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Ontology Supported Hybrid Recommender System With Threshold Based Nearest Neighbourhood Approach

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ABSTRACT

Traditional e-learning systems lack the personalization feature to guide learners for selecting the most suitable courses needed. Choosing appropriate courses in the seminal years is important for a future learner who depends on such decisions, as selecting the wrong courses means a mismatch between learner's capability and personal interests. Therefore, a recommender system was developed to suggest and direct the students in selecting the appropriate courses. This study presents algorithms to personalize courses for scholars based on their interests to make learning effective and more productive. The hybrid methodology has been used to retrieve useful information and make accurate recommendations to help learners to increase their performance and improve their satisfaction level. The results suggest that a hybrid approach is better as it will enjoy all the advantages of the individual recommender systems and mitigate their limitations. A threshold-based nearest neighborhood approach will further strengthen the proposed system by finding a similar learner for targeted learners.

KEYWORDS

E-Learning, Information Retrieval, Neighborhood, Ontology, Recommendation

INTRODUCTION

E-learning is generally defined as learning through the use of electronic media and electronic devices such as computers, laptop, CDs / DVDs and nowadays smart phones also. E-learning was started in early 90's and appeared as a tough competitor to traditional learning system (Ahmad, 2012). In the past few years, it has brought an unseen revolution in universities all around the world. The Learning Management System software application developed to support e-learning has been rated as an effective tool for E-learning purpose to handles all the aspects of the administering, teaching, and learning process. With LMS' interest in the concept of e-learning has been growing strongly because of its various advantages and interactive web technology development, but the problem with all current e-learning systems is they are closed systems and presents same information to all types of users. Therefore, "one size fits all" approach of e-learning faces challenges in such situations their

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performance is either low or they cannot perform at all. The prominent among the problems are static course selection and lack of personalization feature.

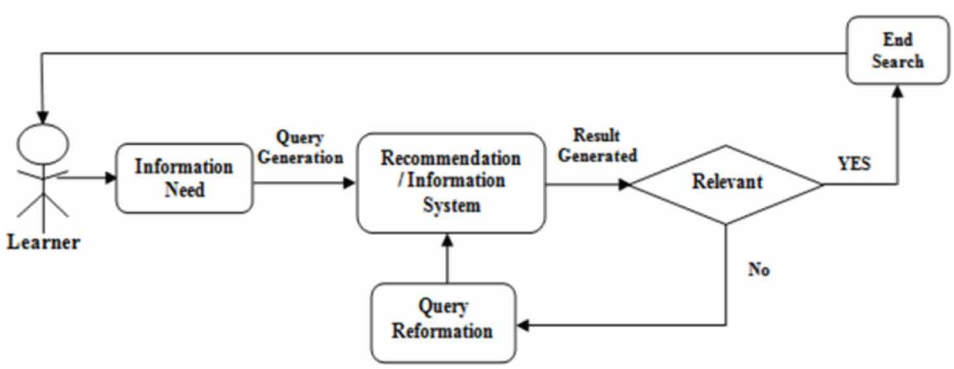
Since e-learning is changing the educational scenario very quickly, therefore new learning management system trends are coming with new features. Nowadays, a trend has been witnessed towards cloud-based LMS with the limitation being low-speed internet connectivity, personalizing learning environment (PLE) using recommender system approach which is becoming an important part of LMS (Czerkawski, 2014) Personalization is to tailor the needs according to the learner's requirements and in the form of recommendations personalization has gained popularity and significant interest in day-to-day life, as people trust and seek others recommendations for decision making. Recommender systems use efficient Information retrieval techniques are being adopted in various fields like social networks, e-commerce, e-health, YouTube, and e-commerce sites, reflecting this social behavior to support users in making decisions for making a wise choice with little efforts (Hazra, 2015). An example of recommendation generation from user view point are shown in Figure 1.

Recommender systems are basically a subset or a division of information filtering concept, which shows an immense potential to help its users to create a personal learning environment and to identify most relevant and interesting items from a large number of items by suggesting it to a user based on their interest, domain, preferences, and ratings of other learners (Hoffman, 2016) Integrating such recommender systems in learning systems will be beneficial for both learners as well as for E-learning tools as such systems provide high potential to achieve personalization and will increase the functionality and effectiveness of E-learning systems by mitigating their weakness. The aim of all recommender systems is to provide a recommendation that will be favorably evaluated and accepted by its users.

There are four broader categories of recommender systems based on how recommendations will be offered such as: content-based, collaborative, knowledge-based and hybrid systems. Collaborative systems recommend items for targeted users based on the preferences (like ratings and history) with other similar users. On the other hand, content-based recommender systems propose items based on the resemblance and profile of users of other users and ignoring the rest. Knowledge based recommender systems adopt techniques from artificial intelligence to inference similarity between item and user. These systems use the deep knowledge about item features rather than user ratings. Furthermore, to mitigate the problems associated with pure recommender systems, hybrid methods of combining the conventional recommender systems were proposed (Tarus, Zhendong, and Mustafa, 2017).

Therefore, a hybrid recommender system (RS) has been proposed that will help in personalizing Learner needs as per the requirements which is otherwise a time-consuming process. Usually, learners couldn't formalize the query even though they are having an idea about the requirements, and to understand nature behind the queries is a research itself. N-Gram classification can play an important

Figure 1. Stages traversed in information retrieval from the user point of view



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