Chapter VIII

A Multiagent Framework for an Adaptive E-Learning System

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Abstract

This chapter describes a multiagent system for delivering adaptive e-learning. This chapter also provides a discussion of three issues related to personalization in e-learning: technology advancement and the shift in perception of the learning process, one-size-fits-all versus personalized services, and the adaptation process. Finally, the chapter provides an overview of most known implemented systems for adaptive e-learning, as well as a detailed description of the architecture and components of the proposed multiagent framework.
Introduction to the Personalization Problem in E-Learning

Computers have great potential for learning: they promise the possibility of affordable, individualized learning environments. In the early teaching systems, the goal was to build a clever teacher able to communicate knowledge to the individual learner. Recent and emerging work focuses on the learner exploring, designing, constructing, making sense of, and using adaptive systems as tools. Hence, the new tendency is to give the learner greater responsibility and control over all aspects of the learning process. This need for flexibility, personalization, and control results from a shift in the perception of the learning process. In fact, new trends emerging in the education domain are significantly influencing e-learning (Kay, 2001):

- **The shift from studying to graduate to studying to learn**: Most e-learners are working and have well-defined personal goals for enhancing their careers.

- **The shift from student to learner**: This shift has resulted in a change in strategy and control, so that the learning process is becoming more cooperative than competitive.

- **The shift from expertise in a domain to teaching beliefs**: The classical teaching systems refer to “domain and teaching expertise” when dealing with the knowledge-transfer process, but the new trend is based on the concept of “belief.” One teacher may have different beliefs from another, and the different actors in the system (students, peers, teachers), may have different beliefs about the domains and teaching methods.

- **The shift from a four-year program to graduate to lifelong learning**: Most e-learners have a long-term learning plan related to their career needs.

- The shift to conceiving university departments as communities of scholars, but not necessarily in a single location.

- **The shift to mobile learning**: Most e-learners are working and have little spare time. Therefore, any computer-based learning must fit into their busy schedules (at work, at home, when traveling), so that they require a personal and portable system.