

Design and Implementation of A System for Personalization of Learning Path in the E-learning Environment

Abstract

Over the past few years, there has been a growing interest in providing personalized content sequencing in web-based tutoring systems. Meanwhile, some of the researchers studied content sequencing methods that emphasized the use of learner's ability as well as characteristics such as knowledge level or preferences. Although the suitability of such methods is proved, they all focus on the Level of Concept Difficulty (LCD) which is mostly considered static and the same for all learners. But, this is not true. Since a learning concept might have different levels of difficulty for learners with different levels of knowledge and ability, dynamic calculation of concept difficulty is expected to be more efficient. To this end, this paper proposes a method based on Choquet Fuzzy Integral and Item Response Theory that can simultaneously take into account the understanding ability of the learner and dynamic LCD for the concepts of the knowledge domain. To evaluate the effect of adaptation and dynamic LCD on the learning process, two other sequencing methods were investigated. One method provides personalized learning path and focuses on static LCD while the other one simply provides fixed sequence of learning materials for all of the learners. Empirical results affirm that the proposed scheme is superior to both of the investigated methods. The results indicate the fact that dynamic LCD can significantly enhance the effectiveness of the learning through facilitating the cognition process, and increasing both the understanding ability and learning performance of the learners.

Keywords: Content sequencing, Choquet fuzzy integral, Difficulty level, Item response theory, E-learning