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Editorial Introduction to multimedia system technologies for educational tools

The application of multimedia system technologies to the field of education is of high interest today because of the wide accessibility of Internet and computer technologies in the classroom. Multimedia technologies have been successfully and widely applied to teaching, self-paced learning, digital libraries, etc., in recent years. Multimedia technology for education has also been a subject of intense research. In the past 10 years, the research of multimedia technology for education has been scholarly as well as practical. The expectations for the educational system have changed markedly during the past few decades. Many of the newer expectations are rooted in the rapidly developing capabilities and the ubiquitous availability of information technology.

As a key information technology for education, multimedia technology provides a fresh perspective to pedagogy and is causing a revolution in the way educators approach the classroom. This is an important arena in which Computer Science and Electrical and Computer Engineering impact K-University education. This special issue is aimed at dissemination of recent advances in multimedia systems and technologies for educational tools. A total of 28 papers were submitted to this special issue and each was peer-reviewed by at least three experts in multimedia. Among them, 10 papers were selected for inclusion in this special issue. The

10 papers in this special issue span the recent development of multimedia systems and technologies systems aimed at a wide range of application domains.

Huang et al. present an integrated semantics integration framework to manipulate the learning resources across media formats and to facilitate the learning knowledge communication among learners and instructors. In contrast to existing products from various e-Learning specifications focusing either on content description or process, they propose a more general solution in integrating the content of learning resources and learning processes at the semantic level in order to provide a more user-friendly pedagogy-enabled e-Learning environment.

Osawa and Sangtae present a system for three-dimensional authoring and presentation in immersive virtual reality environments. Their system can let the user create and edit content through direct manipulation using hand gestures in an immersive environment. It also exploits various features of 3D information visualization to produce effective and interactive presentations.

To assist authors during the authoring of multimedia presentations, Falkovych et al. propose an innovative solution. In their approach, the processes of topic identification, content collection and discourse structure are integrated into a single environment, which allows identification of the context of the authoring process.

Butcher et al. explore the use of a multimedia search interface for digital libraries based on strand maps. Their research shows that, as a multimedia search interface for digital libraries, strand maps are promising tools to promote conceptual discovery and learning through content-based processes that promote learner engagement with relevant science knowledge.

In the video processing area, Mittal et al. present an educational video compression technique that dynamically allocates the space according to the content importance of each video segment in the educational videos. Their technique can significantly enhance the bandwidth utilization over scarce resource networks.

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In the active area of content-based image retrieval, Avula et al. present a new image retrieval system for multimedia education. Their system is a segmentation-based retrieval system in which the user can select a query segment to perform the retrieval.

Ghinea and Chen discuss whether cognitive styles influence the way how humans process information. They investigated the relationship between user cognitive styles and perceptual multimedia quality, in which users had the possibility to specify their desired quality of service settings.

The augmented reality system of Rodney Berry et al. facilitates the composition of music by manipulating objects on a tabletop as a physicalized representation of the music. Their system can be used as an educational tool, particularly in short and intense interactive learning situations such as museums for children.

Bouras et al. present the design, implementation and evaluation of EVE Community Prototype, which is an educational virtual community aiming to meet the requirements of a Virtual Collaboration Space and to support e-Learning services. They also describe the design and implementation of an integrated platform for Networked Virtual Environments, called the EVE Platform, which supports the educational community.

Finally, as a glimpse into the future, Nakatsu et al. propose a new multimedia concept which is termed Kansei Mediation. Several promising examples of advanced technology are described and their potential applications in the context of Kansei Mediation are presented.