

# Advanced signal processing and HCI issues for interactive multimedia services

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## 1 Introduction

With the flood and popularity of various multimedia contents on the Internet, intelligent interactive multimedia services such as personalization and adaptability have become essential in recent multimedia systems. For this reason, they need to be interactive not only through classical modes of interaction where a user inputs information through a keyboard or mouse, but also through advanced interaction modes which are more attractive, more user friendly, more human-like and more informative [9].

We have received 18 manuscripts. Each manuscript was blindly reviewed by at least three reviewers consisting of guest editors and external reviewers. After the first and second review processes, eight manuscripts were finally selected to be included in this special issue.

In Section 2 and 3, we present a brief description about the signal processing and HCI (Human Computer Interaction) issues for interactive multimedia services, respectively. In the last section, we conclude the paper with some observations and future work.

## 2 Signal processing issues for interactive multimedia services

The first paper entitled “Craniofacial reconstruction based on multi-linear subspace analysis,” by Yang et al. [1] proposes a statistical learning based method, which is a multi-linear

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subspace analysis, for craniofacial reconstruction. They constructed two tensor models for the skull and the face skin to represent the craniofacial shape variation and utilize the relevance between different local regions of the craniofacial surface. They also used “partial least squares regression” to build the mapping from the skull to skin.

The second paper entitled “Adaptive Image Data Hiding Using Transformation and Error Replacement,” by Ejaz et al. [3] presents a method of adaptive blind digital image data hiding in Discrete Cosine Transform (DCT) domain using Minimum Error Lease Significant Bit Replacement (MELSBR) method and Genetic Algorithm (GA). They used genetic algorithm to find and watermark the host image blocks and MELSBR method to help reducing the watermark embedding error in DCT domain.

Another paper entitled “Efficient DRM Mechanism of Scalable Contents based on H.264/SVC in Convergence Environment,” by Park et al. [8] proposes a scalable video coding (SVC) DRM mechanism considering the convergence environment that redistributes the adaptive content for devices which may have different display size and computing capabilities between users or in the home network. The proposed method uses the SVC content that is compressed by H.264/SVC scheme which has been standardized recently and encrypted by SVC encryption scheme so that each device gets a content of suitable level according to its own device capability.

The fourth paper entitled “TrendsSummary: A Platform for Retrieving and Summarizing Trend Multimedia Contents,” by Kim et al. [5] proposes a trend summarization scheme with its related multimedia contents called TrendsSummary from Twitter. They selected the candidate keywords from the raw data collected from Twitter by performing simple syntactic feature-based filtering method in order to detect trend and its related keywords. Then, they merged various keyword variants using several heuristics based on the term frequency and selected trend keywords and their related keywords from the candidate keywords set and expand it to the portal sites such as Wikipedia and Google. They finally collected 4 types of candidate multimedia contents, such as TV programs, videos, news articles, and images, from various websites.

### 3 HCI (human computer interaction) issues for interactive multimedia services

Fifth paper entitled “SVD based improved secret fragment visible mosaic image generation for information hiding,” by Kwon et al. [6] proposes a method for information hiding based on secret fragment visible mosaic image. Because the large size of bit stream of recovery information of secret image block sequence creates an additional problem, they present a new way to solve the problem using the color transfer technique in correlated color space. They used the combination of logistic map and Chebyshev map to generate the encryption sequence of the secret image for getting the robust encryption and lower bit rate requirement.

Next paper entitled “The Quality Model for E-learning System with Multimedia Contents: A Pairwise Comparison Approach,” by Jeong et al. [4] implements E-learning system which used various multimedia types or learning materials to support the learners a method to get advanced learning effect and proposes the quality model with 9 criteria: (*Media loss rates, Frame rates, Download time (Access time), File size, User control, Upto-date, Enjoyment, Learnability, and User Friendly*) for multimedia based learning contents in online education environment. They performed the pairwise comparison’s result in terms

of “Learnability”, “Enjoyment”, and “User Friendly” which are important factor on multi-media based learning contents.

Seventh paper entitled “Ontology based User Query Interpretation for Semantic Multi-media Contents Retrieval,” by Lee et al. [7] proposes a user query interpretation and expansion technique based on ontology knowledge base and implemented a prototype system which provides more accurate search results than other semantic search system. The system was performed search results in prototype form by building the knowledge base for a finite domain.

The last paper entitled “Virtual Pottery: A Virtual 3D Audiovisual Interface Using Natural Hand Motions,” by Han et al. [3] presents an approach towards designing and implementing a virtual 3D sound sculpting interface that creates audiovisual results using hand motions in real time. They developed an immersive audiovisual installation, Virtual Pottery, which was conducted using a Motion-capture system and low-cost depth sensing Camera (Kinect). They have already demonstrated Virtual Pottery in two exhibitions under two different camera sensing systems, and the results from the audience were successful.

#### 4 Conclusion

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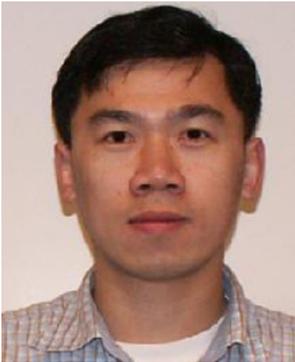


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