

SPECIAL ISSUE

OPEN MEDIA COMPRESSION: OVERVIEW, DESIGN CRITERIA, AND OUTLOOK ON EMERGING STANDARDS

Edited by C. Timmerer, M. Wien, L. Yu, and A. Reibman

1435 A Technical Overview of AV1

By J. Han, B. Li, D. Mukherjee, C.-H. Chiang, A. Grange, C. Chen, H. Su, S. Parker, S. Deng, U. Joshi, Y. Chen, Y. Wang, P. Wilkins, Y. Xu, and J. Bankoski

| INVITED PAPER | This article provides insight into the AOMedia Video 1 (AV1) video compression format. It includes a technical overview of the AV1 codec design as well as a performance evaluation that compares AV1 to its predecessor VP9.

1463 Developments in International Video Coding Standardization After AVC, With an Overview of Versatile Video Coding (VVC)

By B. Bross, J. Chen, J.-R. Ohm, G. J. Sullivan, and Y.-K. Wang

| INVITED PAPER | This article provides a comprehensive overview of video coding standards jointly developed by ISO/IEC and ITU-T considering both high-efficiency video coding (HEVC) and versatile video coding (VVC).

1494 Advances in Video Compression System Using Deep Neural Network: A Review and Case Studies

By D. Ding, Z. Ma, D. Chen, Q. Chen, Z. Liu, and F. Zhu

| INVITED PAPER | This article targets video coding improvements for both individual blocks of the hybrid video encoder and jointly across multiple blocks including end-to-end approaches. It reviews various modules in video coding that could benefit from neural networks and provides case studies for each of these modules.

1521 MPEG Immersive Video Coding Standard

By J. M. Boyce, R. Doré, A. Dziembowski, J. Fleureau, J. Jung, B. Kroon, B. Salahieh, V. K. Malamal Vadakital, and L. Yu

| INVITED PAPER | Immersive volumetric content, which can be captured by multiple cameras, enables six degrees of freedom (6DoF) for the end users. This article provides a comprehensive overview of the MPEG Immersive Video (MIV) codec as well as a description of reference software assets including experimental results.

1537 Compression of Sparse and Dense Dynamic Point Clouds—Methods and Standards

By C. Cao, M. Preda, V. Zakharchenko, E. S. Jang, and T. Zaharia

| INVITED PAPER | This article provides a comprehensive survey of the compression for static as well as dynamic point cloud objects, and point cloud compression using deep learning methods. The adopted coding tools for MPEG's recent standards for video-based point cloud compression and geometry-based point cloud compression are described in detail, and evaluation results are presented as well.

1559 JPEG XS—A New Standard for Visually Lossless Low-Latency Lightweight Image Coding

By A. Descampe, T. Richter, T. Ebrahimi, S. Foessel, J. Keinert, T. Bruylants, P. Pellegriin, C. Buysschaert, and G. Rouvroy

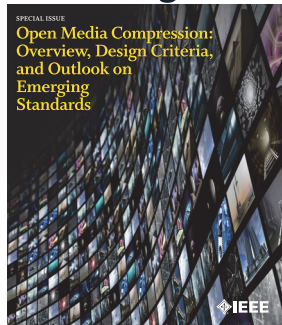
| INVITED PAPER | This article provides a broad introduction to JPEG XS including use cases, key features, and comparison with other image codecs, and a technical overview. It concludes with performance evaluations and status of the standardization process as well as upcoming extensions.

DEPARTMENTS

1423 SCANNING THE ISSUE

Special Issue on Open Media Compression: Overview, Design Criteria, and Outlook on Emerging Standards
By C. Timmerer, M. Wien, L. Yu, and A. Reibman

1623 FUTURE SPECIAL ISSUE/SPECIAL SECTIONS



On the Cover:

This month's cover highlights multimedia content (such as video, audio, image), which is responsible for a majority of today's Internet traffic.

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1578 MPEG Standards for Compressed Representation of Immersive Audio

By S. R. Quackenbush and J. Herre

| INVITED PAPER | This article surveys MPEG-H Audio (universal immersive audio coding) and MPEG-I Immersive Audio (compressed representation for virtual and augmented reality). The article focuses on the differences from other standards as well as the requirements and development process of an MPEG-I 6DoF immersive audio standard.

1590 An Overview of Omnidirectional Media Format (OMAF)

By M. M. Hannuksela and Y.-K. Wang

| INVITED PAPER | The OMAF standard is arguably the first virtual reality (VR) system standard that includes support for 360° video (among others). This article introduces the end-to-end OMAF architecture from content authoring to the player and highlights representation formats of omnidirectional video and images.

1607 An Introduction to MPEG-G: The First Open ISO/IEC Standard for the Compression and Exchange of Genomic Sequencing Data

By J. Voges, M. Hernaez, M. Mattavelli, and J. Ostermann

| INVITED PAPER | The amount of data generated by genomic sequencing machines necessitates the development of an efficient representation format. The article provides an overview of the MPEG-G standard focusing on its core, i.e., the coding of genomic information.

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