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An efficient personalized trust based hybrid recommendation (TBHR) strategy for e-learning system in cloud computing

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Abstract The fast evolution of e-learning systems offers learners with huge opportunities for accessing learning activities via online. This largely provides support and improvement to the learning practices of the users. Nonetheless the problems corresponding to e-learning systems limit its application success. This is due to the fact that several learning activities like different learning materials, subjects, and learning resources, which are developing in this online world makes an e-learning system hard. It is difficult for the individual learners to choose optimized activities for their specific situations/requirements/query, since there exists no personalized service that belongs to that specific user. Recommender systems, which target a trendering personalized environment for studying materials can be utilized for resolving those issues in e-learning system. The available system proposed an e-learning personalization depending on the strategy of hybrid recommendation in cloud-based platform. It presented a recommendation system named as Protus that can do the automatic adjustment to the levels of preferences and expertise of the learners. It identifies various patterns of learning style and behaviours of the learners' by means of testing the learning styles of the learners and then having their server logs. Nonetheless it does not accomplish optimal clustering and also does not take the trust value of user into consideration for improving the accuracy. In order to resolve this problem, the new system proposed a trust based hybrid recommendation (TBHR) strategy. Here, in this system, the learning style and the habits of the learners' are evaluated so as to test the learning styles of the learners and then their server logs are mined. Then the noises are eliminated employing re-rating mechanisms. Depending on the various learning styles, the leaners are clustered by making use of hybrid firefly and K-means algorithms. Afterwards, the behavior and the preferences of the learners are analyzed by carrying out the mining of the sequences observed frequently by the AprioriAll algorithm. Trust-based weighted mean is utilized for analyzing the trust value of users. At last, this system finishes the customized recommendation of the learning content based on the ratings corresponding to these sequences observed frequently, rendered with the help of the Protus system. The system proposed attains a better performance in comparison with the available system in terms of mean absolute error (MAE) metric, accuracy and speed.

Keywords E-learning · Recommendation · Firefly algorithm (FA) · K-mean clustering · Trust based hybrid recommendation (TBHR) · Mean absolute error (MAE) · Cloud computing

1 Introduction

Nowadays, e-learning has risen to be a novel alternate to traditional learning for achieving the aim of education for all. The concept of e-learning has several numbers of definitions and at times baffling interpretations [1]. In this usage, a definition of e-learning is adopted to be the usage of internet technologies for providing and enhancing the students' learning at all times and in all places. One among its benefits is the learning technique that can be offer more adaptive behavior compared to traditional learning [2]. Surely, conventional learning that is based on "one size fits all" strategy, intends to provide support to just one educational model, since in a specific classroom environment, often a teacher has to manage numerous students simultaneously. Such a kind of situation imposes one very student the condition of

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