

A Review on a Semantic Recommender System for IT Professionals

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Abstract— This paper provides us a review on a semantic recommender system for IT professionals. This proposed system will prove very advantageous for the pupils in college at the time of campus placement as well as all the IT professionals who are awaiting for a job in IT industry. This system will contain following six modules namely Admin Panel module, IT recruiters companies module, Trainers module, Students module, Students Interest Finder module and Missing Courses Recommender module. With cooperation of all these six modules, an intelligent system can be developed which will be beneficial to all the students to identify which type of job he/she will be able to do with more interest depending upon professional qualification, choices and interest of the student.

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

I. INTRODUCTION

The Recommender systems are a subclass of information filtering system that helps to guess the rating or choices 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, magazines, research articles, search histories, social issues and products in general. However, there are also recommender systems for scientists, jokes, hotels, financial services,[4] life insurance, persons and twitter followers[5]. Recommender systems [1], which are considered as one of the most popular usage of personalization techniques, is first proposed and applied in the e-commerce field for product shopping. Recommender systems can be defined as programs that attempt to recommend items to users by guessing a user's choice in a given article based on various types of information, including particulars about articles, users and the relationship between users and items. The basic idea of recommender systems is that nearly same users like nearly same items. Therefore, the similarity measure for users or items is vital in the application of recommender systems.

Recommender systems are largely used in different web-based applications in e-commerce, e-business [6, 7], e-porn [9], e-government [8], but very less in e-learning. The main reason is that e-learning activities have special characteristics and needs in society that are different to commercial products [10] in e-commerce and e-business, which involve special needs for recommendation issues and similarity measures.

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

- **Content-based system.** Recommendations are made on the basis of explicit information (users' evaluation of items, forms they have filled out, and so on) or implicit information (users' past behavior). Being based on past ratings or actions exhibited by user, such systems may risk recommending items that are too similar to those the user previously considered. Moreover, content should be expressed in a easier format that enables automatic processing.
- **Collaborative system.** Recommendations are based on the behaviors shown and given preferences of similar people. These systems compute similarity among users and make rating predictions by combining guessings by combining judgements of a person's nearest neighbors (memory-based algorithms) or creating a model based on a predefined ratings (model-based algorithms). A key limitation is that new items or those that have been rated by very less people are rarely advised.
- **Hybrid system.** Recommendations are made by combining content-based and collaborative evaluations of a person's nearest neighbors and make rating approaches.

II. RELATED WORK

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 WORK

In e-learning, user can get up to date knowledge of any topic in the education area without moving to any actual physical location, with the help of e-media like computers, laptops, mobile phones, etc. This is the advantage of e-learning over the traditional abstract learning.

A. Objectives

In this proposed system, here a system is developed which will implement two user defined algorithms which are, Interest identification and Missing courses identification. By using these algorithms, system can suggest beneficial courses to all the registered people according to their interest and capabilities.

B. Problem statement

To create an intelligent system which will be useful to all registered students to identify which type of job he/she will be able to do with more interest depending upon professional eligibility, preferences, skills, knowledge, etc of the student. On this same information, develop a recommendation system which suggests students about missing courses from the courses data sets which matches the minimum demands of IT sector.

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

C. Algorithms Used

Following are the two user created algorithms which are used in this paper:

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

The first algorithm is used to find out students interested job types. The second one is used for comparing students’ professional qualification with company job requirements and identify missing courses using different comparison reports. Basically there are four main users of this proposed model in this paper and they are- Admin, Students, IT Companies and Trainers. Admin panel have following main responsibilities:

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

The work of IT Recruiter Company is as following points:

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

The tasks of Trainers are given below:

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

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

Students have following facilities:

- Registration
- Get registration request approval notice on email
- Login or Logout
- Solve online tests to find out job type interest
- View performance details reports
- View employer companies details
- View interest recommendation report
- View recommended courses report
- Subscribe suggested course
- Avail study material
- Solve online test of subscribed courses
- Communication with trainers
- Download uploaded certificates of different courses

The module of Students Interest Finder will work in the following way: System will eventually find out students preferences with the help of following perspectives

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

Interest wise Analyzed job types recommendation reports creation for each student. Missing Courses Recommender module will perform following functions:

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

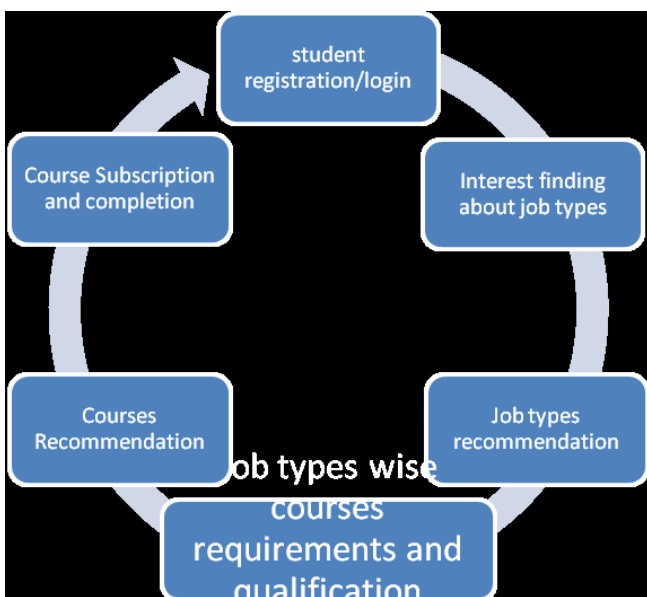


Fig 1.1 Overall working of A Semantic Recommender System

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

IV. CONCLUSION

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

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