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| *Title:* | **CE9: Cross-check for SP09** | | |
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# Abstract

This contribution reports cross-check result for CE9 experiment SP09 to evaluate AMVP/Merge-based in which the use of temporal MVP in AMVP and Merge process for PUs smaller than or equal to 8x8 is disabled. The experimental results perfectly match with the one provided by Mitsubishi in R-D performance.

Experimental Description

In the 5th meeting in Geneva, several proposals related to simplification of MVP list construction are received. One of proposed idea in those proposals is to disable the use of temporal MVP in AMVP and Merge process for PUs smaller than or equal to certain block size (4x4 ~ 8x8). It was agreed to investigate R-D performance of the proposed ideas in CE9 by setting up several experiments (SP07 to SP12) [1]. The combination of block size that is disabled in each experiment is shown in Table 1.

**Table 1: Set of experiments and the block size which is disabled in AMVP and Merge process [1]**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 4x4 | 8x4/4x8 | 8x8 | 16x8/8x16 | 16x16 | 32x16/16x32 | 32x32 | 64x32/32x64 | 64x64 |
| SP07 | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| SP08 | × | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| SP09 | × | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| SP10 | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| SP11 | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| SP12 | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ |

○ means temporal MVPs are used both in candidate lists and in ME. △ means temporal MVPs are used only in ME. × means temporal MVPs are NOT used in candidate lists or ME.

This contribution reports cross-check experiment result for SP09 in which the use of all 4x4, 8x4, 4x8, and 8x8 block size in AMVP and Merge process is disabled [2].

Experimental Condition

The software to be tested was provided by Mitsubishi and its performance relative to the HM3.0 software was checked under the common test condition described in [3] and agreed test sequences / test points / software configuration and performance measurement criteria described in [1]. The computing platform for this cross-check experiment is Window XP 64 bits on Intel i7 core.

Results

R-D performance and execution time of the software are summarized in Table 1 and Table 2. Detailed results are included in the attached excel sheet. It was confirmed that these results perfectly match with the one provided by Mitsubishi.

From our observation, the proposal has been correctly implemented into HM3.0 software. The complexity compared to that of the anchors is reduced which is observed from the reduction of encoding and decoding time. Such reduction should be expected because by disabling certain blocks in AMVP and Merge process means less number of checking process should be performed. However, the simplification by disabling certain blocks seems to lead the AMVP and Merge process to produce less optimal candidate list and has consequence in R-D loss.

Table 1: Experimental results of SP09 for Random Access

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Random access | | | Random access LoCo | | |
| Y BD-rate | U BD-rate | V BD-rate | Y BD-rate | U BD-rate | V BD-rate |
| Class A | 0.4 | 0.4 | 0.7 | 0.3 | 0.3 | 0.2 |
| Class B | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.1 |
| Class C | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.5 |
| Class D | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| Class E |  |  |  |  |  |  |
| All | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 |
| Enc Time[%] | 94% | | | 95% | | |
| Dec Time[%] | 100% | | | 98% | | |

Table 2: Experimental results of SP09 for Low Delay

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Low delay | | | Low delay LoCo | | |
|  | Y BD-rate | U BD-rate | V BD-rate | Y BD-rate | U BD-rate | V BD-rate |
| Class A |  |  |  |  |  |  |
| Class B | 0.5 | 0.3 | 0.0 | 0.3 | 0.3 | 0.2 |
| Class C | 1.0 | 0.8 | 0.8 | 1.0 | 1.1 | 1.0 |
| Class D | 0.9 | 0.2 | 1.3 | 1.0 | 0.6 | 0.8 |
| Class E | 0.7 | 0.5 | 0.6 | 0.5 | 0.4 | 0.6 |
| All | 0.8 | 0.4 | 0.6 | 0.7 | 0.6 | 0.6 |
| Enc Time[%] | 96% | | | 96% | | |
| Dec Time[%] | 99% | | | 99% | | |

Conclusion

The results of CE9 experiment SP09 reported by Mitsubishi has been verified and confirmed. We note that the proposed scheme reduced complexity of both encoder and decoder. However, it penalizes R-D performances.

References

1. Yu-Wen Huang et al., “Description of Core Experiment CE9: MV Coding and Skip/Merge Operations”, JCTVC-E709\_r2, Geneva, March 2011.
2. Yusuke Itani et al., “Improvement to AMVP/Merge Process”, JCTVC-E064\_r1, Geneva, March 2011.
3. Frank Bossen, “Common test conditions and software reference configurations”, JCTVC-D600, Daegu, January 2011.