Online Job and Candidate Recommendation System

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ABSTRACT

To develop an enhanced web application, using web services for both online job and candidate recommendation system. By using Professional Social Recommender (PSR) and Text field filtering the recommendation of jobs and candidates will be classified. Three tier architecture designs have been implemented for efficient data retrieval and data transfer. They are Job seeker interface, Candidate recruitment interface and Recommendation database will be the architecture taken for developing this application. The primary architecture will be the job seeker interface, in followed with candidate recruitment interface and Recommendation database will be interconnected. The professional social recommender will works as a third party agent and the agent will retrieves all the recommended job and candidate profiles. A panel will be designed for displaying the recommended job and candidate details. All the displayed jobs will be more relevant to the user's profile. The generated user and candidate profile will be encrypted in order to overcome the privacy breaches.

Keywords: Professional Social Recommender (PSR), online job, Candidate recommendation

1. INTRODUCTION

Generally, data mining (sometimes called data or knowledge discovery) is the process of analysing data from different perspectives and summarizing it into useful information - information that can be used to increase revenue, cuts costs, or both. Data mining software is one of a number of analytical tools for analysing data. It allows users to analyse data from many different dimensions or angles, categorize it, and summarize the relationships identified. Technically, data mining is the process of finding correlations or patterns among dozens of fields in large relational databases.

Data mining, the extraction of hidden predictive information from large databases, is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. The automated, prospective analyses offered by data mining move beyond the analyses of past events provided by retrospective tools typical of decision support systems. Data mining tools can answer business questions that traditionally were too time consuming to resolve. They scour databases for hidden patterns, finding predictive information that experts may miss because it lies outside their expectations.

Most companies already collect and reference massive quantities of data. Data mining techniques can be implemented rapidly on existing software and hardware platforms to enhance the value of existing information resources, and can be integrated with new products and systems

as they are brought online. When implemented on high performance client/server or parallel processing computers, data mining tools can analyse massive databases to deliver answers to questions such as, "Which clients are most likely to respond to my next promotional mailing, and why?"

2. PROPOSED SYSTEM

The internet-based recruiting platforms become a primary recruitment channel in most companies. While such platforms decrease the recruitment time and advertisement cost, they suffer from an inappropriateness of traditional information retrieval techniques like the Boolean search methods. Consequently, a vast amount of candidates miss the opportunity of recruiting. The recommender system technology aims to help users in finding jobs that matches their personnel interests, it has a successful usage in e-commerce applications to deal with problems related to information overload efficiently. In order to improve the e-recruiting functionality, the recommender system has been enhanced for building personalized recommender systems for candidates and job matching. The fast growth of the internet caused a matching growth of the amount of available online information that increased the need to expand the ability of users to manage all this information. Recommender systems are being broadly accepted in various application to suggest products, services and information items to latent customers.

Gathering the details from the user's profile, CV's and creating job recommendations and matching the profile for the candidate recommendations. The candidates profile details will match with the candidate recruitment profile for providing recommendation matching information. According to the professional recommender system the profiles will be consolidated for getting the confident information. Recommended job and candidate information can be changed according to the user's recruitment needs and user's updated profile details. Recommendation details available in search mode also, jobs recommendations can be search area wise, city wise and state wise, domain interest.

3. MODULE

- Architecture Creation
- Web Services
- Job recommendation with PSR
- View Recommendation

3.1 Architecture Creation

The architecture aligns recommender system with the recruiting process, a workflow management subsystem linked to database management subsystem as the central component. All information related to recruiting activities is stored in the database. The integrated architecture for employee recruitment and recommender system is built on the workflow management subsystem and database to manage the information flow and storage. For the integration of recommender system, we added two important steps: First, a process to build job profiles that describing the job requirements and listing all related skills an employee for this profile should have. Second, they integrated a person-job recommender in the recruitment process as a process step in the selection phase. Finally, matching candidate and jobs can be managed by automated recommendation approaches.

3.2 Web Services

Through introducing the web services, the recommendations can be done. The recommendation system is the method of interconnection between the job seeker and candidate recruitment in various categories. Here the web services will be acting as the intermediate node. Here the connection will be established for job and candidate recommendations. Initially the recommendation database will be connected with the user profile followed by candidate recruitment. So the relevant matches of job and candidate recommendation are given to the job seeker and candidate recruiter.

3.3 Job recommendation with PSR

The job recommendation support in the recruitment process can be observed when considering the phases of the recruitment such as the handling of candidates' applications and the pre-selection of candidates. The recommender systems techniques can be used to address the problem of information overload by prioritize the delivery of information for individual users based on their learned preferences. Additionally, the success of personalization technologies depends critically on the existence of comprehensive user profiles that precisely capture user's interests and the perfect matching method. Moreover, the recommender systems could use historical rating information to determine which type of job required which type of candidate characteristics in the past in order to be rated positively by the recruiter. This information could then be used to predict the match between job and previously not rated candidates. The need of applying the recommender system techniques for selection process can be motivated from different perspectives. While we interested in how people find an appropriate job, other researchers are interested in how change the ways people effectively collaborate once the candidate is recruited. This increases the requirements to select candidates that not only fit with the requirements of the job but also with the team members in terms of interpersonal compatibility.

3.4 View Recommendations

Finally all the recommendation can be viewed in the front end design on the tier one (User interface). A dedicated panel will be designed for displaying both job recommendation and candidate recommendation. This recommendation will be change according to their updated in the profile or posts. Basically recommendations can be create from the user's application and all job updates can be shown. Job search options will be integrated in the user interface. So that user interface is the primary architecture and candidate recommendation will follows the database according to this design.

3.5   Problem definition

According to the survey 79% of job seekers use social media in their job search increase to 86% of young job seekers who are in the first 10 years of their careers .Nearly 2 in 3 employer does not or does not know to use social media to promote job openings and 3 in 4 says their employers does not or does not know to promote their employment .Internet users are using Social Network and 60 % of the internet users are using E-Commerce Application and 40 % of the internet users are viewing news on online. So that according to our proposed system, the problem definition is the combination of these three networks using web services. Nearly 69% of job seekers would not take a job with a company that has a bad reputation, even if employed and 84% would leave consider leaving their current job if offered a job by a company with excellent reputation.

According to a study, on average every corporate job opening attracts 250 resumes but only 4 to 6 of these people will be called for an interview and only one of those will be offered a job. Networking is one of the important component of job searching .In fact, the US Bureau of Labour report that 70% of all jobs are found through networking .Some survey reports even higher

numbers. According to the Society of Human Resources Management, at least 84% of employers are using social media as a recruitment tool with an additional 9% planning to do so. These days most employers and agencies today are using social media to source the right candidates, which means it should be a big part of job search strategy. Online social network sites have become an essential forum to advertise your skills.

4. METHODOLOGIES

- Text field filtering
- Professional Social Recommender
- System requirements for candidate/job recommendation

4.1 Text field filtering

The recommender system approaches are classified into the following main four categories: Collaborative filtering, Content-based filtering, Knowledge-based filtering and Hybrid approaches. The descriptions of different techniques are presented in the following paragraphs.

- Collaborative Filtering is the one of the most successful approaches for building recommender systems. It applies the known preferences of a set of users to predicate the unknown preferences for new users. CF approaches have the capability of working in domain where items contents are difficult to obtain or cannot be parsed automatically.

- Content-Based Filtering is treated as information retrieval problem or machine learning problem. In information retrieval problem, the document representations have to be matched to user representations on textual similarity while, in machine learning problem, the textual content of the representations are combined as feature vectors, which are used for training a prediction algorithm. Additionally, unrestricted texts in user profile. In this type, there are no attribute names with well-defined values. A common approach to deal with text fields is to exchange the text to a structured representation.

- Knowledge-based approach, this type of recommender systems attempts to suggest objects based on interference about users needs and preferences. This approach assists users in the determination of suitable solutions from complex product and service assortments. These solutions based on exploiting deep knowledge about the product domain to figure out the best wishes of the customer. They can use rules and patterns to recommend items based on functional knowledge of how a specific item meets a particular user need.

- Hybrid Approach, all recommendation approaches that mentioned above have characteristics and challenges. To get better performance and overcome challenges, these approaches have been combined. In general, collaborative filtering is integrated with other techniques in an attempt to avoid these challenges. The different ways to integrate collaborative filtering, content-based filtering and knowledge-based approaches into a hybrid recommender system are presented.

4.2 Professional Social Recommender

Professional social recommender approaches for human resource management in general and recruiting processes in particular. Most companies put the focus on their own e-recruiting platforms as primary recruitment channels. Job ads are published automatically on the job portal as soon as they are entered into the system. On the other hand, the applicant creates a profile to

apply it for one of the listed job positions. The user profile is stored in the system, letting the applicant reuse it for other job position. The last functionality gives the companies possibility to create the applicants pool. Thus, the companies achieved a uniform view for all applicants data in one candidate pool. This pool is used by the recruitment department to find the applicant documents. Appropriate applicants documents are directed to the human resource departments for more processing. In addition, the system supports all required communication processes as well as tracks applicant status inside the application process.

Job recommendation problem is bidirectional recommendation between job-seeker and job. The recommendation process can be divided into two parts: job recommendation and job-seeker recommendation. The design idea of these two parts is the same roughly. For a job-seeker, the job with higher matching degree should be recommended to him. Similarly, for a job, the job-seeker with higher matching degree should be recommended to it. In general, the ranking items either are the top *n* candidates that best fit the job in consideration or the top *n* job profiles that best fit the candidates‟ preferences. Additionally, skills requirements matching need to distinguish between must-have and nice-to-have requirements in the matching process. Must-have requirements are constraints that should be possessed by the applicant, whereas nice-to-have requirements are preferences that are taken into consideration when ranking applicants.

4.3 System requirements for candidates/job recommendation

There are major requirements presented in literatures that should be derived when recommending candidates for a specific job.

- The matching of individuals to job depends on skills and abilities that individuals should have.
- Recommending people is a bidirectional process that needs to take into account the preferences not only of the recruiter but also of the candidate.
- Recommendations should be based on the candidate attributes, as well as the relational aspects that determine the fit between the person and the team members with whom the person will be collaborated.
- Individual is considered to be unique; we cannot choose a single person several times.

5. SYSTEM ARCHITECTURE
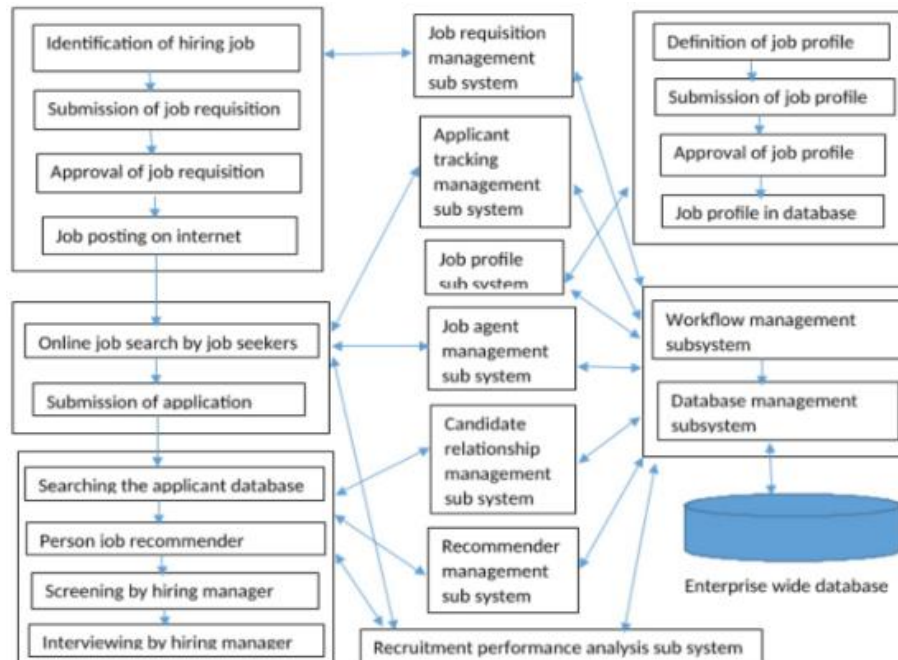
Fig 1. Overview of the system architecture

6. CONCLUSION

As mentioned in the abstract, here a web application using web services for both online job and candidate recommendation system are enhanced. 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 paper analysed the e-recruiting process and the different aspects related to applying the recommender systems in candidates and jobs matching problem.

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Conflict of Interest

None of the authors have any conflicts of interest to declare.

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