Adaptive Systems for Web-based Education

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Preface

Adaptive Web-based educational systems provide an alternative to the traditional “one-size-fits-all” approach in the development of Web-based educational courseware. These systems build a model of the goals, preferences and knowledge of each individual student, and use this model throughout the interaction with the student in order to adapt to the needs of that student. The first pioneer adaptive Web-based educational systems were developed in 1995-1996 (Brusilovsky, Schwarz & Weber, 1996a; Brusilovsky, Schwarz & Weber, 1996b; De Bra, 1996; Nakabayashi et al., 1995; Okazaki, Watanabe & Kondo, 1996). Since that many interesting systems have been developed and reported. An interest to provide distance education over the Web has been a strong driving force behind these research efforts. A good help for the research community was provided by a sequence of workshops that get together researchers working on Adaptive Web-based educational systems, let them learn from each other, and advocate the ideas of this research direction via on-line workshop proceedings (Brusilovsky, Nakabayashi & Ritter, 1997; Peylo, 2000; Stern, Woolf & Murray, 1998). The workshop at AH’2002 is the fourth in these series of workshops. As earlier, the proceedings of this workshop assemble together an interesting collection of papers on various topics associated with adaptive Web-based educational systems. We hope that this volume will serve as another milestone for this research direction and will serve as a source of creative ideas for the researchers worldwide.

In total, 14 full papers and 7 short papers were submitted to the workshop. From this number, the program committee selected 8 contributions to be presented as full papers and 6 to be presented as short papers. 7 contributions were approved as position papers and are published on the workshop Web pages (http://www.lcc.uma.es/WASWE2002). Below we provide a brief summary of accepted full and short papers.

E. Triantafillou, A. Pomportsis and E. Georgiadou address a hard problem of accommodating to the cognitive style of learners in their paper entitled "AES-CS: Adaptive Educational System based on Cognitive Styles". They discuss field dependence as a measurable cognitive parameter and propose several ways to adapt to field-dependent and field-independent learners. In "Adaptive Web-based Learning System with a Free-Hyperlink Environment", H. Mitsuhara, Y. Ochi, and Y. Yano present an adaptive web-based learning system that contains a free hyperlink environment, which enables learners to create and share hyperlinks in the open web. These hyperlinks are adapted using collaborative filtering in order to avoid option overflow. J. Ohene-Djan
introduces in "Ownership Transfer via Personalisation as a Value-adding Strategy for Web-based Education" a model for the personalization of hyperdocuments. The use of this model allows an interaction with electronic documents that is much closer to the manner that users interact with paper-based documents, without losing the advantages of hypermedia systems. M. Baldoni, C. Baroglio, V. Patti, and L. Torasso describe in "Using a rational agent in an adaptive web-based tutoring system" an adaptive tutoring system having a multi-agent architecture. In their approach to adaptation, they use an agent logic programming language (DyLOG) for building cognitive agents that, using reasoning techniques, help users find the solutions to their needs.

"An Adaptive Web-based Tutorial of Agrarian Economy" by C. Carmona, E. Guzman, D. Bueno and R. Conejo describes the process of making an already existing static web system adaptive. M. Trella, R. Conejo, D. Bueno and E. Guzman propose in "An Autonomous component architecture to develop WWW-ITS" the construction of a framework for the development and integration of distributed, autonomous educational components that can communicate with each other. "Automatic Generation of a Navigation Structure for Adaptive Web-Based Instruction", by J. Masthoff, proposes the construction of a hierarchical navigation structure on the base of a concept network, outcomes and prerequisites of concept, descriptive information about the author and the content of the pages itself. C. Karagiannidis and D. Sampson address the common ground between adaptive educational systems and e-learning standards. Their paper "Re-using Adaptation Logics for Personalized Access to Educational e-Content" bridges the gap between adaptive systems and re-usable courseware by proposing a way to encapsulate adaptation logics in an adaptive Web system to make it re-usable in a different context.

The collaborative process of writing stories is described by J. Suhonen in "Using StoryML for adaptive Content Representation". Investigations about the design of "SHAAD: Adaptable, Adaptive and Dynamic Hypermedia System for content delivery" have been taken by D. Merida, R. Fabregat and J.-L. Marzo. To "Facilitate Navigation Planning in Self-directed Learning on the Web", A. Kashihara, S. Hasegawa and J. Toyoda use previews of a planned navigation sequence to support orientation and guidance in a web-based learning environment. J. Smid and P. Svacek work in "Interactive Tutoring Model Using Information Cycling" on the optimization of a user's path through a domain by determining the appropriate number of recapitulations and presentations. C. Romero, S. Ventura, C. de Castro, W. Hall, and M. Hong Ng show in "Using Genetic Algorithms for Data Mining in Web-based Educational Hypermedia Systems" how to apply genetic algorithms for data mining to infer from student's interactions rules that will help to improve the system. Finally, D. Chesher, J. Kay and N. King report in "Simprac - Teaching system for management of chronic illness" how learner
can practice the consultation of patients by investigating the individual consequences of their chosen treatment of patients.

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