Fraunhofer Institut Nachrichtentechnik Heinrich-Hertz-Institut

H.264 / MPEG-4 SVC

Scalable Video Coding for Heterogeneous Media Delivery

What is H.264 / MPEG-4 SVC

Scalable Video Coding (SVC) will be an extension of the H.264 / MPEG-4 Advanced Video Coding (AVC) standard

- Starting point of SVC extension was designed and proposed by Fraunhofer Institute HHI
- Standardization of SVC extension is still under way

Why Scalability

To serve different needs of different users with different displays connected through different network links by using a *single* bit stream, i.e., a single coded version of the video content:

- Spatial scalability: Choose appropriate resolution
- Temporal scalability: Choose convenient frame rate
- Quality scalability: Choose suitable data rate

by removing parts of the bit stream

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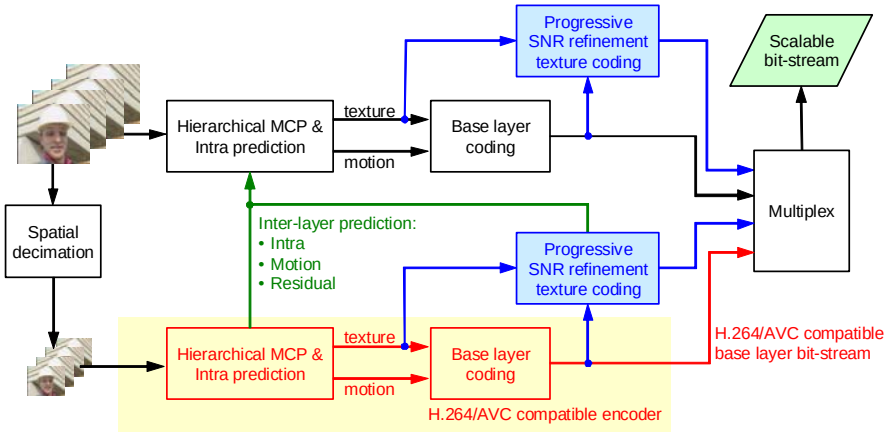
How it works

The SVC extension is built on H.264 / MPEG-4 AVC and re-uses most of its innovative components. As a distinctive feature, SVC generates an H.264 / MPEG-4 AVC compliant, i.e., backwards-compatible base layer and one or several enhancement layer(s). The base layer bit stream corresponds to a minimum quality, frame rate, and resolution (e.g., QCIF video), and the enhancement layer bit streams represent the same video at gradually increased quality and/or increased resolution (e.g., CIF) and/or increased frame rate.



What can be achieved

SVC conforming decoders can combine certain layers in a flexible way in order to adapt to different bit rates, frame rates or spatial resolutions of the video content:

- Spatial scalability within a wide range of resolutions
- Temporal scalability within a wide range of frame rates
- SNR (quality) scalability within a wide range of quality levels

Coding efficiency of SVC depends on the application requirements but the goal is to achieve a rate-distortion performance that is comparable to non-scalable H.264 / MPEG-4 AVC.

What will be demonstrated

World's first real-time H.264 / MPEG-4 SVC decoder implementation:

- Scaling between two different resolutions (QCIF / CIF)
- Scaling between different frame rates
- Fine-granular scaling between different qualities

What are the benefits in terms of applications

- Ease of adaptation to different terminal capabilities
- Resource conserving transmission, storage, and display of video, e.g., in surveillance applications
- Higher transmission robustness, if combined with unequal error protection
- Ease of Multicast Streaming through heterogeneous networks

image processing

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