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A Review on a Semantic Recommender System for IT Professionals

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Abstract--*This paper gives a review on a semantic recommender system for IT professionals. This proposed system will prove very useful for the students in college at the time of campus placement as well as all the IT professionals who are in search of a job in IT industry. There will be six modules namely Admin Panel, IT recruiters companies, Trainers, Students, Students Interest Finder and Missing Courses Recommender. With cooperation of all these six modules, an intelligent system can be developed which helps students to identify which type of job he/she will be able to do with more interest depending upon his/her qualification, preferences and interest.*

Keywords—*Recommender Systems, Semantic, e-learning, Interest Identification, IT, etc.*

I. INTRODUCTION

Recommender systems are a subclass of information filtering system that helps to predict the rating or preferences that a user would give to an item [2][3]. They have become extremely common in recent years, and are applied in variety of applications. The most popular ones are probably movies, music, news, books, research articles, search queries, social tags, and products in general. However, there are also recommender systems for experts, jokes, restaurants, financial services,[4] life insurance, persons and twitter followers[5]. Recommender systems [1], as one of the most popular applications of personalization techniques, is first proposed and applied in the e-commerce area for product purchase. Recommender systems can be defined as programs that attempt to recommend items to users by predicting a user's interest in a given item based on various types of information, including particulars about items, users and the interactions between users and items. The basic idea of recommender systems is that similar users like similar items. Therefore, the similarity measure for users or items is vital in the application of recommender systems. Recommender systems have been widely used in various web-based applications in e-commerce, e-business [6, 7], e-tourism [9], e-government [8], but very few in e-learning. The main reason is that e-learning activities have special features and demands that are different to commercial products [10] in e-commerce and e-business, which involve special requirements for recommendation approaches and similarity measures.

We can classify recommender systems based on the following three categories:

- Content-based. Recommendations are made on the basis of explicit information (users' evaluation of items, forms they've filled out, and so on) or implicit information (users' past behaviour). Being based on past ratings or actions, such systems risk recommending items that are too similar to those the user previously considered. Moreover, content must be expressed in a format that enables automatic processing.
- Collaborative. Recommendations are based on the behaviours and ratings of similar people. These systems compute similarity among users and make rating predictions by combining predictions by combining evaluations of a person's nearest neighbours (memory-based algorithms) or creating a model based on available ratings (model-based algorithms). A key limitation is that new items or those that have been rated by only a few people are rarely suggested.
- Hybrid. Recommendations are made by combining content-based and collaborative evaluations of a person's nearest neighbours and make rating approaches.

II. RELATED WORK & LITERATURE SURVEY

Dianshuang Wu, Jie Lu and Guangquan Zhang has outlined the development of a fuzzy tree matching-based hybrid recommendation approach for an e-learning system in their paper 'A Fuzzy Tree Matching-based Personalized e-Learning Recommender System'. The approach develops both a fuzzy tree-structured learning activity model and a fuzzy tree-structured learner profile model. The authors of 'A Hybrid Trust-based Recommender System for Online Communities of Practice' Xiao-Lin Zheng, Chao-Chao Chen, Jui-Long Hung, Wu He, Fu-Xing Hong, and Zhen Lin illustrated that the recommender adopts hybrid techniques to eliminate the issue of data sparsity. Second, the target users are professionals in informal learning environments. Third, accurate recommendations can be made based on professional's global and local social relations so that professionals can develop their own personal networks and get connected with experts in the same field. Finally, the recommender facilitates meta-cognitive activities by considering learner's attributes and learning preferences.

A recommender system recommends items to its users based on the characteristics on the users and the items. The goal of a recommender system is to learn which users like which items, and recommend items such that the number of likes is maximized. For instance, in [13], [11] a recommender system that learns the preferences of its users in an

online way based on the ratings submitted by the users is provided. It is assumed that the true relevance score of an item for a user is a linear function of the context of the user and the features of the item. Under this assumption, an online learning algorithm is proposed. In contrast, some experts consider a different model, where the relevance score need not be linear in the context. Moreover, due to the distributed nature of the problem, some online learning algorithms need an additional phase called the training phase, which accounts for the fact that the content aggregators are uncertain about the information of the other aggregators that they are linked with. They focus on the long run performance and show that the regret per unit time approaches zero when the user and content characteristics are static. An online learning algorithm for a centralized recommender which updates its recommendations as both the preferences of the users and the characteristics of items change over time is proposed in [12].

III. PROPOSED SYSTEM

In e-learning, user can get appropriate knowledge of any domain in the education field without moving to any actual physical location, with the help of electronic media like computer, laptops, mobile phones, etc. This is the advantage of e-learning over the abstract learning.

A. Objectives:

Here in this proposed system, a system is developed which will implement two user defined algorithms namely, Interest identification and Missing courses identification. By using these algorithms, system can suggest appropriate courses to all the registered students according to their interest and capabilities.

B. Problem Statement:

To develop an intelligent system which helps registered students to identify which type of job he/she will be able to do with more interest depending upon his/her qualification, preferences, skills, knowledge, etc. On this same information, develop a recommendation module which recommends students about missing courses from the courses data sets which matches the minimum requirements of IT industries.

1. Develop a module for job seeker to be registered.
2. Identify semantic requirements to analyse the recommendation algorithms.
3. Identify missing course in his/her resume which is basic requirement of industries.
4. Build a prototype system which evaluate the skills and recommend the Courses.

C. Algorithms Used:

There are two user defined algorithms which are used in this paper as follows:

1. Interest identification algorithm &
2. Missing courses identification algorithm.

The first algorithm is used to find out students interested job types. Another one is used for comparing students' qualification with company job requirements and identify missing courses using comparison reports.

Mainly there are four users of this proposed model in this paper and they are- Admin, Students, IT Companies and Trainers. Following are the responsibilities of the Admin panel:

- Login/Logout
- Pending company registration approval
- Pending students registration approval
- Pending trainers registration approval
- Interest finding quiz management
- View companies log
- View students log
- Activate/deactivate students login
- Delete company login

The work of IT Recruiter Company is as follows:

- Registration
- Get registration approval notification on email
- Login/Logout
- Specify company details and city wise branches details
- Branch wise Job opportunities and requirements registration
- View students list those who fulfill the criteria

The tasks of Trainers are given below:

- Registration
- Get registration approval notification on email
- Login/Logout
- Specify/edit Available Courses info
- Upload study materials/videos

- Communication with students
- Course wise Fees management
- Students payments management
- Online tests question and answers registration
- View students performance
- Upload student's course completion certificate

Students have following facilities:

- Registration
- Get registration approval notification on email
- Login/Logout
- Solve online tests to find out job type interest
- View performance details reports
- View recruiter companies details
- View interest recommendation report
- View recommended courses report
- Subscribe recommended course
- Access study material
- Solve online test of subscribed courses
- Communication with trainers
- Download uploaded certificates

The module of Students Interest Finder will work in the following way:

System will automatically find out students interest with the help of following perspectives

- conducting multiple tests about student's knowledge and qualifications
- Using users profile
- Using users interest details

Interest wise Analyzed job types recommendation reports generation for every student.

Missing Courses Recommender will perform following functions:

- Interested job type wise students qualification and requirements comparison
- Comparison report wise missing courses identification
- Courses recommendation report generation for every student

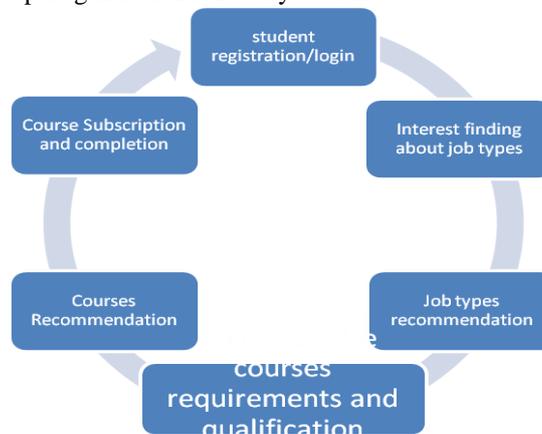


Fig 1 Overall working of A Semantic Recommender System

The Fig.1 shows the overall working of the semantic recommender system.

IV. CONCLUSIONS

The recommender systems are very common in use in all the day-to-day affairs but are less researched in the field of e-learning. Hence, in order to get appropriate job or suggestion of a particular course, this proposed system in this paper, if implemented properly, will prove very beneficial to all the students as well as all the IT professionals. This system is quite different from other recommender systems because, in other systems, only the required course is recommended which is suitable for user. But here in this semantic recommender system, not only the course is recommended, but it is provided online also. This feature makes it different than others.

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