The large scale dataset
Packet loss simulations

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Contribution to VQEG JEG-Hybrid session in Santa Clara, Feb 2015

Context and Aim

- Joint work with
  - Glenn Van Wallendael
  - Marcus Barkowsky

- Large dataset of 59,520 HEVC-encoded video sequences (details in [1], already presented in previous meetings)
  - 5 metrics available: PSNR, SSIM, VIF, VQM, PVQM
  - Total video quality and frame-level granularity (for each one of the 250 frames)

- What is the effect of **packet losses** on the objective video quality?

Methodology

1. Simulate reasonable packet losses affecting the video sequences
   - Use of the publicly available HEVC robust decoder presented in previous meetings [2][3] to create PVS
     - Note: this decoder, by construction, does not cause temporal misalignment between the processed video sequence (PVS) and the original one (SRC)
   - Use of packet loss traces with reasonable parameters

2. Compute the objective quality measures:
   - PSNR, SSIM, VIF, VQM, PVQM
3. Identify interesting cases and unexpected behaviors to be investigated further

Parameters

- Loss traces (generated by Glenn) using a 2-state Markov model with good and bad state
  - Packet loss rate: 0.5% and 1%
  - Average burst length: 1, 1.5, 2
  - Total: 25 realization of the loss traces

- Each event affects one slice of the source sequence. Depending on the encoding parameters of the sequence, the affected area can be:
  - The whole frame
  - A slice with a fixed number of macroblocks
  - A slice with a maximum number of bytes

Current Status

- Not all combinations of resolution, coding parameters and losses have been covered yet due to complexity
- A priority list has been decided (see wiki [4])

Param/Values	Value 1	Value 2	Value 3	Value 4	Value 5	Value 6
WIDTH	960	1280	1920			
GOPTYPESIZE	GOP2	GOP4	GOP8	LDGOP4		
RATECONTROL_QP	26	32	38	46		
RATECONTROL_FRAME_kbit/s	500	1000	2000	4000	8000	16000
RATECONTROL_LCU_kbit/s	500	1000	2000	4000	8000	16000
REFRESH	1	2				
INTRAPERIOD	8	16	32	64		
SLICEARGUMENT	0	2	4	1500		

  - Priority: Green: high Silver: medium Transparent: low
- Rationale: try to cover extreme values first, then intermediate values especially w.r.t. rate.

Current Status and Conclusions

- Status:
  - Resolution 960x544
    - all 19,840 sequences have been subject to all loss traces
    - total 496,000 objective video quality values for each metric (PSNR, SSIM, VIF, VQM, PVQM) with frame-level granularity
  - Resolution 1280x720 and 1920x1080
    - All high-priority combinations tested until now
    - Total 22,500 combinations done, more on the way

- Freely available at [5][6] (links also on the wiki pages)
- We hope to investigate results soon to get a first idea of how the considered metrics react to losses
  - Anybody is welcome to join!

References

- [1] M. Barkowsky, E. Masala, G. Van Wallendael, K. Brunnstrom, N. Staelens, P. Le Callet, Objective Video Quality Assessment – Towards large scale video database enhanced model development, IEICE Transactions on Communications, vol. E98-B, n. 1, pp. 2-11, Jan 2015
- [2] ftp://vqeg.its.bldrdoc.gov/Documents/VQEG_Stockholm_Jul14/MeetingFiles/VQEG_JEG-Hybrid_2014_126_robust_decoder_Stockholm2014_EnricoMasala.pdf
- [3] http://media.polito.it/jeg
- [4] http://vqegjeg.intec.ugent.be/wiki/index.php/JEG_no-reference_hybrid_HEVC#Priority_list
- [5] ftp://ftp.ivc.polytech.univ-nantes.fr/VQEG/JEG/HYBRID/hevc_database/
- [6] http://media.polito.it/downloads/jeg/