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| *Title:* | **Viewing Report for Comparison of 3D-HEVC and MV-HEVC with depth coding** | | |
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| *Purpose:* | Proposal | | |
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# Abstract

This contribution reports the subjective comparison of the current implementations of 3D-HEVC and MV-HEVC with depth coding (based on HTM‑9.0r1) for all 8 test sequences and 4 rate points. The subjective results confirm the objective coding gains of 3D-HEVC.

# Experimental Results

For the subjective comparison between 3D-HEVC and MV-HEVC with depth map carriage, bit streams have been produced for all 8 test sequences at 4 different rate points. For each sequence and rate point, equal PSNR was targeted and the associated bit streams obtained, with rates given in document JCT3V-G0110. For completeness, these rates are also included in Annex A of this document.

For the informal testing, video experts were evaluating the presented sequences. The test took place January, 13, 2014, from 16:30-17:00.

For each rate point and sequence, both coding methods were shown once in a direct comparison, Here, the order of showing the MV- and 3D-HEVC sequence was varied, such that they were shown either in A, B order or B, A. Each expert has assessed each comparison, using the evaluation scale from Table 1:

Table 1: Evaluation scale

|  |  |  |
| --- | --- | --- |
| 3 |  | A much better than B |
| 2 |  | A better than B |
| 1 |  | A slightly better than B |
| 0 |  | A equal to B |
| -1 |  | A slightly worse than B |
| -2 |  | A worse than B |
| -3 |  | A much worse than B |

The results of all experts were averaged for each rate point R1 – R4 and Sequence, giving the final results of the subjective viewing, as shown in Table 2.

Table 2: Averaged subjective Results for MV-HEVC vs. 3D-HEVC comparison.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | R1 | R2 | R3 | R4 | **AVG** |
| S01: Poznan\_Hall2 | -0,2 | 0,2 | 0,6 | -0,2 | **0,10** |
| S02: Poznan\_Street | 0,4 | -0,6 | 0,4 | -0,6 | **-0,10** |
| S03: Undo\_Dancer | 0,2 | 0 | -0,2 | -0,2 | **-0,05** |
| S04: GT\_Fly | 0,2 | -0,2 | 0,4 | -0,2 | **0,05** |
| S05: Kendo | -0,4 | 0,2 | 0,6 | -0,2 | **0,05** |
| S06: Balloons | 0,2 | 0,4 | 0,2 | 0,2 | **0,25** |
| S08: Newspaper1 | 0,6 | -0,2 | 0 | 0,2 | **0,15** |
| S10: Shark | -0,2 | 0,4 | -0,4 | 0,4 | **0,05** |
| **AVG** | **0,100** | **0,025** | **0,200** | **-0,075** | **0,0625** |

All average values are in the range between -1 and +1 and most of them are around 0. According to the evaluation scale in Table 1, the subjective quality is equal.

# Conclusion

The viewing results show equal subjective quality, and thus confirming the objective coding results: For the corresponding rate points of equal quality, MV-HEVC with depth maps requires 24% more bit rate on average, compared to 3D-HEVC.

# Annex A

This Annex contains the tested bit rates for MV- and 3D-HEVC from document JCT3V-G0110 for completeness.

Table 3: Tested bit rates of MV-HEVC with depth carriage vs. 3D-HEVC

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test Sequence | 3D-HEVC bit rates (kbps) | | | | MV-HEVC+D bit rates (kbps) | | | |
| R1 | R2 | R3 | R4 | R1 | R2 | R3 | R4 |
| S01: Poznan\_Hall2 | 100 | 174 | 312 | 609 | 127 | 215 | 384 | 703 |
| S02: Poznan\_Street | 175 | 333 | 659 | 1456 | 199 | 380 | 755 | 1659 |
| S03: Undo\_Dancer | 291 | 603 | 1282 | 2814 | 368 | 758 | 1543 | 3212 |
| S04: GT\_Fly | 229 | 475 | 986 | 2159 | 297 | 617 | 1263 | 2623 |
| S05: Kendo | 148 | 257 | 449 | 836 | 189 | 330 | 574 | 1072 |
| S06: Balloons | 150 | 266 | 462 | 843 | 185 | 331 | 577 | 1060 |
| S08: Newspaper1 | 154 | 270 | 484 | 929 | 184 | 324 | 596 | 1129 |
| S10: Shark | 307 | 652 | 1359 | 2819 | 417 | 870 | 1775 | 3616 |