

JCT3V-F0142 – CE2: Results on 2-Step Disparity Vector Derivation

Min Woo Park

Multimedia Platform Lab.
DMC R&D Center
Samsung Electronics

Introduction

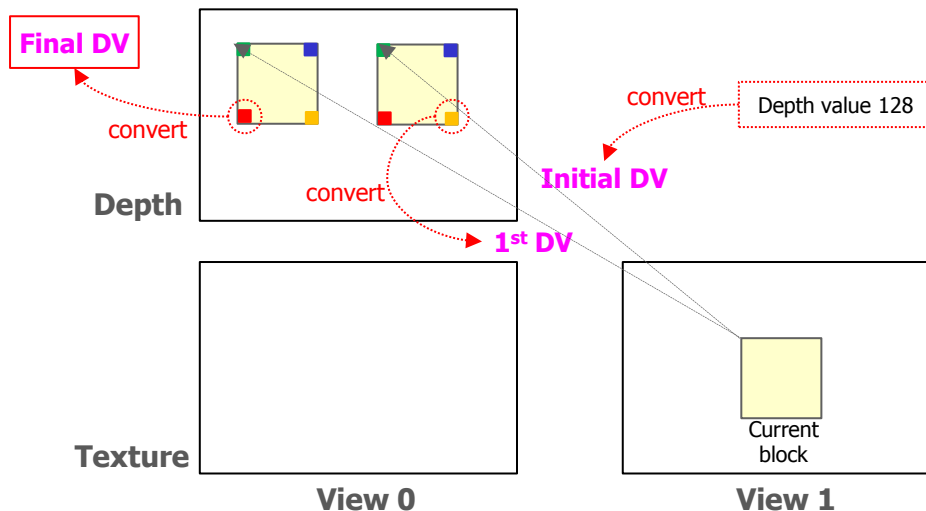
- ❖ The depth-based 2-step DV derivation, which was proposed in JCT3V-E0142, enables to have better coding performance.
 - 0.2% and 0.1% bit-saving for coded and synthesized views
 - Number of operations is comparable with the current in the worst case
 - However, 2-step DV derivation needs one more depth fetch in the worst case
 - Therefore, simplified method is also introduced in this proposal

Proposed Method

❖ 2-step DV derivation

- 1st Step: Depth-based derivation
 - Find corresponding depth block by using initial DV
 - Max. depth value → **1st DV**
- 2nd Step: Depth-based derivation
 - Find corresponding depth block by using **1st DV**
 - Max. depth value → **Final DV**

set to corresponding value
of **depth value 128**



- If the current CU is coded with RP, NBDV is additionally performed

Experimental Results

❖ Based on CTC with HTM 8.0

- 0.3% and 0.7% bit-saving for video 1 and video 2
- 0.2% bit-saving for both coded and synthesized views

	video 0	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate	enc time	dec time	ren time
Balloons	0.0%	-0.3%	-0.2%	-0.1%	-0.1%	-0.1%	98.9%	100.0%	95.7%
Kendo	0.0%	-0.3%	-0.3%	-0.1%	-0.1%	-0.1%	99.1%	93.3%	98.1%
Newspaper_CC	0.0%	-0.5%	-0.9%	-0.3%	-0.2%	-0.3%	100.3%	98.3%	98.8%
GT_Fly	0.0%	-0.3%	-0.6%	-0.1%	-0.2%	-0.2%	99.3%	96.2%	100.3%
Poznan_Hall2	0.0%	0.2%	-0.7%	-0.2%	-0.2%	-0.3%	99.9%	95.0%	99.3%
Poznan_Street	0.0%	-0.2%	-0.5%	-0.1%	-0.1%	-0.1%	99.6%	101.5%	100.2%
Undo_Dancer	0.0%	-0.6%	-1.5%	-0.3%	-0.3%	-0.3%	99.3%	93.7%	99.8%
1024x768	0.0%	-0.3%	-0.4%	-0.2%	-0.2%	-0.2%	99.5%	97.2%	97.5%
1920x1088	0.0%	-0.2%	-0.8%	-0.2%	-0.2%	-0.2%	99.5%	96.6%	99.9%
average	0.0%	-0.3%	-0.7%	-0.2%	-0.2%	-0.2%	99.5%	96.9%	98.9%
Shark	0.0%	-1.3%	-2.4%	-0.4%	-0.4%	-0.4%	98.9%	98.0%	99.2%

❖ In case of non-CTC (BVSP off and DoNBDV off)

- No coding gain changes

Simplification

- ❖ Proposed method needs one more depth block fetch in the worst case
- ❖ In order to reduce the number of depth block fetches
 - We propose
 - to use the 1st DV from 1st Step in the 2-step DV derivation for VSP candidate and
 - to allow only 1 VSP candidate in the merge candidate list
 - The depth block for the final DV is identical to the depth block for VSP
- ❖ The proposed simplified method needs 2 depth block fetches in the worst case as the current 3D-HEVC

Experimental Results

❖ Based on CTC with HTM 8.0

- 0.1% and 0.5% bit-saving for video 1 and video 2
- 0.2% bit-saving for both coded and synthesized views

	video 0	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate	enc time	dec time	ren time
Balloons	0.0%	-0.5%	-0.3%	-0.2%	-0.2%	-0.2%	99.3%	93.8%	98.0%
Kendo	0.0%	-0.5%	-0.7%	-0.3%	-0.3%	-0.2%	99.4%	105.2%	99.0%
Newspaper_CC	0.0%	-0.6%	-1.0%	-0.3%	-0.3%	-0.3%	99.6%	96.3%	99.1%
GT_Fly	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%	99.4%	91.9%	101.0%
Poznan_Hall2	0.0%	0.0%	-0.8%	-0.2%	-0.2%	-0.3%	99.6%	92.8%	98.1%
Poznan_Street	0.0%	0.0%	-0.4%	-0.1%	-0.1%	-0.1%	99.2%	94.6%	99.2%
Undo_Dancer	0.0%	0.2%	-0.8%	-0.1%	-0.1%	-0.2%	99.6%	91.7%	100.9%
1024x768	0.0%	-0.5%	-0.6%	-0.3%	-0.3%	-0.2%	99.4%	98.4%	98.7%
1920x1088	0.0%	0.2%	-0.5%	-0.1%	-0.1%	-0.1%	99.4%	92.7%	99.8%
average	0.0%	-0.1%	-0.5%	-0.2%	-0.2%	-0.2%	99.4%	95.2%	99.3%
Shark	0.0%	-0.8%	-2.1%	-0.3%	-0.3%	-0.3%	98.4%	94.5%	99.6%

❖ In case of non-CTC (BVSP off and DoNBDV off)

- No coding gain changes

Conclusions

- ❖ We propose a 2-step DV derivation with its simplification
 - 0.2% bit-saving for coded and synthesized views
 - No additional memory bandwidth compared to the current 3D-HEVC
- ❖ We recommend to adopt proposed method into next 3D-HEVC WD

Thanks NTT for the cross checking (JCT3V-F0186).

