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Abstract

This document provides the generated ISO/IEC 23090-12 Immersive Video (MIV) anchors based on the Common Test Conditions for Immersive Video and with use of the Test Model 5 of Immersive Video (TMIV) reference software 5.0. The crosscheck was successful although not exact.

1   Introduction

The *Common Test Conditions for Immersive Video* (CTC) [N19214] includes two anchors:

- *MIV anchor* (A), tested in:
    - A97: Full frame (ff) configuration with 97 coded frames, 97-frame source view reconstructions and 300-frame pose traces videos
    - A17: Reduced frame (rf) configuration 17 coded frames, 17-frame source view reconstructions and 17-frame pose trace videos.
- *MIV view anchor* (V), tested in:
    - V17: rf configuration

Both anchors are based on *Test Model 5 of Immersive Video* (TMIV) reference software 5.0 [N19213] and *HEVC Test Model* (HM) 16.16.

TMIV 5.0 also includes a reference:

- *Best reference (R), tested in:*
    - R97: ff configuration, only the 300-frame pose trace videos
    - R17: rf configuration, only the 17-frame pose trace videos

2   Anchor generation and crosschecking

This document is a collaborative effort:
- Philips Research Eindhoven has generated all anchors for all sequences but SE using a load-balancing 64-bit Linux compute server and GCC 9.1.0.
- Intel has generated the anchor for SE and has crosschecked sequences SB, SC, SJ, and SL using Windows 10, Visual Studio 2017 with LLVM 10 as compiler.

- Poznań University of Technology has crosschecked sequences SA, SJ, SD, SN, SP, ST, and SU using Windows 10 and Visual Studio 2017. PUT has not used the TMIV multiplexer in this crosscheck.
- ETRI has crosschecked sequence SB, SC, SD, SE and SL using Window 10, Visual Studio 2017 (VC15). ETRI has not used the TMIV multiplexer in this crosscheck.
- Orange has crosschecked the A17 anchor for sequence SE using Visual Studio 2019 (VC16).

Overall, the crosscheck was successful, but the participants have observed some differences. The following subsections describe our observations.

2.1 Order of atlases

The MIV view anchor has one source view per atlas, but the order is mixed. A likely cause of this behavior is the use of a `std::priority_queue` in Packer.cpp to sort clusters. For the MIV view anchor, all clusters have the same size and the ordering is implementation-defined. This behavior has been observed before, and the old software issue #26 has been re-opened.

2.2 Minor synthesis differences

The largest difference in terms of WS-PSNR was NokiaChess (SN) with 0.04% Y-PSNR BD-rate. The largest difference in terms of VMAF was ClassroomVideo (SA) with 0.02% BD-rate.

We do not expect exact results across different systems because synthesis uses floating-point operations and compiler optimizations on those may result in minor fluctuations. However, we have seen smaller differences in previous meetings. A potential cause is the switch to quaternions (#148) but this is only a hypothesis.

2.3 Rounding of bitrate of intermediate bitstream

TMIV 5.0 had a bug in the reporting of the intermediate bitrate. Therefore, the participants had to calculate the bitrate from the file size and known duration. Issue #190 has been opened.

2.4 Runtime variations

It has been observed that some runtimes can vary as much as 3× between participants. We want to emphasize this sentence of the CTC:

> It is reminded that the proponent has to fill the runtimes for both anchor and proposed method, so that the delta between anchor and proposal runtimes has a meaning.

3 Results

A selection of pose trace videos is available on the MPEG document server at /MPEG-I/Part12-ImmersiveVideo/Anchor_TMIV5.

The CTC reporting templates are attached to this document:

- CTC-anchor-A17.xlsm
- CTC-anchor-A97.xlsm
- CTC-anchor-V17.xlsm

4 Recommendations

We recommend to:

1. Use attached reporting templates for all proposals,
2. Address the software issues #26, #148, and #190 in TMIV 6.0.