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| *Title:* | **3D-CE2.a related: MB-level depth-to-DV conversion in ATM** | | |
| *Status:* | Input Document | | |
| *Purpose:* | Proposal | | |
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# Abstract

In current ATM, the depth-to-DV conversion is performed once for each macroblock (MB) to derive the inter-view MVP in Skip/Direct mode. However, in Inter mode, the depth-to-DV conversion needs to be performed multiple times in motion vector prediction to derive DVs for various partition blocks in one MB. In this proposal, we propose to make all partition blocks of Inter mode within the same MB share the same DV as the one used for the inter-view MVP derivation in Skip/Direct mode, which means for each MB, the depth-to-DV conversion is performed once by deriving the DV from a maximum depth value of four corner samples of the associated depth block. The experimental results reportedly show that the proposed MB-level depth-to-DV conversion introduces almost no coding loss while the computational complexity and memory access of depth samples are reduced.

# Introduction

In current ATM, as shown in Figure 1, a disparity vector (DV) generated by the depth-to-DV conversion is used to locate the reference block in the base view to derive the inter-view MVP for Skip/Direct mode. As for the motion vector prediction, as shown in Figure 2, when a temporal motion vector or inter-view motion vector is not available for each neighboring block, a depth-to-DV conversion is also employed to derive a DV.

To derive the inter-view MVP for Skip/Direct mode, the depth-to-DV conversion is only needed to be performed once for each macroblock (MB). However, in Inter mode, the depth-to-DV conversion needs to be performed multiple times for the motion vector prediction because each partition block needs to derive its own DV.



**Figure 1. Inter-view MVP derivation in Skip/Direct mode**



**Figure 2. MVP derivation in Inter mode**

# Proposed Method

In this proposal, we propose to make all partition blocks of Inter mode within the same MB share the same DV which is derived from a maximum depth value of four corner samples of the associated depth block of current MB. In the proposed MB-level depth-to-DV conversion scheme, the depth-to-DV conversion only needs to be performed once for Skip/Direct and Inter mode for each MB, the accessed depth samples and computational complexity can thus be reduced and the depth-to-DV operations between Skip/Direct and Inter mode are also unified.

# Experimental Results

The proposed simplification is integrated into ATM-6.0 [1] and the simulations are run under the common test conditions [2]. The results of using MB-level depth-to-DV conversion are illustrated in Table 1. The experimental results show that this proposed simplification brings no coding loss while the computational complexity and memory access bandwidth are reduced.

Table 1 Results of using the proposed MB-level depth-to-DV conversion



# Conclusion

This contribution proposes a MB-level depth-to-DV conversion scheme to simplify current design. The results reportedly showed that the proposed simplification brings no coding loss while the complexity and memory access bandwidth are reduced.

# Patent rights declaration (s)

**MediaTek Inc. and Samsung Electronics Co. Ltd. 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-6.0, <http://mpeg3dv.research.nokia.com/svn/mpeg3dv/tags/3DV-ATMv6.0/>
2. D. Rusanovskyy, K. Müller, A. 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-B1100, October 2012, Shanghai.