

# Preface

Distance education or distance learning is an important direction to current high level education. With the blooming of Internet and Web technologies, the popularity of distance learning programs enforces us to think about what advanced technologies can help traditional education. In general, the new era of distance education needs several types of people to work together. Educational professionals are the main players as usual. The design of high-quality contents is the most important factor toward the success of a distance learning program. It is also important that clear presentation/lecture is delivered, both from educational (e.g., clear writing and organization) and technological (e.g., high quality video) perspectives. To ensure the quality and friendliness of contents, digital art designers may assist educational professionals to ensure that multimedia technologies are properly applied to contents. Especially, if Web-based channel is the main delivery media, a visually pleasant design of interface for friendly browsing is necessary. In order to support efficient delivery, a distance learning program also needs technical persons to operate network and computer systems to ensure that video or Web-based contents can be accessed smoothly. Thus, an administrative office needs to gather different types of professionals, include teachers, art designers, and technicians. The administrative office also needs to develop curricula and maintain records for students and accounting, and to ensure that the operation is running smoothly.

The organization of a distance learning program needs a number of professionals. On the other hand, the need of advanced computer and network technologies are essential toward a smooth operation of the program. In fact, advanced technologies for distance learning is still a challenge research area, with several interesting problems not yet discovered and solved. This book collects a few best revised papers from the *International Journal of Distance Education Technologies*, in additional to several invited papers. The book is orga-

nized into five sections. The first section includes a paper which addresses several challenge issues from both sociological and technological perspectives. The article also includes a collection of questions and answers found in panel discussions in international conferences. This article will help new students who are interested in distance education technologies. Section II to Section IV includes 13 articles, which addresses research results from communication, intelligence, and educational perspectives. These three aspects are also the themes of the *International Journal of Distance Education Technologies*. The last section points out a few interesting research issues in a chapter. Especially, advanced multimedia and communication technologies are discussed. The readers of this book can start from the first chapter to have a glance of technical issues of distance learning. Depending on his or her research interest, one can choose Section III to Section V for detailed issues. We give an overview of these thirteen chapters in the next paragraphs. For graduate students in computer engineering or computer science departments who are looking for research issues, the final chapter is recommended.

Communication technologies include new network infrastructures, real-time protocols, broadband and wireless communication tools, quality-of-services issues, multimedia streaming technology, distributed systems, mobile systems, multimedia synchronization controls, and other technologies of distance education. Recently, with the blooming of wireless communication technologies, outdoor distance learning can be achieved base on devices such as PDA or cellular phones. In Chapter II, an e-learning system called TDeLS uses a top-down method, which was proposed in the Information Processing Society of Japan in 1999. The system uses XML-based contents that can be delivered on cellular phones. Whether the contents are delivered on personal computers or mobile devices, the use of privacy and security issues associated with e-learning is an essential need. Chapter III discussed a number of existing privacy enhancing technologies, including methods for network privacy, policy-based privacy/security management, and trust systems. In Chapter IV, a network protocol based on distributed topology construction protocol (DTCP) is discussed. The protocol can be used to improve communication efficiency of mobile devices for distance learning. To support students study in traditional university campuses, Chapter V discusses an agent-based system on cellular phone which is able to provide four types of services: campus navigation, news, login states of students, and online web information. The system was used by several users in a university in Japan with a reasonable satisfaction. Communication technologies can be used not only in distance learning. But, good communication systems are essentially important toward the success of distance leaning programs.

Intelligent technologies include intelligent tutoring, individualized distance learning, neural network or statistical approaches to behavior analysis, automatic FAQ reply methods, copyright protection and authentication mechanisms, soft computing, visual computing, and other technologies of distance education. Com-

puter science and computer engineering foundations usually play an important role. Chapter VI presents an essential technique based on the TAOML language (an extension of XML), from a software engineering perspective. An experimental courseware called the Growing Book is also presented by using the technology. Reusability is one of the focuses in this chapter. A mediator-based architecture is proposed in Chapter VII. The architecture brings help from a service provider to a service requester, through the actions of an agent which is able to allocate proper learning resources via a definition of ontology. TutorFinder, an online tool for students and lecturers to locate suitable tutors, is also included in Chapter VII. In addition, Chapter VIII presents an approach of using adaptive hypermedia for a particular learner based on the profile or records of the learner. The chapter also addresses an advanced assessment technique, called the concept effect model. Students can benefit from the system of knowing what portion of study the individual should further enhance, by following suggestions from the outcome of a test. With a slightly different focus, Chapter IX presents a virtual lab for students to learn DSP (i.e., digital signal processing). A prototype of VDSPL has been implemented by using the IBM Aglet system and Java native interface for DSP experimental platforms. Experimental results demonstrate that the system has received many positive feedbacks from both students and teachers. In general, intelligent technologies have no specific underlying model to achieve one of the challenge issues in e-learning — intelligent tutoring.

Educational technologies include practical and new learning models, automatic assessment methods, effective and efficient authoring systems, and other issues of distance education. Even with a less emphasis of educational technologies in the *International Journal of Distance Education Technologies*, recently, we found several interesting articles with computational mechanisms based on educational technologies. An interesting approach to improve student memory retention by using distance learning tool is proposed in Chapter X. Communication preference and learning style of students were analyzed. Conclusively, the WISDeM's interactive system is likely to make a significant improvement to student learning and remembering. The scaffolding theory is used in Chapter XI. By using visualized domain ontology, an authoring environment based on resource description framework/resource description framework schema (RDF/RDFS) was used to construct domain ontology of mathematics at a secondary school level. The authoring tool is further extended to a content repository management system (CRMS). Another study and experiments of using live audio-video delivery, text chat and document annotations of a lecture presentation are presented in Chapter XII. Using Nanyang Technological University, Singapore as a test-bed, the authors recommends a few development stages of e-learning in a university. In Chapter XIII, grid computing and a grid engine (Globus Toolkit 3.2) were used to develop a SCORM-based ubiquitous learning environment. The environment is able to support learning on different

devices such as PC, Laptop, Tablet PC, PDA, and mobile phones. A study of using such a system for English teaching is presented. And finally, Chapter XIV presents an interesting system on the Web to teach students how to write Chinese characters.

The expected great success of distance learning and the virtual university paradise is still not coming. Even if technology can support such an operation, there still remain some sociological and methodological problems. It is questionable, whether it is political, or technical, for the society to approve virtual university degrees. However, distance learning is now very active in mission-based instruction, and in community-based lifelong education. We hope the academia, the government, the engineers, and the society can work tightly toward the great success of distance education.

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