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| **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**  2nd Meeting: Shanghai, CN, 13–19 Oct. 2012 | Document: JCT3V-B0079 |

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| *Title:* | **3D-CE5.a related: Draft text for the adopted simplified disparity vector derivation proposed in JCT3V-A0046** | | |
| *Status:* | Input Document | | |
| *Purpose:* | Proposal | | |
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# Abstract

In the first JCT-3V meeting, a simplification proposed in JCT3V-A0046 was adopted into 3D-ATM to reduce the number of the depth samples to be accessed for the derivation of the disparity vector (DV). By deriving the DV from a maximum depth value of four corner depth samples instead of all depth samples within the associated depth block, the number of the depth samples to be accessed can be significantly reduced from 256 to 4 and the number of the required comparisons can also be reduced from 255 to 3. In this contribution, the text is provided for this simplification. This simplification is also tested again on current 3D-ATM, ATM-5.1r2. The results reportedly show that this proposed simplification does not cause any coding loss in ATM-5.1r2.

# Introduction

In ATM-4.0 [1], the direction-separate motion vector prediction is utilized for the temporal and inter-view motion vector predictions in Inter mode. If the target reference picture is a temporal prediction picture, the temporal motion vectors of the adjacent blocks around the current block Cb such as A, B, and C in Figure 1 are employed in the derivation of the motion vector prediction. If a temporal motion vector is unavailable, a zero vector is used. The temporal motion vector prediction is then derived as the median of the motion vectors of the adjacent blocks A, B, and C.

On the contrary, if the target reference picture is an inter-view prediction picture, the inter-view motion vectors of the neighboring blocks are employed for the inter-view prediction. If an inter-view motion vector is unavailable, a disparity vector converted from a maximum depth value within the associated depth block is used. The inter-view motion vector predictor is then derived as the median of the inter-view motion vectors of the adjacent blocks A, B, and C.

In the last meeting, the first JCT-3V meeting, a simplified disparity vector derivation proposed in JCT3V-A0046 [2] was adopted into ATM-5.0. The disparity vector is derived from the maximum depth value of four corner depth samples instead of all depth samples within the associated depth block as shown in Figure 2(b). In this contribution, the draft text for the adopted simplification proposed in JCT3V-A0046 is provided.



Figure 1. The direction-separated motion vector prediction in Inter mode

# Draft text

Decoding Process:

J.8.3.1.7.1 Modification process for inter view motion vector in median luma motion vector prediction

Inputs to this process are

– depth reference view component depthPic,

– the location of a top-left sample ( dbx1, dby1 ) of a partition,

– a motion vector mv,

Outputs of this process are:

– the motion vector mv.

Let refViewId be the view\_id value of depthPic.

The following ordered steps apply:

1. ~~Let~~ ~~numSamples be partWidth \* partHeight.~~
2. The variable maxDepth is specified as follows:

maxDepth = INT\_MIN  
for( j = 0; j < partHeight; j+=( partHeight -1) )  
 for( i = 0; i < partWidth; i+=( partWidth -1) ) (J-8-XX)  
 if( depthPic[ dbx1 + i, dby1 + j ] > maxDepth ) maxDepth = depthPic[ dbx1 + i, dby1 + j ]

# Experimental Results

The simplification proposed in JCT3V-A0046 is tested again on ATM-5.1r2 [1] and the simulations are run under the common test conditions [3]. The results are illustrated in Table 1. The anchor is ATM-5.1r2 which already enabling the simplified disparity vector derivation. The test is the ATM-5.1r2 without the simplified disparity vector derivation, i.e., the disparity vector is derived as the maximum of all depth samples within the associated depth block. The experimental results reportedly show that the simplification doesn’t cause any coding loss, while 1:64 complexity reduction is achieved.

Table 1 Results of the comparison between the anchor (ATM-5.1r2) and anchor without the simplification



# Conclusion

In this contribution, the draft text is provided for the adopted simplification proposed in JCT3V-A0046. The simplification is also tested on ATM-5.1r2 and the results reportedly showed that the proposed simplification brings no coding loss while 1:64 complexity reduction can be achieved.

# 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] ATM-5.1r2, <http://mpeg3dv.research.nokia.com/svn/mpeg3dv/tags/3DV-ATMv5.1r2/>

[2] J.-L. Lin, Y.-W. Chen, Y.-W. Huang, S. Lei, “3D-CE5.a related: Simplification on the disparity vector derivation for AVC-based 3D video coding”, 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-A0046, July 2012, Stockholm.

[3] 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.