A Personalized Content-Based Recommendation on Knowledge Level of Learner

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e-Learning is considered as one of the most popular research areas in distance and web based education. Nowadays, most of the education institutions such as universities, colleges and vocational training centers are adapted e-Learning environment to give quality and efficient service to learners. This paper presents a novel approach, a framework for building a personalized content-based recommendation system by considering learner's knowledge has been developed. The knowledge, skill, preferences and learning style of each learner is different. Therefore, we should understand different needs of learners and provide a better recommendation to motivate them. The proposed recommendation system consists of four components, Learning model, Domain model, E-Assessment model and Recommendation model. In e-assessment model, the learner takes diagnostic, formative assessments in different levels such as initial, final, practice and assignment. While learner attempts, the system generates recommendations based on level of knowledge. Through the system, each learner's progress can be identified and compared with other e-learners' results. Then, the learner motivates to learn more learning objects and stick to self-learning style. During this research, Content-based filtering is used as filtering approach for making recommendations. Apart from that, web mining techniques has been used to implement result predictions, clustering e-Learners and classifying learning objects. However, cold start problem has been minimized by using an initial test at the start point of each learning module. Furthermore, the impact of introducing the e-assessment model to support and improve the learning process is evaluated following the action research methodology and comprised two main activities: system testing and validation, in a real scenario, a programming course in Bachelor of Information Technology at University of Colombo. In this research, decision support accuracy metrics was used for evaluating recommendation algorithm. A set of students who is following above course was selected to determine knowledge levels and performances. Based on data analysis, it was observed that the use of the system and the models had a positive impact on student learning and performance. Students learned through more interaction with the system and, as a result, their performance in the assignments and final examination had improved. The system also provided added benefits to facilitators for tracking of students' progress throughout the whole course.

Keywords: e-Learning, Personalization, Content-based filtering, e-assessment, Cold start