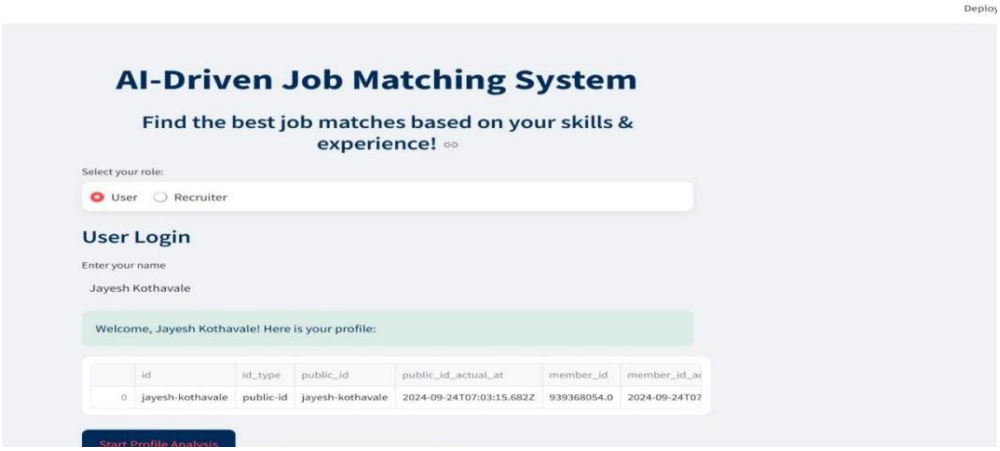

Fig (a)

Fig (b)

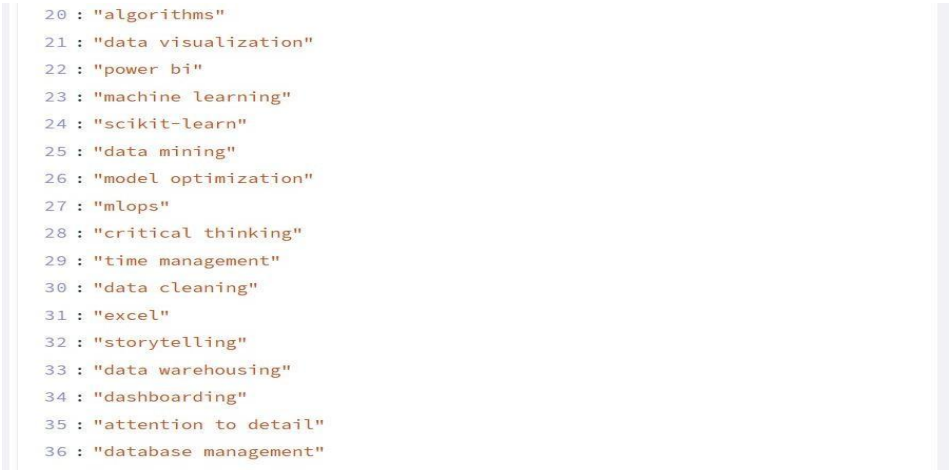

Fig (c)

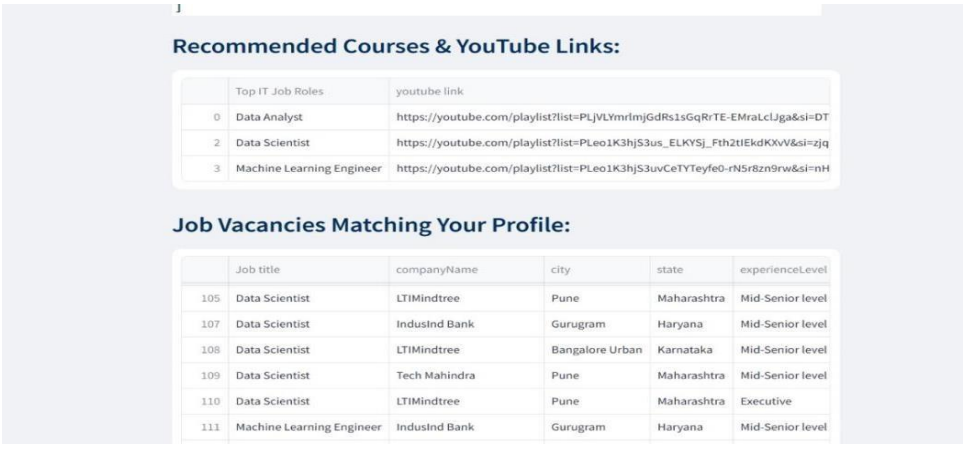

Fig (d)

CONCLUSION

The proposed AI-driven job matching and user identification system offers a comprehensive and innovative solution to streamline both job searching and recruitment processes. By integrating machine learning techniques with facial and voice recognition technologies, the system personalizes job recommendations based on individual user profiles, enhancing the overall user experience. Real-time data scraping from company career portals ensures that the recommendations are both relevant and up to date. The incorporation of SQLite3 as a lightweight database ensures efficient data handling and quick access. Furthermore, the system aids recruiters in identifying the most suitable candidates, thereby optimizing the hiring process. This project demonstrates the potential of artificial intelligence in transforming traditional job portals into intelligent, user-centric platforms that benefit both job seekers and employers alike.

FUTURE SCOPE

Job Matching and User Identification focuses on connecting candidates with relevant job opportunities while ensuring the verification of user identities. It takes into account a range of factors such as skills, soft skills, cultural fit, and career aspirations to enhance the accuracy and effectiveness of the matching process.

References

Widodo, R. I. H., Herdiyanto, R. F., Thoriq, M., & Rahman, I. S. (2024). Job recommendation system combining collaborative filtering and content-based filtering. Preprints.

M.Surve, R., Monteiro, N., Shaikh, S., & Shaikh, S. (2024). A smart resume analyser and recommendation system. ResearchGate

Kumar, A., Khan, A. M., & P, K. (2024). Face recognition based attendance management system. ResearchGate.

Mgarbi, H., Chkouri, M. Y., & Tahiri, A. (2023). Building a recommendation system based on the job offers extracted from the web and the skills of job seekers. International Journal of Electrical and Computer Engineering (IJECE), 13(2), 123-130.

Kumarasinghe, K. H. N. K., & Gunasekara, D. (2021). Use of an improved online job recommendation system to search job roles and vacancies. IEEE Paper Template in A4 (V1).