

SKILL AND JOB RECOMMENDER SYSTEM

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Maximum Marks	4 Marks

Paper 1: Jorge Valverde-Rebaza, Ricardo Puma, Paul Bustios, Nathalia C. Silva, Job Recommendation based on Job Seeker Skills: An Empirical Study, March 2018

job recommender systems have become popular since they successfully reduce information overload by generating personalized job suggestions. Although in the literature exists a variety of techniques and strategies used as part of job recommender systems, most of them fail to recommending job vacancies that fit properly to the job seekers profiles. Thus, the contributions of this work are threefold, we: i) made publicly available a new dataset formed by a set of job seekers profiles and a set of job vacancies collected from different job search engine sites; ii) put forward the proposal of a framework for job recommendation based on professional skills of job seekers; and iii) carried out an evaluation to quantify empirically the recommendation abilities of two state-of-the-art methods, considering different configurations, within the proposed framework. In this paper, we proposed a framework for job recommendation task. This framework facilitates the understanding of job recommendation process as well as it allows the use of a variety of text processing and recommendation methods according to the preferences of the job recommender system designer. Moreover, we also contribute making publicly available a new dataset containing job seekers profiles and job vacancies. Future directions of our work will focus on performing a more exhaustive evaluation considering a greater amount of methods and data as well as a comprehensive evaluation of the impact of each professional skill of a job seeker on the received job recommendation.

Paper 2: Shaha T. Al-Otaibi^{1*} and Mourad Ykhlef², A survey of job recommender systems, 3 August, 2012

Recommender systems are being broadly accepted in various applications to suggest products, services, and information items to latent customers. Many e-commerce applications join recommender systems in order to expand customer services, increase selling rates and decrease customers search time (Schafer et al., 1999). For example, a wide range of companies such as the online book retailer Amazon.com (Linden et al., 2003), books (Mooney and Roy, 2000), and news articles (Das et al., 2007). Additionally, Microsoft provides users many recommendations such as the free download products, bug fixes and so forth (Shani and Gunawardana, 2011). All these companies have successfully set up commercial recommender systems and have increased web sales and improved customer fidelity. We used a literature analysis of many journals and proceedings related to the recruiting process and the job recommendation researches. We have seen from our literature review and from the challenges that faced the holistic e-recruiting platforms, an increased need for enhancing the quality of candidates/job matching. The recommender system technologies accomplished significant success in a broad range of applications and potentially a powerful searching and recommending techniques. Consequently, there is a great opportunity for applying these technologies in recruitment environment to improve the matching quality. This survey shows that several approaches for job recommendation have been proposed, and many techniques combined in order to produce the best fit between jobs and candidates. We presented state of the art of job recommendation as well as, a comparative study for its approaches that proposed by literatures. Additionally, we reviewed typical recommender system techniques and the recruiting process related issues. We conclude that the field of job recommendations is still unripe and require further improvements.

Paper 3: Deepali V Musale¹, Mamta K Nagpure², Kaumudini S Patil³, Rukhsar F Sayyed⁴, Job Recommendation System Using Profile Matching And Web-Crawling, May 2016

The developed system is job recommendation system for campus recruitment which helps college placement office to match company's profiles and student's profiles with higher precision and lower cost. For profile matching, two matching methods are used: semantic matching, tree-based knowledge matching and query matching. These methods are integrated according to representations of attributes of students and companies, and then the profile similarity degree is acquired. Based on profile similarity degree, preference lists of companies and students are generated. Also students can perform keyword based search for job profiles from various job recruitment sites. For obtaining data from online recruitment sites system uses web crawling. With loop matching, matching results would be further optimized and provide more effective guidance for recommendation.

A lot of research has been carried out in the field of job recommender systems. A large variety of job recommendation systems already exist that try to provide one or the other aspect of the information by applying different methods [4]. The key problem is that most of job hunting websites just provides recruitment information to website viewers. Students have to retrieve information among those displayed by websites to find jobs they want to apply. The whole procedure is lengthy and inefficient. In addition, many e-commerce websites, uses collaborative filtering algorithm without considering user's resume and item's properties [9]. W. Hong et al. developed iHR an online job recommendation system that classifies users into groups by using historical behaviors of users and individual information and then uses the appropriate recommendation approach for each group of users. This approach is suitable for the cases in which different users may have different attributes and a single recommendation approach may not be appropriate for all users [10]. Another approach, the Austrian job board for graduates Absolventen [11], uses an RS to suggest appropriate jobs to applicants. This system considers input as a CV to create the user profile. These user profiles are then compared with the available jobs. Moreover, the RS has been enhanced with implicit relevance feedback, which allows the system to find out user preferences. Mamadou et al. presented an online social network-based recommender system that extracts users' interests for jobs and then make recommendations according to user's interest [12]. Yao et al. proposed a hybrid recommender system that exploited the job and user profiles and the actions undertaken by users in order to generate recommendations. Unfortunately, they did not satisfy both job seekers and recruiters at the same time to achieve a successful recommendation. Different from these previous works, we model the relations among users by cross-similarity which indicates the two-sided matching to generate preference for both job seekers and recruiters [13].

Paper 4: G.Mahalakshmi¹, A.Arun Kumar², , B.Senthilnayaki¹ , J.Duraimurugan¹, Job Recommendation System Based On Skill Sets, 8 August 2022

Machine learning is a sub-field of data science that concentrates on designing algorithms that can learn from and make predictions on the data. Presently recommendation frameworks are utilized to take care of the issue of the overwhelming amount of information in every domain and enable the clients to concentrate on information that is significant to their area of interest. One domain where such recommender systems can play a significant role to help college graduates to fulfill their dreams by recommending a job based on their skill set. Currently, there are plenty of websites that provide heaps of information regarding employment opportunities, but this task is extremely tedious for students as they need to go through large amounts of information to find the ideal job. And many students are not aware of which job is suitable for them. Nowadays, the IT fields are in a boom. Many engineering students are learning some technical skills by doing some

courses but they don't know which skill is for which job. Simultaneously, existing job recommendation systems only take into consideration the domain in which the user is interested while ignoring their profile and skillset, which can help recommend jobs that are tailor-made for the user. This paper examines the user's resume then compares the knowledge of degree, soft skills, hard skills, and the projects he has done and then only the system recommends the jobs for that user. The system not only recommends the jobs but also shows the score of his/her resume for the respective job. Then, the system also recommends skills to improve the scores of their resume.

Most works are just built for the companies or for the purpose of making money from the people by giving some irrelevant choices. Many were using collaborative recommendation, which recommends the many searched jobs or the jobs which were chosen by some other. It only works if the system deals with more number of resumes which seems it can only be used by the companies. Some systems are asking to log in and some were asked to buy subscriptions. Logging in makes you redirect some spam mails. In many papers, they have been solved through content recommender which is not enough. A literature paper [15] had done research on content recommender system, tfidf vectorizer, and cosine similarity in a row but in that the author doesn't think about the implementation process and only concentrated more on securing the data. Job Recommendation System has a major role to play among recommending systems. With the presence of new algorithms and techniques, the system needs to evolve along with it. The main objective of this project is to recommend a suitable job for the candidates.