GUEST EDITORIAL PREFACE

New Trends in Information Technology in Education

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INTRODUCTION

Education throughout the world is undergoing various processes of change, pressured by demands to provide a variety of education models for increasing number and diversity of students. Among these changes, new information technologies are used to make learning and teaching more effective and attractive between students and teachers.

The 2009 IEEE International Symposium on Information Technology in Medicine & Education (ITME) has been established as renowned event covering the newest trends on Information Technology in Education. The symposium ended with inspiring success, which has on the one hand explored the theoretical and practical issues of IT in education and medicine and, and on the other, fostered new ideas and collaboration between researchers and practitioners. Hence, the contributions do not only cover new technologies, but also new applications of IT in Education. Numerous joint research papers and joint projects have also emerged from the successful track record of events at ITME 2009.

In 2009, the second ITME 2009 was held in Jinan, located on China's east coast. Accordingly, authors that submitted work to the ITME 2009 symposium came from different countries with remarkably many submissions from Australia, China, Finland, Italy, Switzerland, UK, USA and so on. ITME 2009 was jointly organized by Shandong Normal University, Lanzhou University, Xiamen University and Henan University of Technology.The event has received many excellent papers and the proceeding has been published. It is necessary to publish some selected excellent papers in an international journal so as to be shared extensively to improve IT in education and medicine. Therefore, a JDET Special Issue on "The New Trends on Information Technology in Education" is proposed.

PAPER OVERVIEW

The papers in this Special Issue include five out of the more than 300 submissions we received for ITME 2009, plus two outstanding written by those working in IT for education. After an

already rigorous review process at the symposium, we invited only 9 authors to submit an extended version of their contribution to this Special Issue. All these submissions were of very high quality, but unfortunately it was only possible to include the following top-ranked submissions into this special issue, which gives an excellent overview of new trends on IT in Education at ITME 2009. In clustering the papers for this issue, which are suitably varied in both content and form, we move gradually from foundations towards technical tools for educational activities.

In the first paper, *Scalable Video Streaming in Wireless Mesh Networks for Education*, Yan Liu et al. argue that wireless mesh network (WMN) is a self-organizing, self-managing and reliable intelligent network which allows educators to deploy a network quickly whenever there is a need and video streaming plays an important role in WMNs for multimedia data transmission. Beginning from a scalable video coding scheme that enables the video server to deliver layered videos to different user groups, the authors develop a quality control method to automatically change the output data rate based on network conditions. Their video streaming system for education based on WMN has been is demonstrated to be effective.

Next, in *EIIS: An Educational Information Intelligent Search Engine Supported by Semantic Services*, Chang-Qin Huang et al. move the focus to semantic web. To meet the special requirements of the education field, the authors design an EIIS framework in which both web-based resources and local e-resources are semantically processed. They also provide a semantic factor and a response time factor in order to automatically reason semantic concepts and relevant rule sets. Furthermore, the authors develop two levels ranking and differentiate the same relevance by semantic similarity. In doing so, they raise the precision rate and the ranking performance of EIIS.

Continuing semantic web, in *Adaptive Device Context Based Mobile Learning Systems*, Haitao Pu et al. consider that mobile computing e-learning represents the next stage of computer-aided, multi-media based learning. In order to provide device independence mobile learning services, the authors propose a context-aware mobile learning approach. After defining several fomal notions such as device context, adaptation coefficient etc., they construct a mobile learning system in which mobile learning services are automatically adaped to mobile learners' devices. Their system is seen to automatically detect the contextual enviroment of mobile computing.

Clearly, ontology for e-learning is a widespread way for knowledge representation and reasoning. In *A Knowledge Engineering Approach to Develop Domain Ontology*, Hongyan Yun et al. aim at constructing ontologies at special domains. Following software development life cycle standard IEEE 1074-2006 and ontology design criteria proposed by T. R. Gruber, the authors develop a knowledge engineering approach to build marine biology ontology for e-learning. In order to demonstrate the validity and rationality of their ontology, the authors apply it to the OASIS system. As well, they document their experiences in the development of marine biology ontology.

Moving from physical tools to applications of IT in education, Wenhao Li considers educational software. In *A Scheduling Algorithm for the Distributed Student Registration System in Transaction-Intensive Environment*, the author pre-calculates each of workflow applications before each of them is deployed into the workflow engine. By constructing a priority list for solution generating, the authors introduce a dynamic and adaptive schedule algorithm. The advantages of the algorithm such as preferably efficiency and fitting the distributed student system well are described.

After that, in *K-Nearest Neighbors Relevance Annotation Model for Distance Education*, Xiao Ke et al. consider online automatic annotation for distance education systems by object identification in an original way for

teaching small kids. Having undertaken a K-Nearest Neighbors Relevance model which combines KNN method with relevance models, the authors solve the problems of high computational complexity to some extent and annotation results affected by irrelevant training images when calculating joint generation probabilities between visual areas and keywords. As a consequence, the online automatic annotation is able to effectively help small children to learn interrelations between image contents and corresponding keywords.

Last but not least, in *Research on Key Technology in Remote Education System of Spirit Diagnosing by Eye in TCM*, Feng Guo et al. propose an interesting remote education system which receives videos from users and responses to them with result of auto-diagnosed Spirit. Extracting the most relevant ones to "Spirit" from quantitative eye features is key to this Spirit diagnosing system. With videos capturing the eye condition, attribute intervals of eye features are generated by maximizing the class-attribute interdependence. In doing this, candidate rules are obtained by association rule mining based on the Cloud model. Finally, three modified complementary rule-pruning methods are combined to trim irrelevant rules.

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Jianming Yong is a vice chairman of IEEE Queensland Computer Chapter, Australia. He has published over sixty scientific research papers in prestigious and highly-impacted journals and International Conferences. He has edited five special journal issues and 7 International Conference proceedings and books. He has an extensive research cooperation network with world leading research centres in USA, France, Japan, etc. He has been serving as a member of International steering committee of CSCWD over last 7 years. He is a PC member of several prestigious International Conferences. He was holding a senior research visiting position at one of world leading security research centre at Purdue University, USA. Dr. Jianming Yong is a permanent senior academic staff at School of Information Systems, Faculty of Business, University of Southern Queensland, Queensland, Australia.