

Special Session on Media Streaming

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Multimedia has become the major player in today's information technology industry. The rapid growth of computing power, networking technology and Internet based e-commerce witnessed in the past few years has created many new channels and business opportunities for the dissemination of multimedia content. Streaming media over the Internet, wireless networks and home networks is about to become the mainstream media communications. Despite its initial commercial success, media streaming still faces many challenging technological issues such as quality of service (QoS) guarantee and cost effectiveness that remain to be solved. This special session is thus devoted to address some of the main technological challenges for media streaming, including rate-adaptation and scalable coding for heterogeneous networks, QoS and congestion control, streaming systems and architectures, and packet-loss resilient coding and transport.

The presentation given by Li provides an overview of the video coding technique of Fine Granularity Scalability (FGS), which is the subject of Amendment 4 of MPEG-4 Video Standard, and is developed in response to the growing need on a video coding standard for streaming video over the Internet. Lu presents different approaches to media streaming, from the perspectives of both scalable source coding and content delivery network. He shows that a content delivery network helps improve quality and scalability of streaming, complementing a reactive approach such as scalable coding. Deshpande and Zeng propose to use Hypertext transfer protocol (HTTP) for streaming JPEG 2000 images. The system they developed can handle resolution, quality and region of interest scalability features of JPEG2000 images. Thus client devices with different capabilities, variety of screen resolutions, heterogeneous bandwidths can all achieve a scalable viewing of the same content stored in a single file at the standard web server.

Haghighi, Pourmohammadi and Alnuweiri present a scalable architecture for an MPEG-4 streaming server as well as a practical design of the DMIF (Delivery

Multimedia Integration Framework) instance for remote retrieval. Their system provides the necessary framework for testing stream flow control methods, as well as a platform for exploiting a variety of delivery technologies. Shin, Kim, Lee and Kuo present a dynamic QoS mapping framework for relative service differentiation-aware media streaming in which sender, receiver and a media gateway at the border to differentiated service domain interact with each other to control the QoS of the continuous media application under a cost constraint.

The problem of error control and error resiliency is becoming increasingly important because of the growing interest in streaming media over unreliable networks. Cai and Chen address the close interaction between forward error control coding, packetization, and source coding structure. They present a scheme based on a novel pre-interleaving idea for error resiliency over packet networks. They demonstrate that the pre-interleaving is able to generate the desired error patterns for video source coding while still preserving the features of conventional combination of channel coding and packetization, thus achieving significant quality improvement for heavy packet loss networks. Shirani, Gallant and Kossentini address the problem of robust transmission of compressed images over unreliable networks, using overcomplete expansion for multiple-descriptions coding, through pre- and post-processing of the image data without modification to the source or channel codecs. Tai, Liu and Wang propose a scalable video coding algorithm for low bit rate failure-free video transmission. They present an interesting idea of structuring motion field information into two correlated representations. When the decoder receives both of them, it can better resolve the uncertainty of the motion field through motion vector refinement.