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| *Title:* | **3D-CE5.h related: Constrained DV for inter-view data access** | | |
| *Status:* | Input Document | | |
| *Purpose:* | Proposal | | |
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# Abstract

In the HEVC-based 3D video coding, HTM 4.0.1, a derived disparity vector (DV) is used to locate the corresponding block in the neighboring view picture for the inter-view motion prediction and inter-view residual prediction. Considering that the input data is rectified to avoid misalignment of camera geometry, the vertical component of the DV used for inter-view residual prediction is restricted to zero. However, the vertical component of the DV used for inter-view motion parameter prediction is not restricted to zero. In this contribution, we proposed to restrict the vertical component of the derived DV for inter-view data access to zero for unification and simplification. The experimental results reportedly show that the proposed scheme brings no BD-rate changes for overall results.

# Introduction

In the HEVC-based 3D video coding, HTM 4.0.1 [1], to share the previously encoded motion information and the residual of reference views, the inter-view motion parameter prediction and inter-view residual prediction are employed. To derive the reference motion parameters and reference residual signal for current block in the dependent view, a DV for current block is firstly derived, and then the reference block in the already coded picture in the reference view is located by adding the DV to the location of current block.

Since the input data are rectified such that no vertical disparities exist, the vertical component of the derived DV for inter-view residual prediction is forced to be zero. As shown in Figure 1, the DV used to locate the reference residual block has only horizontal offset. In current HTM, however, there is no such restriction on the DV used to locate the reference motion block for inter-view motion parameter prediction.



**Figure 1. Inter-view data access for inter-view residual prediction (Left) and inter-view motion parameter prediction (Right).**

# Proposed Method

Since the input video data are rectified, the optical axes of camera can then be assumed to be parallel. Therefore, in this contribution, we propose to force the vertical component of the derived DV for inter-view data access such as inter-view motion parameter prediction to be zero. With this proposed constraint, it can avoid the inter-view data access going beyond the current LCU row, which enables LCU-aligned inter-view data fetch. It can also reduce the memory access bandwidth for inter-view data access and provide unification with the derived DV used in the inter-view residual prediction.

# Experimental Results

Experiments were conducted according to the common test conditions [2], and the software is based on HTM-4.01 [2]. The results are shown in Table 1. The BD-rates and run times of the constrained DV derivation are almost unchanged.

**Table 1. The BD-rate result of constrained DV derivation**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Video 1 | Video 2 | Video only | Synthesized only | Coded & synthesized | Enc time | Dec time | Ren time |
| Balloons | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 101.1% | 101.8% | 101.2% |
| Kendo | -0.1% | 0.2% | 0.0% | 0.0% | 0.0% | 100.2% | 99.4% | 98.8% |
| Newspapercc | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 101.0% | 100.3% | 99.4% |
| GhostTownFly | 0.2% | -0.2% | 0.0% | 0.0% | 0.0% | 100.0% | 99.0% | 100.5% |
| PoznanHall2 | 0.5% | 0.6% | 0.2% | 0.2% | 0.2% | 100.2% | 100.0% | 106.3% |
| PoznanStreet | -0.5% | 0.0% | -0.1% | -0.1% | -0.1% | 99.9% | 99.9% | 99.9% |
| UndoDancer | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 99.9% | 99.4% | 99.2% |
| 1024x768 | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 100.8% | 100.5% | 99.8% |
| 1920x1088 | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 100.0% | 99.6% | 101.4% |
| **average** | **0.0%** | **0.1%** | **0.0%** | **0.0%** | **0.0%** | **100.3%** | **100.0%** | **100.7%** |

# Conclusion

In this proposal, we proposed to constrain the vertical component of the derived DV for inter-view data access to be zero for simplification and unification. Experimental results reportedly show no BD-rate and run time increase.

# Patent rights declaration (s)

**MediaTek Inc. may have current or pending patent rights relating to the technology described in this contribution and, conditioned on reciprocity, is prepared to grant licenses under reasonable and non-discriminatory terms as necessary for implementation of the resulting ITU-T Recommendation | ISO/IEC International Standard (per box 2 of the ITU-T/ITU-R/ISO/IEC patent statement and licensing declaration form).**

# References

[1] HTM-4.0.1, <https://hevc.hhi.fraunhofer.de/svn/svn_3DVCSoftware/tags/HTM-4.0.1/>

[2] Dmytro Rusanovskyy, Karsten Müller, Anthony Vetro, “Common Test Conditions of 3DV Core Experiments”, Joint Collaborative Team on 3D Video Coding Extension Development of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11, JCT3V-A1100, July 2012, Stockholm.