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Job Recommendation System Using Profile Matching And Web-Crawling

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Abstract:- **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 (e.g. Naukari.com,indeed.com). 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.**

Keywords:- Recommendation System; Web crawling; Parse cloud; Campus Recruitment centre

I INTRODUCTION

The recommender systems are being used in every possible system for example, clothes recommendation, book recommendation etc. However the type of recommendations provided may be different according to the domain of its use. In the case of job recommendation system the case is little bit different. Here, it will be favorable to provide mostly personalized and profile based job recommendations. In job recommendation systems, here are varieties of students, having different education level and skills. Based on student's respective background details, each one of them expects to get only those job recommendations which are highly relevant for that particular student. [1]

Also, two students having similar profiles may have different job tastes. Here, job taste can be defined as the preference criterion considered before applying for a particular job. For one, preference can be of getting a job in higher company, as opposed to the other who may be interested in having a job which offers higher payment. Considering this, the second phase of recommendations, are provided to the respective customer according to his/ her job taste or preferences. These job preferences are getting from the already applied jobs group of the students. [1]

The current campus recruiting systems have often been criticized due to their relatively lower matching degree (e.g. information overload or ambiguity), long recruiting time period and higher recruiting cost. Briefly telling, 4 points are there lead to those problems. First, the requirement descriptions the Human Resource given were not clear and definite, which resulted in the large range of requirement and led to job seekers' misunderstanding. Second, students who lack required career planning or cannot understand the requirement description thoroughly may apply for the inappropriate positions. Third, the phenomenon that students under greater employment pressure apply for various positions massively and aimlessly would increase the cost of candidate selecting. In order to deal with those actually practical issues, we designed a campus recruitment recommendation system for college placement office by making use two types of profile matching mechanisms and also providing the keyword based search. [2]

This led to develop a web based placement system. So that anyone with a proper logging can access it from anywhere. This system will help us to do all the placement tasks automatically. This system is developed to improve the existing system. This system has improved functionality. It has the functionality of maintaining important data required for placement and students information very efficiently. With this system there are lesser chances of data loss. The time required for maintaining all the data manually will be reduced with this system. All the data will be maintained automatically with the help of this system. We save a lot of time. Students get information regarding the arriving companies with this. Students get all the data at one central place. They can access to this information from anywhere with a proper logging.TPO get the list of eligible students among all automatically with this system. TPO can access this system with a proper logging. She/he can access all students' resumes and company data. She/He can go through them all. As soon as she/he

uploads the information regarding the upcoming placement drives he'll get a list of eligible students allowed to sit for the drive. This will be all automatically done. This system will reduce a lot of workload of TPO. [3]

The main aim of this paper is to provide readers with a proper knowledge about the structure of developed system, data storage using parse cloud and xml format, students and company profile matching, keyword based search using web crawling and notification through message to the students. that is nothing but the total flow of the system.

II LITERATURE SURVEY

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].

A. Proposed Solution:

After a survey performed in literature [4], [9] ,[10],[12]and [13] we have studied the different recommendation systems results and choose the matching method that contains two types of matching which provides the better matching result than existing one.

Due to existing systems data handling techniques, effective recommendation results are not upto that extends. And with these all reasons we got motivated to developed the job recommendation system using profile matching using web crawling for TPO achieve the following:

- Two types of matching provides the better results for job recommendation.
- Android application facility
- Key word based job searching using web crawling.

Therefore, the proposed paper presents the structure of the developed system, and the better job recommendation than the existing systems.

III PROPOSED SYSTEM

The developed system consist of three modules: college campus recruitment system, keyword based search from online recruitment sites and Android application. In college campus recruitment system student's profiles and company's profiles are collected. Students profile generated by taking information from students through registration and login portal. Company's profile will be generated by the admin from the information and requirement provided by the company to admin. After that profile matching is perform on the students and company's profiles.

This profile matching includes two types of matching: semantic matching and tree based knowledge matching. Semantic matching is perform on the attributes like technical skills, extra-curricular skills, projects, etc. while tree based knowledge matching is perform on numerical attributes like qualification, marks, etc. Completion of this matching result in preference list generation.Then the notification is send to students about the companies recommendation through SMS, email and notification.

In second module i.e., keyword based search module students have the provision to search for the companies from various online recruitment sites. Web crawling technique is used for searching through these sites. Students have to put the keyword e.g. C# and web crawler searches for those companies who have vacancies for C# developers through various online recruitment sites like Naukri.com .

In third module i.e. android app have the provision of registration and login for students and this students data will be

stored at the parse cloud. whenever the admin post the any job requirement from web portal the profile matching is done notification is send to the matched profiles on their mobile phone.

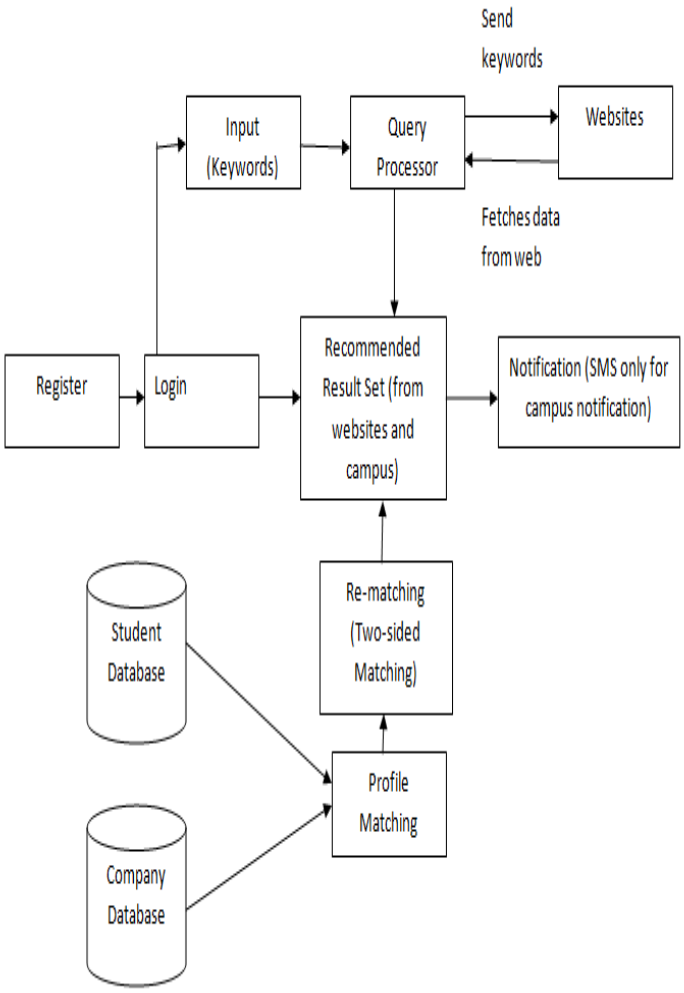

Figure 1 Architecture Model

IV RECOMMENDATION PROCESS

In this section, we present the SMS-based recommendation process which mainly focuses on the issues of profile matching . At the very first, we represent the attributes of both companies and students with database according to our requirement. Then the database filtering, semantic matching and tree-based knowledge matching are adopted to match profiles of companies and students data. Based on the rank order of similarity degree, the company preference lists and student preference lists are generated. Notification through SMS and mail is send. [2] The details of recommendation process are shown in Figure 2.

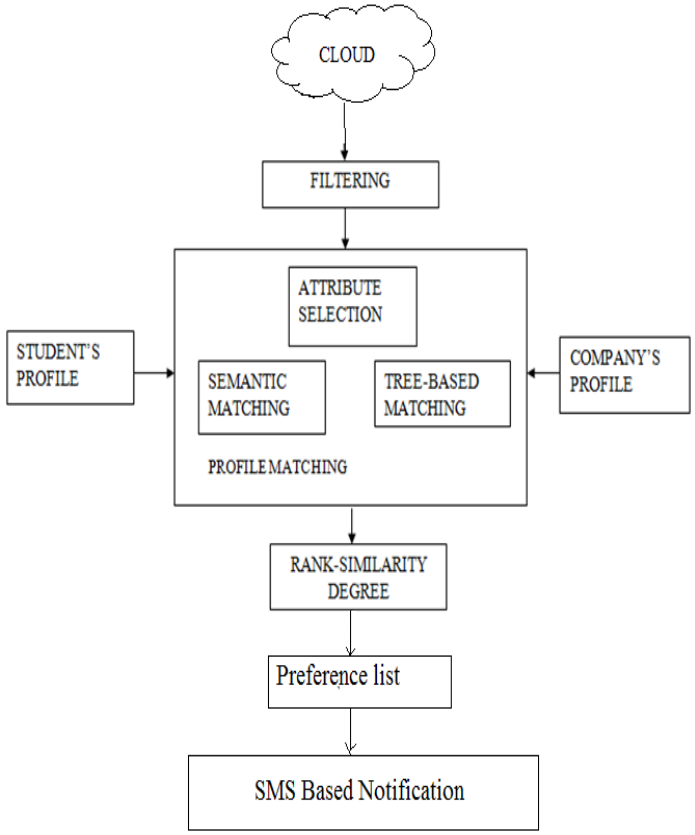

Figure 2 Framework of Recommendation process

B. Profiles of companies and students:

How the profiles of companies and students are provided plays an important role in the further matching process and recommendation process.

1. Feature Selection: To change the default, adjust the template as follows. The features that were found relevant in a job recommendation belong to two main categories: Students and Job. For students the features that were considered for judging his or her behavior are: Age, Gender (male/Female), Marital Status (single/married), Education, Grade, Major, and Experience, Skills, Current Location . And the features relating to the job are: Required Qualification and Experience (if any), Skills requirement, Employer or the Company, Industry field, Position Offered, Payment and Location. [1]

2. Data Categorization: As the objective was to find out the criteria on which the students, belonging to different age group, gender, education level, marital status, grades etc, focuses for selecting the offered job, the complete categorization or

generalization was done. The student's data as well as company data both are categorized into different groups for finding out the student's behavior belonging to a particular group for selecting a particular job on the basis of four parameters as follows:

Company group level, position offered, pay-scale offered and job location, based on which different matching methods are applied.

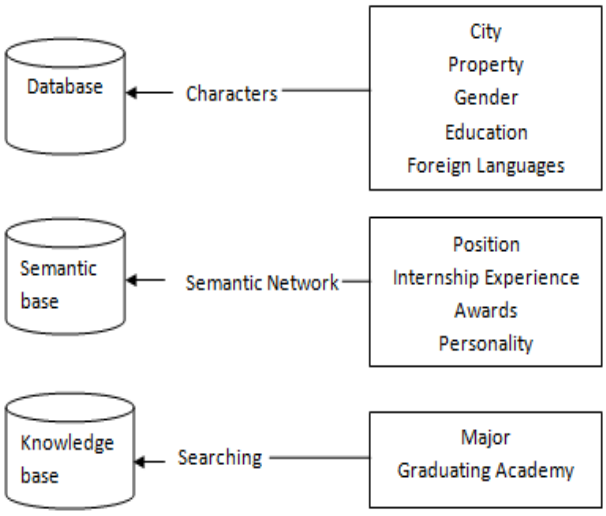

Figure 3 Profile Representation

C. Profile matching:

In order to narrow the range of profile matching and provide more precise matching results, Firstly filter the inappropriate profiles according to the value of attributes (city, property, marital status, gender, education), and then match the profile according to the representation of other attributes. Considering different representation of attributes should be matched in different ways, here we employ two kinds of matching methods which are proposed for semantic matching, tree-based knowledge matching. Position, internship experience and personality are the four important aspects that companies concern, however, those attributes are traditionally matched manually. Were unsuitable matching occurs frequently due to misunderstanding or incomprehension of specific content. But in our paper, from the profile, we have got the concepts of those attributes, which provide great convenience for us to use concepts similarity to match them. [2]

Providing proper matching for attributes of major and graduate academy is also main concern of companies. In this part, we generate a knowledge tree for representing major and graduate academy knowledge (see example of major in Figure 4. How the profiles are represented are shown in Figure 3 [2]

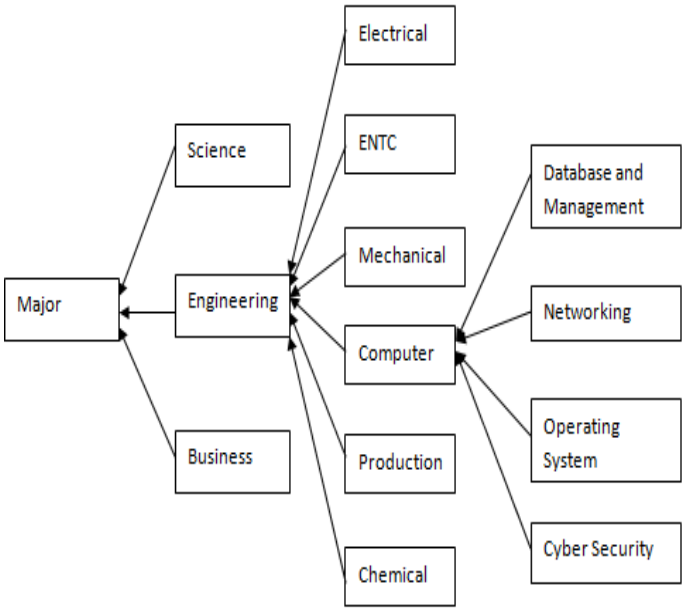

Figure 4 Tree Based Knowledge Representation

D. Recommendations Generation:

The complete procedure of recommendation generation includes the following phases:

- Shortlist the jobs recommendation for which the student is currently eligible for: The fields considered for short listing are: max, min.
- Qualification required and min. experience required for that job.
- Calculating the Content Based Similarity: Now calculate the similarity index for the short listed jobs with to the candidate. The similarity index is calculated in between the jobs required skills field and student's possessed skill's fields.
- Applying the Decision Tree Induction Rules for the category to which the student belongs: Here, the basic categorization of jobs is done firstly. After that these categories are matched according to the preference matrices of the generated rules and assigned preference weights accordingly.
- Generating the final weights: At the end calculate the final weight score by summing up all the values.
- Sorting the jobs in descending order: According to the final score get, sort the jobs in descending order.

V KEYWORD BASED SEARCHING

The keyword based searching will be providing on the portal through which students can solve their query about companies by performing web mining on recruitments sites (eg.naukri.com).On the basis of this web mining data is gather for performing matching algorithm. With which the preference list of recommendation is generated. The basic steps for web mining are as follows:

E. Data Crawling:

The very first step in the procedure is to acquire data regarding the jobs and students from various sources. In this step the various information related to keyword is acquire.

1. Semantic web mining: In the Semantic Web, content and structure are strongly intertwined. Therefore, the distinction between content and structure mining vanishes. However, the distribution of the semantic annotations may provide additional implicit knowledge.[8]
2. Data matching: From the mined data the matching is performed with respect to the keyword. For matching different algorithms like semantic matching and tree-based matching are used.
3. Preference List Generation: From the result generated by data matching, the preference list is generated for providing the better options for the students.

VI EXPERIMENTAL RESULTS

This project aims to provide the better and fast job recommendation to the students with precise matching of the profile of students and company. Not only the depending on profile matching but the students can also get job vacancies as per requirement from online websites using web crawling. Student has to register for login and then fill their personal ,qualification details, Skills, Project details. If entire details are filled properly then only resume of student is generated. Based on the profiles students and company matching is performed and companies are recommended to student We are also providing the android app which helps in faster notification to students about vacancies.

VII CONCLUSION

In this paper, the efforts were put to take into consideration the job preferences of the candidates along with the content based profile matching, providing SMS based recommendation. Also the jobs are recommended from the online website like naukri.com, etc. The first type of recommendation is done through web portal by using keyword based search and second type of recommendation is done through profile matching and sending notification to the students. Thus proper job recommendations are provided to the students.

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