

Guest Editorial

With the recent development in the multimedia standards technology such as MPEG-4, MPEG-7, and H.264/AVC, there is a new quest for further technological breakthrough in the areas of multimedia content description and video compression technology based on these new standards. The aim of this special issue is to investigate novel technologies to enable new applications for diverse varieties of networks and devices.

In this special issue, the articles are categorized in two major parts. The first part with six articles is about content analysis of multimedia content. The second part of this special issue is on the subject of scalable and error resilient video coding for heterogeneous networks. There are five articles addressing efficient scalable video coding, which is now a major effort in the recent call for proposal of the video group at the MPEG committee. Error resilient coding, which offers a non-scalable solution for mobile networks, is addressed in the last article.

In the first part, six articles address the problem of semantic analysis of multimedia content. The first article entitled "A Robust Video Scene Extraction Approach to Movie Content Abstraction" addresses the problem of automatically extracting semantic video scenes from feature films based on multimodal information. The generated scene structure forms a compact yet meaningful abstraction of the video data, which can help facilitate the content access. The second article entitled "MPEG-4 Facial Animation in Video Analysis and Synthesis" presents a complete system for the analysis of facial expressions from image sequences and their synthesis in a model-based codec. With the presented model-aided coding extension of hybrid video codecs, bit-rate reductions can be achieved in comparison to standard hybrid video codecs. The third article entitled "Description Method for Spatio-temporal Regions in a Video and Its Application" approximates the object region in a frame by a simple figure such as a rectangle, an ellipse or a polygon, and describes the coordinates of its representative vertices. This article uses MPEG-7 tools to describe spatio-temporal location description efficiently. The fourth article entitled "Summarization of News Video and Its Description for Content-based Access" proposes a novel method for summarizing a news video based on multimodal analysis of the content. The approach exploits the closed caption (CC) data to locate semantically meaningful highlights in a news video and speech signals in an audio stream to align the CC data with the video in a time line. The fifth article entitled "Intellectual Property Management and Protection for MPEG Multimedia Content: A Structured Language for Interoperable IPMP Systems" defines a new simple language for the platform independent description of IPMP tools. The definition of such an "IPMP structured language" can achieve full interoperability between content protection and decoder platforms originated by different content producer with the possibility of renewing IPMP systems. The sixth article entitled "The TV-Trawler Project" enables the filtering, recording and delivery of digital video broadcasts over satellite, by matching incoming content descriptions to predefined sets of personal user preferences using MPEG-7.

In the second part of this special issue, the articles focus on scalable video coding, which is currently an intensive research area. The first

article entitled "Macroblock-based Progressive Fine Granularity Scalable Video Coding" proposes a novel highly efficient macroblock-based progressive fine granularity scalable (MBPFGS) video coding scheme that can optimally balance drifting errors and coding efficiency. The second article entitled "Enhanced Mode-adaptive Fine Granularity Scalability" constructs enhancement-layer predictors from macroblocks of current reconstructed base-layer frames, macroblocks of previously reconstructed enhancement-layer frame, and the average. The third article entitled "Block-based Fine Granularity Scalable Video Coding with Optimized Rate Allocation" proposes to solve the problem of inefficient coding caused by uniform rate allocation with an optimized and fast rate allocation method based on the rate-distortion behavior of the block. The fourth article entitled "Video Compression for Multicast Environments Using Spatial Scalability and Simulcast Coding" proposes techniques to select between simulcast coding and spatial scalability for multicast video transmission, which can be used to determine the proper multicast coding approach for providing service to clients with different communication links. The last article entitled "Rate-Distortion Optimized Intra-Update for Error Resilience in MPEG-4 Video Coding" proposes an intra-update method based on rate-distortion optimization in error-prone environments. The rate and the distortion are estimated using the Lagrangian optimization method to simultaneously select the coding mode and the quantization step size.

The guest editors thank all the people who contributed to the special issue, including the authors who submitted articles but whom we were unable to accommodate. Thanks go to the reviewers for their professional opinions on the evaluations of articles with short notice. The guest editors also thank Dr. Eugene Veklerov for giving us the opportunity to organize this special issue. We also express our special appreciation to Professor Yun-Qing Shi for his encouragement and guidance. Last but not the least, we owe many thanks to Mr. Chun-Yi Lee for his support of the project.

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