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Job Recommendation System using NLP

Prof. D. B. Satre, Rohit V Badke, Mahesh Aher, Tanmay Kanase, Abhay Patil

CE Department

Marathwada Mitramandal's Institute of Technology,, Pune, Maharashtra, India

Abstract: In today's competitive job market, it is increasingly important for companies to hire the best employees for the job and to ensure that they retain those employees for the long term [1]. We address the problem of recommending suitable jobs to people who are seeking a new job.Our technology uses all previous job transitions along with employee and institution data to predict an employee's next job transition. Faced with the multitude of recruitment information on the Internet, job seekers always spend a lot of time searching for useful information. To reduce this heavy work, we design and implement an online job recommendation system [3].This paper describes a process that focuses on building a job recommendation system for a recruitment industry, starting from data acquisition to the final result. Result of this project is a NLP based recommendation system used as an engine for the recruitment platform.

Keywords: NLP: Natural Language Processing, JRS: Job Recommendation System.

I. INTRODUCTION

Over the past years, internet usage has increased and the hiring process has changed. Almost all job offers are now made online, either on company websites or through various online recruitment platforms. This makes post-ads more accessible to job seekers. Job applications are also made online by email or directlyon thecandidature recruitment platform. These two changes resulted in a significant increase in the number of job applications received per job offer. As a result, this leads to a phenomenon known as "information overload" in a decision support environment. While a lack of information often leads to poor decision-making, too much information can also lead to poor decision-making if we fail to manage all the information properly[1].

Recently, job recommendation has attracted a lot of attention in search and has played an important role in online recruitment sites. Unlike traditional recommender systems that recommend items to users, a job recommender system (JRS) recommends one type of user (e.g. job seekers) to another type of user (e.g.hiring staff). Specifically, a job recommendation system is designed to provide a job seeker with a list of job descriptions based on their preferences, or to generate a list of job seekers for a recruiter based on requirements. of the post. In order to achieve a good recommendation effect, JRS offers and applies many recommendation methods. Typically, for a given user, existing JRS use specific recommendation methods to generate a ranked list of jobs/candidates[3].

II. LITERATURE SURVEY

JobFit: Job Recommendation using Machine Learning and Recommendation Engine

In this research author used various Machine Learning Algorithmswhich includes Linear regression, Decision Tree, Random Forest Classifier, Natural Language Processing for providing HR a sorted list of candidates with those who are more fit for job. They also used content-based and collaborative filtering techniques which recommends jobs to the user based on theitem similarity to the other jobs the user has previously liked. Dataset used are "Similar Skills", "National Longitudinal Survey of Youth 1997", "IBM HR Analytics Employee Attrition and Performance", "Household Income and Labour Dynamics in Australia", "German Socio-Economic Panel". Author compared various recommender system and proposed a system which overcome problems related to those recommender system.

Based on application of AI technology in resume analysis and job recommendation

In this paper author have presented a recommender system that can be applicable in large job fairs where several job seekers seek to match with maximum of jobs vacancies. Other than 'education', 'skill' author also considered 'personality traits' of applicant which obtained satisfactory performance in the evaluation of job applicants. They

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usedcontent-based recommendation method which include 'Term Frequency matrix', 'Document Vector' and 'similarity calculation'.

Enhanced Job Recommendation System

In this paper author presented recommendation system as supervised machine learning problem. Their techniqueutilize all past job transitions data as well as data associated with employees institution to predict its next transition. They uses 'collaborative filtering' 'content based filtering' and 'Vector Space Model'. This paper conclude that collaborative filtering gives better performance and overall factors. This paper also states improvement which can be made using hybrid algorithms alongside with collaborative filtering algorithms to further optimize recommendation system.

III. PROPOSED SYSTEM

OCR: The process of our system's job matching service begins when a candidate uploads their curriculum vitae (CV). The CV is then digitised and examined using optical character recognition (OCR) technology.

The system also analyses job advertisements using natural language processing (NLP) methods. Because of this, the algorithm is able to extract crucial job needs and competencies from job listings. The system then compares the CV and job postings using a variety of algorithms and methods to assess how similar the two documents are to one another. The algorithm recommends jobs to the applicant that match their talents and experience based on the findings of this study. In conclusion, our job matching system offers job searchers an effective and fast way to locate employment possibilities that fit their skills and professional objectives. The hiring procedure includes a comprehensive NLP analysis of the job posting and the CVs kept in our database. Advanced methods are used in this research to find the degree of similarity between the two. Our algorithm creates a list of suggested applicants who are most in line with the job requirements based on these findings. This procedure guarantees a thorough and effective hiring process and enables us to find the best applicants for the job.Both the CountVectorizer and the Term Frequency-Inverse Document Frequency (TF-IDF) approaches are frequently employed in text mining and natural language processing. They can be applied to text data preprocessing for job recommendation systems.



Fig. System Architecture

TF-IDF:TF-IDF is a more sophisticated technique that considers both the value of each word in the collection of documents as well as the frequency of words in a text. Each word is given a weight based on how frequently it appears in a text and how uncommon it is overall in the collection of documents. The TF-IDF score is the name given to this factor. TF-IDF could be utilised in a job recommendation system to give important terms more weights.

CountVectorizer: A collection of text documents can be turned into a matrix of word counts using the straightforward method known as "CountVectorizer." It compiles a vocabulary of every word used in the text and calculates how often each word appears in each document. The generated matrix can be used to represent the documents numerically so that machine learning algorithms can use it as input. The job descriptions and review texts might be represented as bag-of-words vectors using CountVectorizer in a job recommendation system so that similarity metrics could be used to compare the vectors and suggest the best job matches.

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KNN:A common technique used in recommendation systems, particularly job recommendation systems, is K-nearest neighbours (KNN). KNN can be used in a job recommendation system to find similar career openings or profiles based on specific criteria and suggest appropriate jobs to users.

- 1. Data Representation: In a high-dimensional space, each user profile or job title is represented as a feature vector. Qualifications, abilities, experience level, industry, location, and other pertinent characteristics might be included in the features.
- 2. Similarity Measure: The distance between feature vectors is calculated using a similarity measure, such as the Euclidean distance or cosine similarity. It establishes the degree of similarity between various user profiles or job roles.
- 3. Nearest Neighbour Search: The system measures the distance between the user's profile and all the labelled profiles in the database when a user asks for job recommendations. Based on the estimated distances, the KNN algorithm determines the K closest neighbours to the user's profile.

KNN can also be integrated with other recommendation algorithms, including collaborative filtering or content-based filtering, to produce hybrid recommendation systems that take advantage of the advantages of several strategies.

IV. CONCLUSION

In this study, a recommendation system for open positions is based on resume analysis. The proposed system for recommending candidates for open positions is based on resume analysis. All of these are intended to act as a foundation for job applicants' self-awareness and evaluation, to help them navigate the plethora of openings presented at large-scale interview events, and even to help them pinpoint the positions that are currently the best matches for them.

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