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Email of convenor: kyuheonkim@khu.ac.kr

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MPEG Issues a Call for Proposals on Dynamic Mesh Coding

The 136th MPEG meeting was held online, 11–15 October 2021

MPEG Issues a Call for Proposals on Dynamic Mesh Coding

At its 136th meeting, *MPEG Technical Requirements* jointly with *MPEG Coding of 3D Graphics* issued a Call for Proposals (CfP) on Dynamic Mesh Coding. A dynamic mesh sequence may require a large amount of data since it may consist of a significant amount of information changing in time. Therefore, efficient coding technologies are required to store and transmit such content. MPEG previously developed mesh coding standards; however, these standards do not consider time-varying attribute maps and connectivity information.

Companies, organizations, and experts are invited to submit proposals for this call. Parties do not need to be MPEG members to respond. A declaration of intention to respond needs to be submitted by 14 January 2022. Responses to the CfP will be evaluated during the 138th MPEG meeting in April 2022, where proponents are required to participate and present their proposals. Detailed information, including instructions on how to respond to the call for proposals, the requirements to be considered, and the test data to be used are available at <http://www.mpeg.org/>. For further information on the call, please contact Dr. Marius Preda (MPEG Coding of 3D Graphics Convenor) at marius.preda@it-sudparis.eu, or Dr. Igor Curcio (MPEG Technical Requirements Convenor) at igor.curcio@nokia.com.

**MPEG promotes Reference Software and Conformance for
Neural Network Coding to Committee Draft**

MPEG recently ratified the first international standard on Neural Network Compression for Multimedia Applications (ISO/IEC 15938-17). At the 136th MPEG meeting, *MPEG Video* promoted ISO/IEC 15938-18 providing (i) reference software, (ii) guidelines, and (iii) assets for conformance testing to Committee Draft (CD), the first milestone of its formal approval process.

The neural network coding standard is designed as a toolbox of coding technologies. The specification contains different parameter reduction (e.g., pruning, sparsification, matrix decomposition), parameter transformation (e.g., quantization), and entropy coding methods, that can be assembled to encoding pipelines combining one or more (in the case of reduction) methods from each group. The reference software is written in Python and provides a framework defining interfaces for each of the three steps in the coding pipeline and components implementing all supported methods. Additionally, the new standard provides bitstreams for testing the conformance of decoders against the neural network coding specification (ISO/IEC 15938-17).

MPEG Promotes Third Edition of Energy-Efficient Media Consumption (Green Metadata) to Committee Draft

At the 136th MPEG meeting, *MPEG Systems* promoted the third edition of ISO/IEC 23001-11 Energy-Efficient Media Consumption (Green Metadata) to Committee Draft (CD) stage. ISO/IEC 23001-11 specifies metadata (Green Metadata) that facilitates the reduction of energy usage during media consumption. The metadata enable means for (a) reducing decoder power consumption, (b) reducing display power consumption, (c) media selection for the joint decoder and display power reduction, and (d) quality recovery after low-power encoding. The third edition adds three main aspects to the standard: (1) the existing green metadata for interactive signalling for remote decoder power reduction is enhanced by adding new syntax elements for a finer control of decoder complexity on a high variety of platforms and processor cores; (2) a Versatile Video Coding (VVC) Supplemental Enhancement Information (SEI) message carrying green metadata related to complexity metrics for decoder power reduction; and (3) metrics for quality recovery after low-power encoding. The development of the standard is expected to be completed by the end of 2022.

MPEG Progresses VVC Conformance Testing

At the 136th MPEG meeting, two important milestones were achieved by the *MPEG Joint Video Experts Team* with ITU-T SG16 in developing conformance testing for ISO/IEC 23090-3 Versatile Video Coding (VVC): (1) Conformance Testing for Versatile Video Coding (ISO/IEC 23090-15) reached Final Draft International Standard (FDIS) which provides means to test implementations of VVC for their conformance to the profile specified in VVC version 1. (2) VVC version 2 (incl. operation range extensions for higher bit depth and high bit rates) is in the last phase of its development and is planned to be finalised in January 2022. Therefore, a related conformance testing specification has been promoted to Committee Draft Amendment (CDAM) for testing the features of the new profiles in VVC version 2.

The standardisation of such tests will assist implementers of VVC in checking the proper functioning of their implementations during the development of their products. Such tests will also help the users and potential users of VVC products by providing a way to verify claims of the conformance of such products. Thus, such tests will assist the community in achieving interoperability of encoder and decoder products and will encourage the adoption and use of VVC.

MPEG Ratifies Event Messages in Tracks of the ISO Base Media File Format

At the 136th MPEG meeting, *MPEG Systems* has reached the last milestone of the development of a standard to carry event messages in tracks of the ISO Base Media File Format (ISO/BMFF) by promoting ISO/IEC 23001-18 to Final Draft International Standard (FDIS) stage.

This specification provides a method for the carriage of event messages in tracks of the ISO Base Media File Format (ISO/IEC 14496-12). This event message track format associates the timeline of the `DashEventMessageBox` messages to the track timeline. The specified track format enables common ISO/BMFF processing such as multiplexing and de-fragmentation. In addition, multiplexing and de-multiplexing operations using top-level `DashEventMessageBox` based on this event message track format are defined. The carriage in the event message track format will also make this information more easily accessible to devices that can seek through ISO/BMFF formatted media files.

MPEG Completes Subjective Verification Tests for Video-based Point Cloud Compression (V-PCC)

At the 136th MPEG meeting, a subjective test to assess the performance of the new Video-based Point Cloud Compression (V-PCC) standard (ISO/IEC 23090-5) was completed by the *MPEG Visual Quality Assessment advisory group*. The results confirm that excellent visual quality can be achieved using bit rates between 15 and 25 Mbps. All tested V-PCC profiles show considerable compression gain (*i.e.*, 8-9 times better) compared to the anchor Point Cloud Library (PCL) codec.

Subjective quality was assessed using rigorous methods proven in 2D video evaluation wherein a dynamic 3D point cloud is rendered to a 2D video by following a preselected camera path.

Four profiles have been subjectively tested: (i) one profile with a very simple reconstruction in 3D space and (ii) three profiles with a more sophisticated reconstruction in the 3D space. The first profile used High Efficiency Video Coding (HEVC) as the underlying video codec, while the others used either HEVC or Versatile Video Coding (VVC) as the underlying video codec. The subjective quality assessment further confirms that compelling gains can be achieved by replacing of the underlying video codec (*i.e.*, VVC instead of HEVC) and by keeping the point cloud codec unchanged.

V-PCC is specified in ISO/IEC 23090-5:2021 — Information technology — Coded representation of immersive media — Part 5: Visual volumetric video-based coding (V3C) and video-based point cloud compression (V-PCC).

MPEG Issues a Call for LiDAR and Volumetric Point Cloud Content

MPEG Coding of 3D Graphics is currently evaluating technologies that improve its existing point cloud compression standards for volumetric scanners. To ensure that future compression standards are tailored to the needs and requirements of the industry, *MPEG Coding of 3D Graphics* has issued a Call for Point Cloud Content at the 136th MPEG meeting. Industry partners are now invited to propose point cloud content acquired using novel acquisition methods such as advanced LiDAR or volumetric scanners. Detailed information about the call, including means of how to respond, can be found at <http://www.mpeg.org/>. For further information on the call, please contact Dr. Marius Preda (MPEG Coding of 3D Graphics Convenor) at marius.preda@it-sudparis.eu.

MPEG Evaluates Responses to the Haptics Phase 1 Call for Proposals

At its 134th meeting, *MPEG Technical Requirements* issued a Call for Proposals (CfP) on the Coded Representation of Haptics. This CfP sought submissions of technologies that could provide efficient representation and compression of time-dependent haptic signals and were suitable for coding of timed haptic tracks that may be synchronized with audio and/or video media. This CfP was an essential part of Phase 1 of the multi-year MPEG roadmap for haptics.

At its 136th meeting, *MPEG Technical Requirements* concluded its evaluation of four responses to the Haptics CfP. The technologies evaluated included descriptive, human-readable representations, highly efficient psychophysical compression schemes, and support for both vibrotactile and kinesthetic devices. Based on the evaluation of these responses, a subset of the technologies has been selected to form a combined codec (termed RM0) that leverages the best of these technologies and ensures long term relevance for future use cases, including Extended Reality (XR). One of the technologies selected had excellent scores using the subjective MUSHRA tests; a second one had the best PSNR scores and is based on optimised perceptual wavelet coding. A third included technology provides a lightweight JSON framework compatible with the Khronos glTF framework, which is already extended by the MPEG-I scene description standardisation efforts, in which haptics is expected to play a significant role.

After the evaluation of the responses, MPEG will move into the collaborative phase of this effort where its members will work together to improve and fine-tune the combined RM0 technology over



the next several months. It is expected that phase 1 of Haptics will reach the first milestone of standardisation (*i.e.*, issuing a Committee Draft) by 2022.

How to contact MPEG and further information

Journalists that wish to receive MPEG Press Releases by email should contact Dr. Christian Timmerer at christian.timmerer@aau.at or subscribe via <https://lists.aau.at/mailman/listinfo/mpeg-pr>. Further information can be found on the MPEG Website: <http://www.mpeg.org/>.

Future MPEG meetings are planned as follows:

No. 137, Online, 17 – 21 January 2022

No. 138, Alpbach (possibly hybrid mode), AT, 25 – 29 April 2022

No. 139, Cologne, DE, 18 – 22 July 2022

No. 140, Antalya, TR or France, 24 – 28 October 2022

For further information about MPEG, please contact:

Prof. Dr.-Ing. Jörn Ostermann (Convenor of MPEG Technical Coordination, Germany)

Leibniz Universität Hannover

Appelstr. 9A

30167 Hannover, Germany

Tel: +49 511 762 5316

Fax: ++49 511 762 5333

Email: ostermann@tnt.uni-hannover.de

or

Prof. Dr. Kyuheon Kim (Convenor of MPEG Liaison and Communication, Korea)

Department of Electronic Engineering

Kyung Hee University

Seoul, South Korea

Tel: +82 31 201 3810

Email: kyuheonkim@khu.ac.kr

or

Priv.-Doz. Dr. Christian Timmerer (MPEG Press Officer, Austria)

Alpen-Adria-Universität Klagenfurt | Bitmovin Inc.

9020 Klagenfurt am Wörthersee, Austria, Europe

Tel: +43 463 2700 3621

Email: christian.timmerer@aau.at