Introduction: special issue for the selected papers in the fourth international conference on Intelligent Multimedia Computing and Networking (IMMCN) 2005

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This special issue introduces seven papers selected from the IMMCN' 2005, covering a wide range of emerging topics in multimedia field. These papers receive high scores and good comments from the reviewers in their respective areas of intelligent and next-generation networking, technology and application, multimedia coding, content analysis and retrieval. The seven papers are extended to 20 pages and then gone through another review process before the final publication. In this issue, we have two papers for video streaming, two papers for multimedia applications, one paper for video coding, and two papers for image and video retrieval.

The first paper "On Aggregate Available Bandwidth in Many-to-One Data Transfer—Modeling and Applications" by S. C. Hui and Y. B. Jack addresses the modeling of aggregate available bandwidth in multi-sender network. This paper begins by showing simulation on the statistics of single-source and multi-source availability. Two critical cases due to the constraints of bandwidth and video bit rate are separately investigated. Then, a hybrid download-streaming algorithm and a playback-adaptive string algorithm are proposed for video delivery under different bandwidth availability scenarios. The second paper "Transmission of Layered Video Streaming via Multi-path on Ad Hoc Networks" addresses the difficult problem of streaming videos over mobile and unstable ad-hoc networks. First, a multicast routing protocol (LVT-MR) for layered video transport is proposed. By this protocol, multiple disjoint multicast routes from a video source to many receivers are established. Each route has mesh topology against broken links during video streaming. Secondly, a video traffic dispersion algorithm is proposed for allocating multiple video streams to a multicast group. Performance comparison against various routing protocols (DSR, AODV, SMR) are experimented.

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The paper "Advanced Networking Services for Distributed Multimedia Streaming Applications" describes new hardware platforms, based on the programmable networking devices called network processors, to meet the demand for intelligence and flexibility in network systems. To demonstrate the idea, the authors present a software infrastructure which enables the dynamic creation of application-specific services on programmable communication devices, using Intel IXP2400 network processor and an image manipulation algorithm. The fourth paper "Early Evaluation of Future Consumer AV Content Analysis Application with PC Networks" by F. D. Lange and J. Nesvadba describes a system to facilitate the early evaluation and integration of multi-modal features. This system integrates various existing AV content analysis tools in a network of PCs, based on PC-based design methodology and service oriented architecture. A wide range of issues is involved: MPEG codec, feature extraction (from low-level to high-level), streaming and networking components, and interface management. A novel interface which allows the manual allocation of resources (AV tools) is also demonstrated. Overall, this paper presents a sophisticated system to elaborate the overview and challenges of managing various AV content analysis tools over a set of PCs.

The paper "An Improved Variable-Size Block-Matching Algorithm" by H. Wang, Q. Liu and H. Lu proposes an improved video block-based matching algorithm for H.263. The improvement comes from two aspects: (1) motion estimation: eliminating the need of threshold setting in matching and improve the speed by MMP prediction; (2) explicitly handle illumination effects. The paper "Content-based Image Retrieval Using Joint Correlograms" by A. Williams and P. Yoon presents image retrieval by integrating multiple low-level visual features (color, gradient magnitude, rank, texture) with correlogram representation, namely joint correlogram. To reduce the feature size, a preprocessing step with URV decomposition is also introduced. Empirically, the authors show the merit of using joint-correlogram for retrieval over other single features in a large image database. The last paper "OM-based Video Shot Retrieval by One-to-One Matching" discusses the advantages of using bipartite graph based optimal matching for video shot retrieval. Variants of approaches for improving the speed and effectiveness of optimal matching, based upon keyframe selection, are discussed and experimented. The paper shows that, by incorporating color information under graph matching and motion histogram, the performance of shot retrieval and ranking is generally improved for various video genres in particular the sport videos.

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