

Chapter X

Knowledge Mining for Adaptive Multimedia Web-Based Educational Platform

Leyla Zhuhadar, University of Louisville, USA

Olfa Nasraoui, University of Louisville, USA

Robert Wyatt, Western Kentucky University, USA

Inside Chapter

This chapter introduces an Adaptive Web-Based Educational platform that maximizes the usefulness of the online information that online students retrieve from the Web. It shows in a data driven format that information has to be personalized and adapted to the needs of individual students; therefore, educational materials need to be tailored to fit these needs: learning styles, prior knowledge of individual students, and recommendations. This approach offers several techniques to present the learning material for different types of learners and for different learning styles. User models (user profiles) are created using a combination of clustering techniques and association rules mining. These models represent the learning technique, learning style, and learning sequence, which can help improve the learn-

ing experience on the Web site for new users. Furthermore, the user models can be used to create an intelligent system that provides recommendations for future online students whose profile matches one of the mined profiles that represents the discovered user models.

Introduction

Today, an educational Web site can be a gold-mining repository rather than a static Web site—a voyage in space, time, and technology to discover the hidden student behavior and experience. At the department of Distance Learning at Western Kentucky University, an interactive Web environment was developed whereby teachers, researchers, and knowledge seekers can discover information about their distance learning students. Every single access to our platform, from each individual student to different types of learning material, such as *text, audio, podcasting, and video lectures* were traced and recorded in log files. The audio and video lectures were presented through the latest technology, Podcasting and VODcasting, to enhance the learning *mobility*. By tracking the behavior of each online student and knowing which lectures he/she has selected, the sequence of lectures that were selected, the type of the selection (text, audio, or video), and the method used (online or off-line), we can build a user model (user profile), which is a system representation of how the learner relates to the conceptual structure of the application.

According to De Bra, Aroyo, and Cristea (2004), education has been (and still is) changing dramatically: several changes are occurring simultaneously, which are characterized by the three *A*'s: *anyplace, anytime, anyhow* (p. 387). For the last few years, there has been a noticeable cultural trend among students who prefer to combine study and work. Online courses and the Internet play a major role in helping the students become independent of the physical availability of the teacher. However, online courses do not automatically make the teacher available anyplace and anytime. Some researchers have tried to create automatic teaching systems that simulate the intelligence of the teacher like SQL-Tutor (Mitrovic, 2002) and ELM-ART (Weber, 2001) or Beal's Artificial Intelligence inspired system (Beal, Qu, & Lee, 2006). According to Beal et al. (2006),

Intelligent tutoring systems (ITS) can provide effective instruction, but learners do not always use such systems effectively. Motivated students interested in course material take to ITS readily, but others will improvise ways to get through without putting in much effort.

50 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/knowledge-mining-adaptive-multimedia-web/30197

Related Content

Federated Agent-Based Architecture for Collaborative Education Model

Iwona Miliszewska (2009). *Strategic Applications of Distance Learning Technologies* (pp. 84-95).

www.irma-international.org/chapter/federated-agent-based-architecture-collaborative/29723

"A Community of Opinion and Debate": Postgraduate Students' Reactions to Compulsory Online Discussions

Elizabeth A. Beckmann (2012). *Student Reactions to Learning with Technologies: Perceptions and Outcomes* (pp. 69-90).

www.irma-international.org/chapter/community-opinion-debate/58757

Assessing Teaching and Students' Meaningful Learning Processes in an E-Learning Course

Päivi Hakkarainen, Tarja Saarelainen and Heli Ruokamo (2009). *E-Learning Technologies and Evidence-Based Assessment Approaches* (pp. 20-36).

www.irma-international.org/chapter/assessing-teaching-students-meaningful-learning/9145

Design and Implementation of Multiplatform Mobile-Learning Environment as an Extension of SCORM 2004 Specifications

Kiyoshi Nakabayashi (2010). *Multiplatform E-Learning Systems and Technologies: Mobile Devices for Ubiquitous ICT-Based Education* (pp. 164-181).

www.irma-international.org/chapter/design-implementation-multiplatform-mobile-learning/36078

Learning Object Model and Framework Design for the Digital Modules Production

Alicia García Holgado, Francisco José García-Peñalvo, Valentina Zangrando and Antonio M. Seoane Pardo (2013). *Multiculturalism in Technology-Based Education: Case Studies on ICT-Supported Approaches* (pp. 28-36).

www.irma-international.org/chapter/learning-object-model-framework-design/69572