Goal-Based Framework for Multi-User Personalized Similarities in e-Learning Scenarios

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ABSTRACT

Web-based learning or e-Learning in contrast to traditional education systems offer a lot of benefits. This article presents the Goal-based Framework for providing personalized similarities between multi users profile preferences in formal e-Learning scenarios. It consists of two main approaches: content-based filtering and collaborative filtering. Because only traditional content-based filtering is not sufficient to generate the recommendations for new-users, therefore, the proposed work hybridized multi user’s collaborative filtering functionalities with personalized content-based profile preferences filtering. The main purpose of this proposed work is to (a) overcome the user-based cold-start profile recommendations and (b) improve the recommendations accuracy for new-users in formal e-learning recommendation systems. The experimental has been done by using the famous ‘MovieLens’ dataset with 15.86% density of the user-item matrix with respect to ratings, while the evaluation of experimental results have been performed with precision mean and recall mean to test the effectiveness of Goal-based personalized recommendation framework. The Experimental result Precision: 81.90% and Recall: 86.56% show that the proposed framework goals performed well for the improvement of user-based cold-start issue as well as for content-based profile recommendations, using multi users personalized collaborative similarities, in formal e-Learning scenarios effectively.

Keywords: Cold-Start, Collaborative Filtering, Content-Based Filtering, e-Learning, Goals, Hybrid Filtering, Recommender Systems

1. INTRODUCTION

Knowledge, technology, and mutual environments enhancements are the state of superior learning outcome. This intensification of web informational content increased the difficulties of find the relevant content quickly and efficiently. For end-users, idiosyncratic e-learning scenarios are diverse in learning information or guidance and content-based electronic learning environment (modern learning) is one of them (Salmon, 2003). The modern learning or

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e-Learning in contrast to traditional education systems offer a lot of benefits. The e-Learning provides an intellectual and efficient way to enhance the range of knowledge, communication and distribution across all the areas of learning. These enhancements, in contrast to modern educational systems have become an important part of daily life for millions of users for achieving their learning goals (Voorhees & Harman, 2005). The learning goals are only effective if learners use them to pinpoint and process goal-relevant information. Arguably, the clarification of learner’s goal is a paramount motive of any learning environment. The abusement of learning goals will lay down the learner’s interest and end-users could not grab the knowledge as per their goal or requirement. The researchers in e-Learning admired from the importance of learning goals and adopted this term in e-Learning environment (Dinuzzo, Pillonetto, & De Nicolao, 2011). The reason behind the adoption of learning goals is to support the growth of e-Learning scenario, encourage the interest of learners, and distribute goal-relevant knowledge or information as per their goal-directive activities. This is accomplished by encompassing the range of media, web-based tools, and technological environments such as information retrieval (IR) (M.Chughtai, B.Selamat, & Ghani, 2013).

The information retrieval (IR) systems are being used to retrieve informational learning content and help the users to find their required information. Particularly, these sort of information retrieval systems require some query or a set of keywords from user as input, such as users’ required learning contents (Shishehchi, Banihashem, Zin, & Noah, 2011). The reason of discouraging this strategy is that the user spends a lot of time for visiting every page to get the particular learning content. This process takes a lot of searching time and although cuts the users interest. However, recommender systems (Ghauth & Abdullah, 2010); offers more flexibility to decrease the content searching time, increase the user’s interest, and provide the recommendations relevant to user’s goals or interests (P.di Bitonto, M.Laterza, T.Roselli, & V.Rossano, 2010).

Recommender or recommendation system steadily “system” interchanged with “platform or engine”, is a branch of information retrieval, which filters the result in three ways; namely, content-based filtering CBF, collaborative filtering CF and hybrid filtering HF (Lara, 2004). In content-based filtering CBF only recommends relevant learning contents to users that are similar to the ones they preferred themselves in the past (Adomavicius & Tuzhilin, 2005). In collaborative filtering CF, the users recommend relevant items/learning contents that other users with similar interest and preferences liked in the past (Ghazanfar & Prugel-Bennett, 2010). The hybrid filtering HF is a third way of e-learning recommender systems to tackle the filtering results (Burke, 2002). The HF basically, hibernates the features of CF and CBF, somehow the encouraged researchers combine some adopted machine learning techniques or approaches with CBF or CF or sometimes with the combination of both to emerge the artificial Intelligent aspects in it. These adaptations construct the intelligent hybrid approaches that drive the way of knowledge and management in an automotive intellectual era; perhaps it depends upon the controversial issues, and domain requirements.

2. BACKGROUND OVERVIEW

The enhancements of knowledge, requirement, and technology also increase the challenges in working domains. For that the technological enhancements were seen as; multimedia learning (also known as m-learning), project-based learning, e-learning activity, e-training and learning, online education and virtual learning environment, etc (Terry Mayes & Freitas, 2006). These enhancements in contrast to modern learning or e-Learning offer many online systems which become an important part of daily life for millions of learners. Somehow, these systems are not enough to accrue the learner’s interest and required learning goal (van Setten,
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