H.265/HEVC streaming evaluation

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Agenda & Introduction

#1. HEVC streaming over RTP/UDP (Real-time Transport Protocol)
- Based on UDP transport protocol
- Lost/corrupted packets are **NOT** retransmitted
- Impaired picture quality but smoother playback

#2. HEVC streaming with DASH (Dynamic Adaptive Video Streaming over HTTP)
- Based on TCP transport protocol
- Lost/corrupted packets are retransmitted
- Nearly perfect picture quality but freezing/pause occur
#1. HEVC streaming over RTP/UDP

- Existing HEVC subjective studies have not evaluated the impact of network impairments.
- This work has
  - Quantified the effects of packet loss in HEVC on perceptual quality:
    - Packet loss rate of 3% or more caused high levels of user dissatisfaction
    - PSNR results correlate MOS scores reasonably well, though MOS match QoE better
  - Showed the relative importance and relationship between factors:
    - Packet loss, video sequence content, error concealment method, spatial resolution and encoded bitrate
- More details in
Follow-up work on H.265 QoE modeling:
- New method to determine the content type of a video sequence from semantic data contained within an encoded HEVC bitstream
- Leverage the relationship between an HEVC encoder’s partitioning and prediction mode decision making processes and the spatio-temporal features within the video stream

More details in
#2. HEVC streaming with DASH
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- Previous studies in DASH have focused on H.264/AVC based streaming
- This preliminary work has
  - Presented an experimental HEVC-DASH testbed for adaptive streaming of HEVC video over an HTTP/TCP paradigm
  - Demonstrated PSNR results under various scenarios:
    - Different HEVC encoding modes, network packet loss (1%, 3%, 5%) and delay (50ms, 100ms, 150ms), and DASH video segment sizes (2s, 10s)
  - Video sequence duration: 60s (concatenated HEVC sequences)
- More details in
Remarks & Questions

- Subjective test plan for HEVC-DASH is underway
  - Suggestions welcome:
    - Optimal/adequate video sequence duration
    - Common test sequences (not concatenated ones)
    - Beyond MOS

- Keen to collaborate with VQEG colleagues for this and other projects (including EU Horizon 2020, UK etc. projects), joint publications, joint PhD supervision etc.

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