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**Title** **[MIV] Basic View Packing with Screen Content Coding (SCC)**
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# 1 Introduction

The contribution provides experimental results of the HEVC screen content coding (SCC) with alternative basic view packing mode for immersive video. The gain with SCC or class-F configuration has been reported [1,2]. The SCC contains the intra block copy (IBC) tool for packing basic view(s) efficiently. In the current test model for MPEG immersive video (TMIV), Atlases include multiple basic views for increasing the overall compression performance [3]. This document reports the compression performance results with a new basic view packing alignment mode (vertical/horizontal).

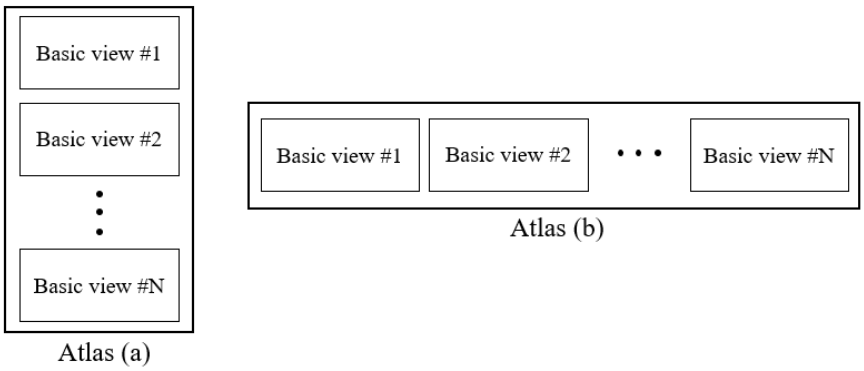


**Fig. 1.** Example of view packing alignment in the Atlas
(a): vertical (anchor), (b): horizontal (newly proposed)

# 2 Basic View Packing with SCC

IBC uses a reference block located in the already reconstructed regions of the same picture. In the process, the raster scan order can be affected on the Atlas compression, which contains basic views.

With alternative view packing alignment, this document provides the results of performance comparsion with HEVC-SCC. With the simple packing alignment as a pre-processing technique, meaningful BD-rate gain was observed in HEVC-SCC.

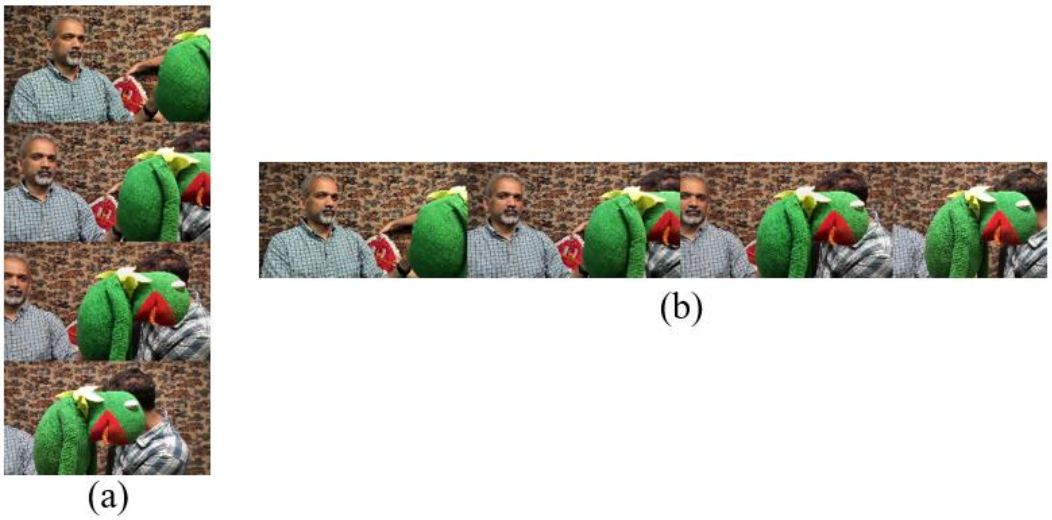


**Fig. 2.** Example of view packing alignment (SE)

# 3 Experimental Results

In the experiments, TMIV 6.0 and HM-16.16+SCM-8.6 were used [4]. Table 1 shows BD-rate gains for HEVC-(a) and HEVC-(b). The HEVC-(a) is anchor under CTC, and HEVC-(b) is horizontally packed Atlas. The results of SA and SC sequences containing single basic view were excepted. In the table 1, as expected, there were no significant BD-rate gains.

**Table 1.** Y-PSNR BD-rate gains for HEVC-(a) v.s. HEVC-(b) 'rf'(*rf: reduced frame, 17 frames)

| | SB | SD | SE | SJ | SL | SN | SO | SP | SQ | SR | ST | SU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High | 0.06% | -0.28% | 0.05% | 0.01% | 0.60% | 0.04% | -0.07% | -0.60% | 0.07% | 0.05% | 0.36% | -0.06% |
| Low | 0.11% | -0.30% | -0.17% | 0.04% | 0.54% | -0.05% | -0.02% | -0.85% | 0.13% | 0.15% | 1.03% | 0.26% |

Table 2 shows BD-rate gains for HEVC-SCC-(a) and HEVC-SCC-(b). The different view packing alignment was affected on SCC coding performance, especially on natural content (NC) sequences under low-bitrate condition.

**Table 2.** Y-PSNR BD-rate gains for HEVC-SCC-(a) v.s. HEVC-SCC-(b) 'rf'

| | SB | SD | SE | SJ | SL | SN | SO | SP | SQ | SR | ST | SU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High | 0.08% | 8.65% | -5.41% | -0.94% | 0.30% | 0.02% | 6.54% | -6.61% | 0.08% | 0.00% | -3.70% | -3.45% |
| Low | 0.14% | 8.34% | -7.36% | -1.55% | 0.53% | 0.01% | 6.96% | -11.25% | 0.17% | 0.04% | -4.00% | -6.97% |

# 4 Conclusion

This document presents the view packing alignment results of HEVC-SCC. It observed performance improvements by packing multiple basic views in Atlas with different alignment. The horizontal packing alignment of basic views shows around -6% BD-rate gains, especially on NC sequences under low-bitrate condition.

# 5 References


[1] "[MPEG-I Visual] HEVC-SCC in TMIV", Jarosław Samelak, Adrian Dziembowski, Dawid Mieloch, Marek Domański, ISO/IEC JTC1/SC29/WG11 MPEG2020/ m54327, Alpbach

[2] "[MPEG-I Video][MIV] Using VVC Class-F configuration improves the performance of MIV", Vinod Kumar Malamal Vadakital, Adrian Dziembowski, Dawid Mieloch, ISO/IEC JTC1/SC29/WG11 MPEG2020/ m54390, Online.

[3] "Basic view allocator with disjoint pruning graph", Bart Kroon, ISO/IEC JTC1/SC29/WG11 MPEG2020/ m54754, Online.

[4] "Common Test Conditions for MPEG Immersive Video", ISO/IEC JTC1/SC29/WG11 MPEG2020/ w19484, Online.