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| *Title:* | **CE2.h related Improved disparity vector derivation** | | |
| *Status:* | Input Document | | |
| *Purpose:* | Proposal | | |
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# Abstract

In this contribution, an improved Disparity Vector(DV) derivation process is presented. When no valid disparity vector can be derived a zero disparity vector is used for generating the IVMP(Inter-view Motion Vector Predictor) candidate in the current 3D-HEVC. However, there usually exists a non-zero disparity between the corresponding positions in two views. Hence, unlike in MCP where a zero motion vector can simply imply no motion, the use of zero DV is not reasonable in general.. Therefore, three options of replacing the zero DV are proposed in this contribution . The simulation result has BD-rate change video-total : -0.1% and synth-total : -0.1% compared to HTM-6.0 with 100.2% encoding time, and 99.6% decoding time

# Introduction

In 3D-HEVC, a DV is searched by Depth oriented NBDV process in order to find the corresponding position in the reference view so that motion information can be inferred across-views. If there is no available NBDV, a zero vector is used to generate the IVMP(Inter-View Motion Predictor) candidate. However, the zero DV does not point to the co-location in interview cases unlike with the zero motion vector case in a single view video. There is usually an offset between views because of camera setting.

 

**offset**

Figure1. inter-view offset between views (Newspaper L: view1, R: view0)

Figure1 shows an example of inter-view offset between views.

Therefore, zero DV insertion is not reasonable in general cases of DV derivation. Three replacements are presented to derive more accurate DV.

If derivation of DV can be more accurate, tools using DV have the benefit. Especially, the zero DV replacements might have a better performance at the first time of DCP search than zero vector. There is not any information for the first time of DCP search in dependent view. Therefore, no NBDV is unavailable. Replacement of zero DV makes first seeding location for the first time of DCP search more accurate so that MVD(Motion vector Difference) needed to coded is reduced.

# Proposed Method

## Proposed Method1

Zero DV is replaced with Depth oriented zero DV. Since depth has many flat areas, depth oriented disparity This approach has a benefit changing conventional DV derivation process merely.



Figure1. Zero DV replaced with Depth oriented zero DV

## Proposed Method2

Zero DV is replaced with depth oriented disparity from middle depth value. To improve getting virtual depth position, this method is applied. The middle depth value can be derived from DLT(Depth LookUp Table). DLT stores valid depth index and sample value. The corresponding depth sample value of the middle index of DLT is set to middle depth value. This sample value can be converted to a disparity vector. The disparity derivation from depth can be achieved by B-VSP LUT(Look Up Table ) or coded camera parameter.



## Proposed Method3

Zero DV is replaced with depth oriented disparity from LCU\_DV(Largest CU DV). To search more accurate virtual depth position, additional DV derivation process for LCU is necessary for each LCU. LCU\_DV can be derived from the DoNBDV[2] process for each LCU. If no NBDV is available on PU, LCU\_DV can be a candidate for DV. Virtual depth position can be set using LCU\_DV.



If LCU\_DV is also unavailable, disparity vector is converted from the depth value (1 << (bit depth – 1)).

# Experimental results

Three methods are integrated into HTM-6.0. The configuration of common test condition is applied. Table1, 2, 3 reports the experimental results for the proposed method 1, 2, 3, respectively.

Table1. results on depth oriented zero vector



Table2. results on depth oriented disparity from middle depth value



Table3. results on Depth oriented disparity from LCU DoNBDV



# Conclusion

In this contribution, three replacements of zero DV is proposed to improve DV derivation process. Zero vector doesn’t mean co-location because of inter-view offset. These vectors might have a better performance at the first time of AMVP of DCP than zero vector conceptually. The methods have coding gain and the increments of complexity are negligible.

It is recommended that one of the proposed methods is adopted into 3D-HEVC.

# Reference

1. H. Liu, J. Jung, J. Sung*, etc.*, (LG), "3D-CE2.h : Results of Illumination Compensation for Inter-View Prediction", Joint Collaborative Team on 3D Video Coding Extension Development (JCT-3V) of ITU-T VCEG and ISO/IEC MPEG JCT3V-B0045, Shanghai, China, October, 2012.
2. Y.-L Chang, C. –L. Wu*, etc.*, (Qualcomm), " 3D-CE5.h: Disparity vector generation results", Joint Collaborative Team on 3D Video Coding Extension Development (JCT-3V) of ITU-T VCEG and ISO/IEC MPEG JCT3V-A0097, Stokholm, Sweden, July, 2012

# Patent rights declaration(s)

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