

Online Job Portal Application using Machine Learning

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Abstract— In the rapidly evolving job market, an efficient and personalized job portal plays a pivotal role in connecting job seekers with suitable opportunities. This project aims to develop a comprehensive job portal application by integrating various machine learning algorithms, enhancing user experience and job matching accuracy. The key components include Natural Language Processing (NLP), K-Nearest Neighbors (KNN), skill matching, job recommendation, resume parsing, and Decision Tree-based decision-making.

This project aims to create a dynamic and intelligent job portal that not only streamlines the job search process but also provides a personalized and efficient experience for both job seekers and employers. The amalgamation of NLP, K-Nearest Neighbors, skill matching, recommendation systems, resume parsing, and decision trees forms a robust framework for enhancing the functionality and activeness of the job portal application.

Index Terms— INTRODUCTION, LITERATURE SURVEY, ALGORITHMS, USES, CONCLUSION.

I. INTRODUCTION

In today's job market, online job portals redefine traditional search processes, leveraging technology to bridge the gap between job seekers and employers. They offer streamlined talent acquisition, enabling exploration of diverse opportunities without geographical constraints. These platforms provide personalized job matching through advanced algorithms, analysing user profiles for tailored recommendations. This approach enhances placement success, benefiting both job seekers and employers with mutually beneficial matches.

Moreover, these portals prioritize a skill-centric approach, acknowledging the importance of aligning job seekers' qualifications and expertise with available positions. Skill-matching algorithms are pivotal, ensuring job feedback is tailored to individual candidates' specific skill sets rather than generic criteria. Online job portal applications are thus instrumental in shaping the future of recruitment through technology-driven solutions. By offering seamless, accessible, and personalized experiences, these platforms enhance the efficiency and effectiveness of job search and hiring processes, fostering a more connected and dynamic job market.

II. LITERATURE SURVEY

The literature on online job portals highlights their significant impact on the job market, recruitment processes, and employment ecosystem. Scholars emphasize their transformative role in revolutionizing traditional job search

methods, providing accessibility and convenience for seekers worldwide. This advancement meets the evolving needs of both seekers and employers, allowing seamless exploration of opportunities across geographical boundaries.

Scholarly discussions focus on the personalized nature of job matching algorithms within online job portals, exploring their intricate mechanisms. Emphasizing their analysis of user profiles, preferences, and skills, researchers highlight how these algorithms provide tailored job recommendations. The literature underscores how this personalized approach improves the effectiveness of the job search process, fostering more meaningful connections between candidates and employers.

Scholars underscore the significance of skill-centric approaches in online job portals, emphasizing skill-matching algorithms' role. These algorithms align job seekers' skills with job requirements, tailoring instructions to individual expertise. Additionally, researchers delve into how portals influence organizations' recruitment strategies, analysing impacts on hiring processes and talent acquisition.

In summary, the literature survey on online job portals highlights their transformative influence on the job market, discussing accessibility, personalized matching, skill-centric approaches, and recruitment strategy impacts. These insights contribute to understanding the significance of online job portals in shaping the contemporary employment landscape.

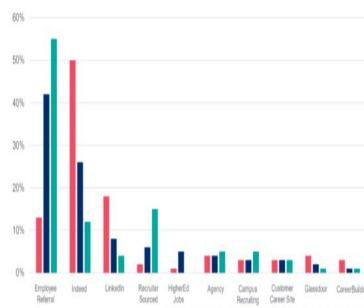


Figure 1. Sources for hiring job employees

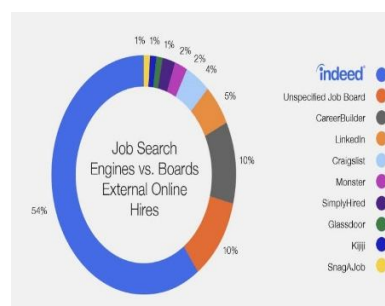


Figure 2. Online hiring vs Offline hiring

III. ALGORITHMS

Based upon the previous terms the application is created using several algorithms and many machine learning techniques so some of them were mentioned below.

A. K-Nearest Algorithm

In online job portals, the K-Nearest Neighbors (KNN) algorithm reshapes candidate-employer interactions, enhancing precision and efficacy of job recommendations. Rooted in pattern recognition and classification, KNN relies on closeness in feature space, considering attributes like education, experience, and skills to redefine candidate-employer matches.

In online job portals, the KNN algorithm excels in personalized job matching by analyzing candidate profiles and job specifications for similarities, surpassing traditional keyword matching. It addresses skill-centric challenges by considering candidate proximity based on skill sets, ensuring granular and precise matches beyond broad categories. In candidate-employer dynamics, KNN refines recommendations based on interactions, fostering symbiotic relationships.

Essentially, the K-Nearest Neighbors algorithm serves as a linchpin in orchestrating personalized job recommendations within online job portals. Navigating candidate profiles, skills, and preferences, it enhances job matching efficacy, propelling platforms in digital talent acquisition.

B. Skills Matching Algorithm

In the envisioned online job portal project, the Skill Matching Machine Learning Algorithm is pivotal, orchestrating talent acquisition precision. Surpassing traditional methods, it navigates nuanced skill sets, facilitating seamless connections between job seekers and employers within the dynamic ecosystem.

At its essence, the Skill Matching Algorithm employs machine learning to dissect the intricate skill sets within job seekers' profiles. Unlike traditional methods dependent on exact keyword matches, it embraces a sophisticated

approach, considering the breadth and proficiency of applicants' skills. Through comprehensive analysis of skill proficiency, relevance, and specificity, it presents a detailed depiction of each candidate's unique capabilities.

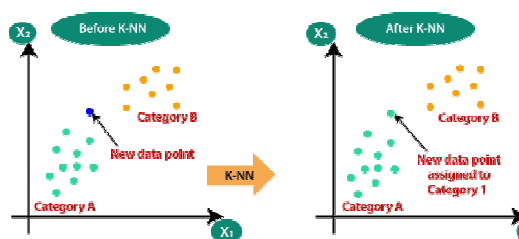


Figure 3.KNN training model

The Skill Matching Algorithm plays a pivotal role in job recommendation, meticulously analyzing diverse skills within job seekers' profiles. Employing advanced pattern recognition, it discerns contextual relevance, distinguishing genuine expertise. As a discerning curator of job listings, it evaluates nuances and contextual relevance, ensuring tailored opportunities aligning with both skills and desired expertise levels. Essentially, the Skill Matching Machine Learning Algorithm redefines job matching, introducing precision and personalization. Its sophisticated skill analysis, adaptive learning, and role in fostering connections position it as a cornerstone in the architecture of forward-thinking online job portals.

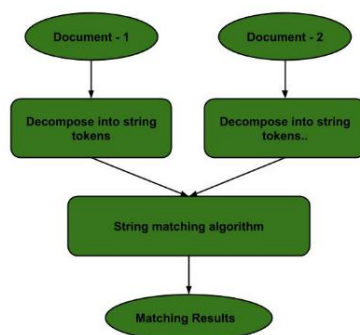


Figure 4. Skills matching algorithm

C. Natural Language Processing

In our dynamic online job portal, Natural Language Processing (NLP) enriches user experience and transforms information utilization by adding semantic understanding. Primarily handling resume parsing, NLP showcases linguistic analysis skills, extracting crucial details like skills and experiences from diverse resumes, surpassing traditional keyword-based parsing limitations.

NLP goes beyond resume parsing, enhancing job recommendations by understanding semantic contexts and skill relevance. It crafts enriched job descriptions, aiding employers in attracting qualified candidates. Continuous learning ensures adaptation to linguistic trends, keeping the platform advanced. This semantic analysis ensures tailored recommendations, improving user experience and job search efficacy.

In conclusion, NLP stands as a cornerstone in the architecture of our online job portal, infusing It endowed with the capability to decipher the intricacies of human language. From resume parsing to semantic job matching and beyond, NLP enriches the platform, creating a seamless and intuitive experience for users navigating the complex terrain of talent acquisition and career advancement.

D. Job Recommendation

In our online job portal, the Job Recommendation algorithm serves as a guiding compass, providing personalized precision in navigating career opportunities. This sophisticated machine learning marvel transcends conventional job matching, orchestrating analysis based on user insights into their professional journey, preferences, and skills for tailored recommendations.

Furthermore, the algorithm leverages collaborative filtering techniques, drawing inspiration from the collective wisdom of the community. It identifies patterns in job preferences of users with similar profiles, extrapolating these

to predict recommendations. The algorithm dynamically adjusts its recommendations based on users' skill and experience advancements, ensuring a perpetually relevant job pool.

In summation, the Job Recommendation algorithm is not merely a feature; it is the heartbeat of our online job portal. It epitomizes the marriage of data science and human aspirations, creating an ecosystem where career paths align harmoniously with individual dreams. As users traverse the digital landscape of opportunities, this algorithm stands as a steadfast companion, illuminating the path to professional fulfilment with every personalized recommendation it unfolds.

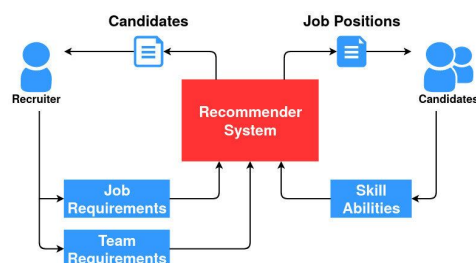


Figure 5. Job Recommendation System

E. Resume Parsing

In our Online Job Portal Application, the Resume Parsing Processing Machine Learning Algorithm revolutionizes resume analysis, orchestrating harmonization of diverse formats. It transforms routine tasks into insightful explorations, acting as a technological beacon. At its core, the algorithm normalizes resumes, ensuring a consistent dataset for accurate analysis.

Natural Language Processing (NLP) assumes a central role, transcending simple word analysis to comprehend contextual relevance and relationships. Through semantic analysis, it captures a candidate's experiences, accomplishments, and aspirations beyond keyword matching. Continuous learning refines its understanding of industry-specific skills, adapting to the evolving demands of the job market.

Seamlessly integrating with the Job Recommendation Algorithm, processed data forms the backbone of personalized career suggestions, ensuring tailored recommendations aligned with individual aspirations and competencies.

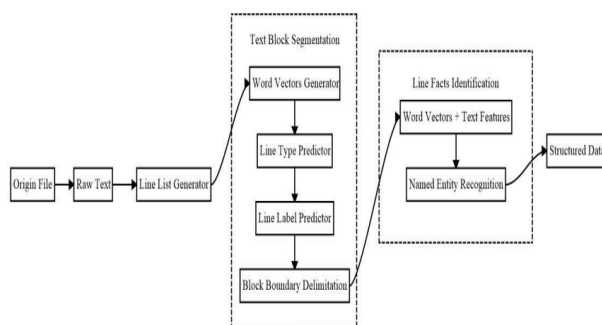


Figure 6. Resume Parsing functioning

F. Decision Tree

Within our Online Job Portal Application, the Decision Tree Algorithm strategically guides career choices and recruitment decisions. Employing a hierarchical structure, it unravels candidate profiles and job specifications, making nuanced decisions based on qualifications, experience, skills, and industry expertise.

Through a process of iterative refinement, the Decision Tree Algorithm optimizes its structure, ensuring that the questions posed at each node are the most informative for classification. This iterative learning mechanism allows the algorithm to evolve dynamically, making it adept at handling evolving job market dynamics and industry trends.

In conclusion, the Decision Tree Algorithm stands as a linchpin in our Job Portal Application, harmonizing the aspirations of candidates with the array of opportunities available. It's not merely an analytical tool; it's a strategic navigator, guiding individuals and organizations toward mutually beneficial connections in the ever-evolving landscape of professional journeys.

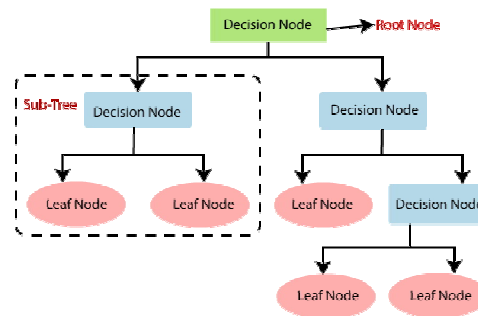


Figure 7. Implementation of Decision Tree

G. Homomorphic encryption

Homomorphic encryption, a revolutionary privacy-preserving technology, holds promise in resume processing within online job portals. It enables computations on encrypted data, ensuring confidentiality of sensitive resume details. In job portal applications, it secures transmission and storage of resumes, typically encrypted upon upload to the platform.

Homomorphic encryption enables encrypted resume analysis and processing, empowering machine learning algorithms like skill matching and job recommendation to operate directly on encrypted data. This ensures matching job requirements with encrypted skill sets and making recommendations without exposing resume contents.

In conclusion, integrating Homomorphic encryption into online job portals enhances data security and privacy, allowing seamless analysis of encrypted resumes while safeguarding personal details. This contributes to establishing a trustworthy and privacy-centric environment within the ecosystem.

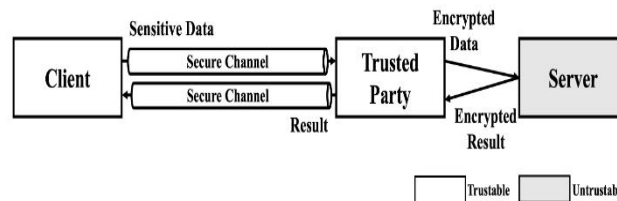


Figure 8. Block Diagram of Homomorphic Encryption

IV. USES OF ONLINE JOB PORTAL APPLICATION

Online job portals, leveraging advanced technologies like NLP and k-Nearest Neighbors, revolutionize employment navigation, offering a multitude of benefits and applications in the contemporary landscape.

A. Effective Job Matching

Using algorithms like k-Nearest Neighbors, the system analyzes candidate profiles against job requirements, ensuring precise matches and enhancing the likelihood of securing positions aligned with skills and aspirations, saving time for both seekers and recruiters.

B. Personalized Job Recommendations

Job Recommendation algorithms, driven by Decision Trees, offer personalized job suggestions by understanding candidates' unique attributes like skills and preferences, streamlining the job search process for tailored opportunities aligning with career goals.

C. Skills Based Matching

Skill Matching algorithms ensure candidates are matched with roles aligning with their specific skill sets, aided by Decision Trees assessing skill relevance and proficiency for accurate matches.

V. CONCLUSION

This online job portal integrates cutting-edge machine learning algorithms like k-Nearest Neighbors, Decision Trees, Skill Matching, Job Recommendation, and Natural Language Processing. k-Nearest Neighbors ensure

precise matches, Decision Trees offer personalized recommendations, and Skill Matching minimizes biases. Natural Language Processing introduces a conversational interface, catering to users with varying proficiency. Decision Trees ensure adaptability, making the system responsive to industry shifts. This project pioneers career exploration with advanced algorithms, shaping the future of recruitment.

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