

**INTERNATIONAL ORGANISATION FOR STANDARDISATION
ORGANISATION INTERNATIONALE DE NORMALISATION
ISO/IEC/JTC 1/SC 29/WG 11
CODING OF MOVING PICTURES AND AUDIO**

ISO/IEC JTC 1/SC 29/WG 11 N9159

July 2007 – Lausanne, CH

Source: Convener of MPEG
Status: Approved by WG11
Subject: MPEG Press Release
Date: 2007 July 6



MPEG Debuts Scalable Video Coding

Lausanne, CH – The 81st MPEG meeting was held in Lausanne, Switzerland from 2-6 July 2007.

Highlights of the 81st Meeting

MPEG Video - New Scalable Video Coding Standardization Completed

MPEG announces the availability of a new Scalable Video Coding (SVC) standard which has been developed by the Joint Video Team (JVT) in collaboration with ITU-T. SVC has been approved as Amendment 3 of the Advanced Video Coding (AVC) standard ISO/IEC 14496-10 (also published as ITU-T Rec. H.264), with full compatibility of base layer information so that it can be decoded by existing AVC decoders. The SVC design enables the creation of a video bitstream that is structured in layers. Such an architecture features the ability to decode either the full bitstream or a subset of it with the removal of enhancement layers. Data remaining after the removal of enhancement layers is still decodable with a decoded video quality that is commensurate with the amount of remaining data. Scalability modes enabled by the enhancement layer information include temporal (increase of frame rate), spatial (increase of picture resolution) and fidelity (increase of quantization accuracy) scalability. Applications such as instantaneous (post-encoding) bit rate adaptation under varying channel conditions, adaptation for various displays and terminal types, and compatible extension of existing services (e.g. support for both 720-line and 1080-line HD formats from a single video stream) are easily supported. Unlike previous scalable compression solutions, the compression efficiency of SVC is very high and hardly distinguishable from "single-layer" AVC codecs in most operation modes. Due to a novel design which re-uses major components of ordinary AVC decoders and runs only one motion compensation loop, the complexity increase for supporting the scalability features in decoders is kept to a minimum.

Systems-Level Support for Scalable Video Coding Applications

To fully support SVC applications at the systems level, a new amendment to the AVC file format (ISO/IEC 14496-15) and a new amendment to MPEG-2 Systems (ISO/IEC 13818-1 | ITU-T Rec. H.222.0) have been started for supporting the new Scalable Video Coding (SVC) extensions of the AVC video standard.

The new amendment 2 to the AVC file format, referred to as the SVC File Format, will support storage and use of SVC scalable video data based on the AVC file format. At the 81st meeting, MPEG progressed this amendment to the FPDAM (final proposed draft amendment) ballot stage of the ISO/IEC approval process. The SVC file format not only stores the SVC bitstreams in an AVC compatible way, but also stores descriptors and options for how subsets of these streams can be extracted for different levels of fidelity, resolution, and frame rate. An example application that would rely on this amendment is the streaming (unicast or multicast) of scalable video content to clients with a variety of decoding and display capabilities (or preferences) and connection bandwidths. The SVC file format provides a flexible and efficient alternative to the otherwise more complicated solution of having to transcode the bitstream to meet the various requirements of the end-user clients.

The new amendment 3 to MPEG-2 Systems (2006 edition) enables the carriage of scalable video data within MPEG-2 program and transport streams. At the 81st meeting, MPEG progressed this amendment to the PDAM (proposed draft amendment) ballot stage of the ISO/IEC approval process. This new MPEG-2 extension facilitates the use of AVC video over MPEG-2 streams for higher spatial or temporal resolution, or higher picture fidelity at the same resolution. One application scenario where this extension is especially useful is to provide broadcasters with the ability to efficiently deploy premium services without affecting their existing customer base. Such a premium service could be the enhancement from today's HD formats to the higher quality and resolution of AVC formats. Set-top boxes with 1080p50/60 SVC capability on top of the existing HD AVC formats can be shipped to premium customers without the need to replace existing HD AVC set-top boxes.

Multiview Video Coding Standardization Initiated

MPEG has issued a new proposed draft amendment (PDAM) for Multiview Video Coding (MVC) based on AVC, which supports simultaneously compressing multiple video streams that are captured by an array of cameras. The technology is suitable to support various types of newly-developed stereoscopic and multiview displays, allowing functionalities such as random access to selected views and view scalability of bitstreams. Decoding of at least one view (the "base view") is possible by existing AVC decoders. For MVC, the data rate is reduced when compared to independent encoding of the various camera views, utilizing the similarity between the views to achieve improved compression capability.

MPEG-21 – Reference and Utility Software Delivered

The development and delivery of reference software is a significant responsibility of MPEG as it creates standards to address technology requirements across a myriad of markets. At the 81st meeting, the new version of the reference software for the MPEG-21

Multimedia Framework was completed. This software implements all normative parts of MPEG-21 and hence enables implementers of the MPEG-21 specification to gain a deep understanding of the intended use for each of its different parts. In addition, utility software which gives further insight into the informative clauses is provided in the package. The participating experts also developed several examples of integrated utility software which can assist industry in implementing combined technologies specified by MPEG. This reference and utility software is freely available to anyone who wishes to develop products that conform to MPEG-21 standards. It can be found as ISO/IEC 21000-8 at <http://standards.iso.org/ittf/PubliclyAvailableStandards>

Other Notable Accomplishments of the 81st Meeting

Call for Proposals Issued for Image and Video Signature Tools

MPEG has issued a Call for Proposals for Visual Signature Tools which are intended to complement the existing MPEG-7 Visual Descriptors by providing "fingerprints" to uniquely identify individual media items. The idea is that these new descriptors (the signatures) would be robust (unchanging) across a wide range of common editing operations and other modifications, but would be sufficiently different for every item of "original" content to identify it uniquely and reliably – just like human fingerprints. Responses are due by the October 2007 meeting in the category of image identification, and by April 2008 in the category of video identification.

Video Surveillance Application Format Progresses

MPEG completed the first stage of standardizing the Video Surveillance Multimedia Application Format (MAF) by releasing a Committee Draft (ISO/IEC CD 23000-10 Video Surveillance MAF) of the standard. This specifies the bitstream format, metadata descriptors and video capabilities as required by surveillance applications. When complete, the Video Surveillance MAF standard will be directly applicable in surveillance cameras and archives, and hence provides a foundation of interoperability in this dedicated application domain.

Frame-based Animated Mesh Compression Tool Available

MPEG enriched its set of compression tools for 3D graphics by promoting a new approach to efficiently represent animation of 3D objects. This technology is specified in Part 16 of the MPEG-4 standard, together with other 3D graphics related tools. In contrast with model-based approaches already standardized in MPEG-4 (skinning and morphing) the new specification may be used for representing the result of any type of mesh deformation. The mesh vertex positions in 3D space are encoded for each frame in a manner analogous to the way pixel colors are represented for each frame in video coding formats. The compression schema benefits from recent advancements in signal compression on various levels: motion-based prediction, frequency transforms and context-based arithmetic encoder. It features state of the art compression performances and advanced functionalities such as scalability.

Contact MPEG

Digging Deeper Once Again

Communicating the large and sometimes complex array of technology that the MPEG Committee has developed is not a simple task. The experts past and present have contributed a series of white-papers that explain each of these standards individually. The repository is growing with each meeting, so if something you are interested is not there yet, it may appear there shortly - but do not hesitate to request it as well. You can start your MPEG adventure at:

<http://www.chiariglione.org/mpeg/mpeg-tech.htm>

Further Information

Future MPEG meetings are planned as follows:

No. 82, Shenzhen, CN 22-26 October 2007

No. 83, Antalya, TR 14-18 January 2008

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This press release and other MPEG-related information can be found on the MPEG homepage:

<http://www.chiariglione.org/mpeg>

The text and details related to the Call mentioned above (together with other current Calls) are in the Hot News section, http://www.chiariglione.org/mpeg/hot_news.htm. These documents include information on how to respond the Calls.

The MPEG homepage also has links to other MPEG pages which are maintained by the MPEG subgroups. It also contains links to public documents that are freely available for download by non-MPEG members.

Journalists that wish to receive MPEG Press Releases by email can contact Arianne Hinds using the contact information provided above.