Special Issue: Interactive Multimedia Convergence

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Welcome to the special issue of *Multimedia Tools and Applications* on “Interactive Multimedia Convergence.” This special issue contains a collection of papers that explore techniques, experiences, architectures, and algorithms addressing topics including

- Interactive multimedia computing for convergence
- Multimedia and content protection
- Software infrastructure, middleware, and frameworks for convergence multimedia
- Mobile and wearable computing for convergence information
- Agent technology in convergence information system
- Convergence information applications in u-Commerce, u-Learning, and u-Health
- Innovative application of convergence information
- Cooperative design in convergence environments
- Artificial intelligent methodologies for convergence information

A brief description of each paper follows.

The paper by Lee et al. [1] presents hidden relevant documents buried in larger scientific documents according to terminological paraphrases. The authors propose an effective method of retrieving documents that contain alternative expressions denoting technological concepts in the literature based on predicate argument tuple. The proposed method, which consists of multiple arguments as well as a predicate representing their semantic relationship, expresses both syntactic and semantic interrelations between words in a sentence. As a result, the authors show that PAT-based retrieval could

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identify hidden relevant documents that could not otherwise be retrieved. Therefore, their proposed model can be used as a supplementary model to improve search performance after combining it with other conventional retrieval models. The paper by Chung et al. [6] presents the towards virtualized and automated software performance test architecture. The system architecture considers efficient usage of computer resources, and test automation to reduce human acts is addressed. The paper also describes our proposed method for system architecture and test automation procedures. Using the proposed system architecture, they show how to use the virtual machines, along with which types, for performance measurement. In addition, the six test automation steps are introduced in the paper for the automated testing procedures. Finally, a few experiments were able to show that the proposed schemes may allow automated software performance testing using virtualization.

The paper by Kim et al. [5] introduces a business intelligence application based on the adaptive recognition of user intentions and usage patterns in a mobile environment. This application is named InSciTe Adaptive and is based on text mining as well as semantic Web technologies. InSciTe Adaptive provides several types of technology analyses and prediction services, thereby helping users make better business decisions. Further, it supports technology-focused analysis and predictions, including technology trend analysis, element technology analysis, and convergence technology discovery, as well as adaptive recognition of user intentions by using semiautomatic user modeling processes. The paper by Chung et al. [10] provides a broadcasting method that considers stopping distance and an improved back-off algorithm based on the number of neighbor nodes, which lowers the potential of “chain-reaction collisions,” since the vehicle travels at high velocity. This research allows for a broadcasting method for VSC on highways. This method uses a number of neighbor nodes based on how concentrated vehicles are in one area. Rather than sending an emergency message after the collision, faster communication makes predicting traffic hazards possible. Experimenting with NB and IB, the frame reception success rate can be improved.

The paper by Yang [13] introduces a system for building a honeypot farm using a dynamic virtual machine to collect attack information and virtualization technology. The authors propose a dynamic honeypot model consisting of the following components. It is a virtual machine that controls and supervises the state of the virtual machines, an agent that checks IP addresses using the state of the internal domain to create a dynamically virtual machine, a honeypot farm consisting of multiple dynamic virtual machines, a protocol-based intrusion detection system to detect attacks using collected attack information, and a log server to store all records. The paper by Jo et al. [2] presents a social network-based personalized advertisement. The proposed system applies user modeling between collaborative filtering and a frequent pattern network model in order to recommend advertisements according to user conditions. The proposed method alleviates the cold start and sparsity problems of collaborative filtering. Recommendation accuracy will increase when social relations are sufficient.

The paper by Kim et al. [9] presents a facial landmark detection method using an improved active shape model on the Android platform. The authors propose and implement a novel algorithm that extends and enhances the traditional algorithmic state machine (ASM) method except for three modifications. The authors also detail the effects of facial landmarks while implementing an efficient extraction algorithm for facial feature points on

mobile devices, as most are specific to desktop computers. For this, the authors conducted ASM fitting tests on all frontal images in the face databases. Experimental results revealed that our proposed method is both more accurate and more efficient compared to the classic ASM method. The main contribution of this paper is that the new model can be implemented on the Android platform, which is convenient and can be adapted for use by a large number of applications in the mobile environment. The paper by Park et al. [3] introduces vulnerability of privacy exposure in a mobile data transmission channel. The authors propose a selected major domestic and external website that provides cloud, VoIP, messenger, and e-mail services and inspect whether or not major data are encrypted. The paper also carries out inspection in a wired/wireless environment using Wireshark as an inspection tool. Both wired and wireless environments are verified, and the encryption rate of the ID/password is at an average encryption rate of 85.5 %. However, the encryption rate of the data is relatively low at an average encryption rate of 27.8 %.

The paper by Lee et al. [7] discusses previous research topics and methods regarding information systems in the fields of supply chain management (SCM) as an analysis of current trends and future directions. The authors were able to identify current trends as well as the most popular research topics and methodologies. One of the most important research methods in empirical research is the lab experiment land survey. The paper further shows that research topics associated with IS in SCM are diversified, whereas research methods are limited due to the lack of theoretical knowledge and qualitative study. The paper by Lee and Song [12] introduces direct optimization of an inference model for human activity and posture class recognition. The authors describe the design and implementation of a class label-tagging system for human activity recognition based on sensor data obtained from a single tri-axial accelerometer attached to the waist of a human subject. Our human activity and posture classifier was designed to more effectively model an event that takes place over a period of time. Consequently, the problem becomes a process of tagging class labels onto sequential data obtained from a single tri-axial accelerometer. The experiment shows that embedding prior probability into the recognition process reduces the error rate in a set of categories. Several experiments proved the efficiency of their proposed method as well as the usefulness of the system.

The paper by Park et al. [11] details performance improvement of an intelligent u-Port system using metallic object applications. For the intelligent u-Port system, the authors manufactured a compact multiple meander antenna to analyze performance deterioration in a metal environment. In the proposed antenna design, the antenna structure consists of a square-shaped power feeder connected to the body for coordination with an attached common-use tag chip, whereas the patch device is manufactured in the form of multiple meanders to efficiently scale back the size of the antenna body. Characteristics of bandwidth, efficiency, and recognition distance were compared and analyzed based on the size of the proposed antenna as well as the number of folds. The results showed that the efficiency and gain characteristics change according to the size of the antenna, and the number of folds in the form of meanders significantly influence the recognition distance of the antenna.

The paper by Kang et al. [4] presents a statistical ontology approach for adaptive object recognition in a situation-variant environment. The proposed method utilizes context ontology, context modeling, context adaptation, and context categorization to design the ontology based on illumination criteria for surveillance. After selecting the

proper ontology domain, a set of actions is then selected to achieve better performance in that domain. The authors carried out extensive experiments on these concepts in the area of object recognition under dynamic conditions and achieved enormous success that will enable us to proceed with our basic concepts. Consequently, the authors concluded that the performance of the context-aware classifier selection methods for adaptive object recognition is highly dependent upon the environment. The paper by Ko et al. [8] explores how to improve the problems of model verification using verification meta-information and transformation similarity by property matching. In addition, to support verification of the target model generated from the source model, the authors define the verification meta-model for the UML model, RDBMS model, and RT-UML model. By suggesting a verification-based transformation profile for the system structure model, this study provides a new method on how to inspect a converted model, which is one of the most important subjects in model transformation verification research.

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