Chapter 5

PERSONALIZED INTELLIGENT TRAINING ON THE WEB: A MULTI-AGENT APPROACH

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Abstract One of the most interesting realm among those ones brought up to success by the development of the Internet is distance learning and training. For this reason, the investigation for adequate architectures and platforms supporting flexible and tailored training solutions is nowadays of great interests in the scientific community. This paper is concerned with the presentation of an original architecture for intelligent distance tutoring which make use of software agents. The way in which the knowledge is represented and stored is discussed together with the ability of our system to manage individual learning paths for different users. The rationale for using Agents is presented and the implementation of the system is discussed.

1 INTRODUCTION

The great amount of information available across the Internet brought to the development of new sophisticated information-based technologies; interests in knowledge management, in information retrieval and information filtering are becoming hot topics in several areas for different applications across Internet.

Among the enormous number of such applications, one of the most interesting is the Distance Learning. The potential of the Web for providing rich materials and experiences, the possibility and capability to learn more knowledge implied by digital technologies are factors of increasing importance in a world where the amount of information that needs to be learned grows very rapidly and becomes obsolete very quickly. As a matter of
fact, the proliferation of Local Area Networks (LANs), and Wide Area Networks (WANs) for telecommunications, information and data applications has brought the enabling technological framework needed to bring network-based multimedia training to full availability of millions of people worldwide.

Interactive training delivered via a computer has been reported to be more effective than traditional classroom lectures, and, moreover, to reduce training time and costs [1], [2]. Exploiting computer delivered training it is possible to increase training effectiveness by increasing student participation, interest and retention of knowledge and reducing attrition level [3]. Fletcher [4] summarized a set of supporting evidences for the benefits of technology based learning systems coming from numerous analyses and specific studies. His conclusions can be summarized as follows.

- Technology can be used to teach: in the absence of any other instruction, technology based learning systems improve student achievement.
- Technology improves instructional effectiveness compared with the “conventional instruction” (lecture, text-based materials, hands-on experience).
- Technology reduces time to reach instructional objective: analyses covering a wide range of content areas (military training, adult education, and higher education) shows an average reduction of the 30% of time if compared with “conventional instruction”.
- Technology can be used to teach “soft skills” (soft skills are knowledge and skills associated with social interactions).
- Students enjoy using technology: they are more likely to say they enjoy technology based instructions than conventional mechanisms.

Benefits of computer based training relies on the fact that they exploit a “learner-centered” training paradigm in place of the classical “tutor-centered”. Such approach focus on needs, skills and interests of the learner. At the heart of the modern instructional design there is, in fact, the idea that people learn best when engrossed in the topic, motivated to seek out new knowledge and skills because they need them in order to solve the problem at the hand [5].

The purpose of this paper is to present ABITS, an innovative solution for intelligent training over the Internet able to address all these topics. Its features include automatic learners evaluation (through profiling) and intelligent course tailoring based upon user needs and inferred user profiles. ABITS includes and integrates several state-of-the-art technologies: metadata and conceptual graphs for knowledge manipulation, intelligent agents and fuzzy user profiling. ABITS is Web-based: it requires zero cost installation for end-users and can allow them to take training without time and place constraints. Moreover ABITS is content open: it allow easy integration of content from multiple courseware providers and authoring-tools in order to reuse existing didactic material.