

A Novel Resource Recommendation System Based on Connecting to Similar E-Learners*

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Abstract. E-learners always finds it is difficult to make a decision about which of learning materials best meet their situation and need to read, whilst instructors are finding it is almost impossible to reorganize different materials corresponding to individuals. Based on the investigation on real learners in the Network Education College of Shanghai Jiaotong University, we found that many learners share common need of learning resources if they have similar learning preferences and status during learning process. This paper proposes a novel E-Learning resource recommendation system based on connecting to similar E-Learners, which can find and reorganize the learners share similar learning status into smaller communities. Furthermore a recommendation platform is developed to enable the learner to share filtered resources.

Keywords: E-Learning, Resource Filtering, Recommendation System, learning communities.

1 Introduction

E-learning settings such as on-line courses offered in China often involve large numbers of students who have diverse professional background, learning preferences, and various learning needs. As a result, learners are finding it is difficult to make a decision about which of learning materials best meet their situation and need to read, whilst instructors are finding it is almost impossible to reorganize different materials corresponding to each learner separately. Thus it would be very useful an E-Learning system could automatically guide the learner's activities and intelligently generate and recommend learning materials that would improve the learning [1, 2].

Personalized recommendation approaches are first proposed and applied in E-commerce area for product purchase [3-5], which help customers find products they would like to purchase by producing a list of recommended products for each given customer [6, 7]. Literature review shows there are also many researchers have attempted to adopt recommender systems to e-learning sites. Research [8] described a mechanism focused on how to organize the learning materials based on domain ontology which can guide the learning resources recommendation according to

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learning status. A multi-attribute evaluation method is proposed in [2] to justify a student's need and developed a fuzzy matching method to find suitable learning materials to best meet each student need. Research [9] presented a method to organize components and courseware using the hierarchy and association rules of the concepts, which can recommend the relative contents to students and also can help them to control the learning schedule. However, most of these methods missing one important issue in E-Learning Recommender System, that is, the natural learning behavior is not lonely but interactive which relying on friends, classmates, lecturers, and other sources to make the choices for learning. For example, during the learning process, a learner read a useful material, summarized what he/she has learned or got the answer of a typical question, some learners with similar learning status are likely need these resources. We did an investigation on real learners in the Network Education College of Shanghai Jiaotong University and found that many learners share common need of learning resources if they have similar learning preferences and status. If an effective method can be presented to help the similar learners to share useful learning resources, it will promisingly enhance the learning effect.

This paper proposes a novel E-Learning recourse recommendation system based on connecting to similar E-Learners, which can find and reorganize the learners share similar learning status into smaller communities. This system starts from the learning log data gathering and profile generation of each learner. The approach first creates Learner Agent for each learner, which can help to generate learner profile and monitor the learning behavior. During the learning process, each Learner Agent must register with a Group Agent and report its learning status dynamically. Based on the changeable behavior, the Learner Community Structure Exploiting Engine will run the community organization algorithm and reorganize the learners share similar learning status and preference into the same community. Furthermore, taking advantage of the organized learner communities, a Learning Resource Recommendation Platform is developed to visualize the details of learner community and recommended resources which finally enable learners can mutually meet the need of others in the same community. Experimental results show that this method can not only effectively reorganize learners share similar learning status into communities, but also enhance the recommendation accuracy.

2 System Description

This system is designed to have three main components 'Learner Information Monitoring and Profile Maintenance', 'Learner Community Structure Exploiting' and 'Learning Resource Recommendation Platform', shown in Figure 1.

Each component is connected to the E-Learning Interface, Learning Log Database and Learning Resource Database, which is supported by a domain conceptual map. We will discuss the details of each component as the following sections.

2.1 Learner Information Monitoring and Profile Maintenance

The implementation of technologies for developing recommender systems is strongly dependent on the type of information that is being used [10]. During the learning