Fraunhofer
HHI

Versatile Video Coding

The amount of compressed video data is growing faster than ever before. Already today, they comprise the majority of bits on the Internet and in mobile data traffic. This illustrates the need for even more efficient compression than the current HEVC standard. In April 2018, the ITU-T Video Coding Expert Group (VCEG) and the ISO/IEC Moving Pictures Expert Group (MPEG) began standardization of the HEVC successor: Versatile Video Coding (VVC).

In July 2020, the VVC standard specification was finalized and preliminary verification tests confirm 50% bit rate reductions over HEVC for the same perceived quality.

Standardization phase

In October 2017, the Joint Video Experts Group (JVET), a collaboration between ITU-T VCEG and ISO/IEC MPEG, issued an open call for proposals for new video coding technology. Many companies, including Fraunhofer HHI, submitted proposals. Fraunhofer HHI's proposal combined already known technologies with new methods; for example, algorithms developed with the help of machine learning. Fraunhofer HHI's proposal was among the best in all tested categories. Based on the results of this call for proposals, a collaborative project was initiated in April 2018.

Several of the new coding tools proposed by Fraunhofer HHI passed a rigorous examination process and were adopted into the current draft. After two years, the final standard was officially approved in July 2020.

Open industry forum for future licensing of VVC

In 2018, the Media Coding Industry Forum (MC-IF) was established with the intent to provide an open industry forum for discussions of licensing issues related to the deployment of VVC. MC-IF currently includes over 25 members, both from industry and research, including Fraunhofer. Right after finalization of the VVC standard, MC-IF announced VVC pool fostering as a first step toward a patent pool to license VVC essential patents. More information: www.mc-if.org

Highly Efficient Encoder and Live Decoder

In parallel to these VVC standardization activities, Fraunhofer HHI has developed a highly efficient software encoder (VVenC) as well as a live software decoder (VVdeC). Building upon experience from previous successful products for the H.264/AVC and H.265/HEVC standards, the Fraunhofer HHI VVC encoder and decoder are fully compliant and made freely available as soon as the standard was established to enable early adoption, showcasing, and testing. Since 2019, Fraunhofer HHI is demonstrating early versions of the HHI

VVC software decoder, enabling live decoding of 10-bit HD and UHD camera content on a laptop. Furthermore, video content encoded with the latest version of the HHI VVC software encoder is being made available and compared to state-of-the-art video codecs.

About Fraunhofer HHI

The Video Coding & Analytics department of Fraunhofer HHI has made substantial contributions to the field of video coding with a high impact in academia, international standardization, and industry. This includes significant contributions to the entire development process of the two generations of video coding standards H.264/MPEG Advanced Video Coding (AVC) and H.265/MPEG High Efficiency Video Coding (HEVC). For these contributions, Fraunhofer HHI has been honored four times as co-recipient of an Emmy, one of the most important television awards.

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