

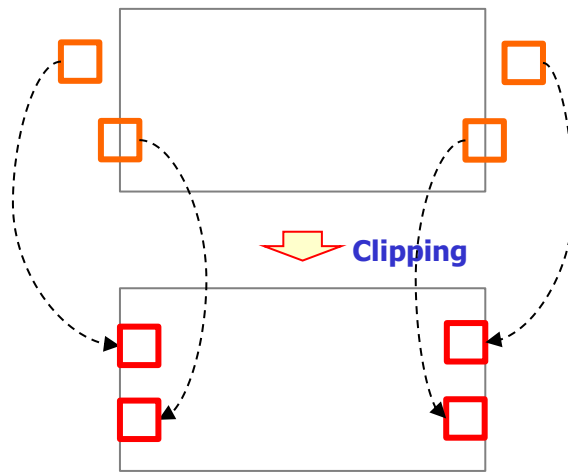
JCT3V-E0141 – CE2.h related: Clipping in Depth-based Disparity Vector Derivation

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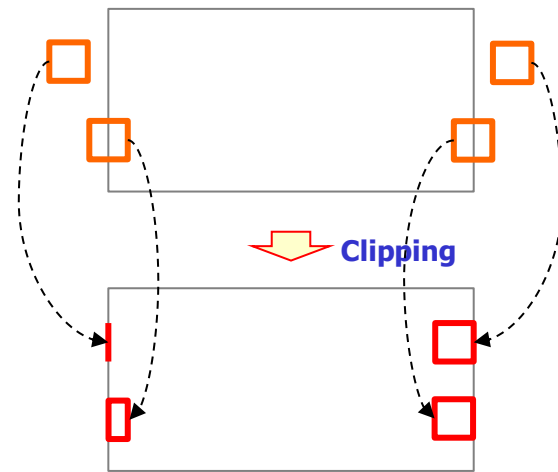
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Bug on Depth-based DV Derivation

- ❖ Mismatch between Spec. and S/W in depth-based DV derivation
 - When retrieving the corresponding depth block by NBDV
 - In the current Spec., the corresponding block should be located inside of the depth picture
 - But, in the HTM S/W, at the left and above picture boundary, the corresponding block can be located outside or on boundary of the depth picture



Spec.



HTM 7.0r1

Bug on Depth-based DV Derivation

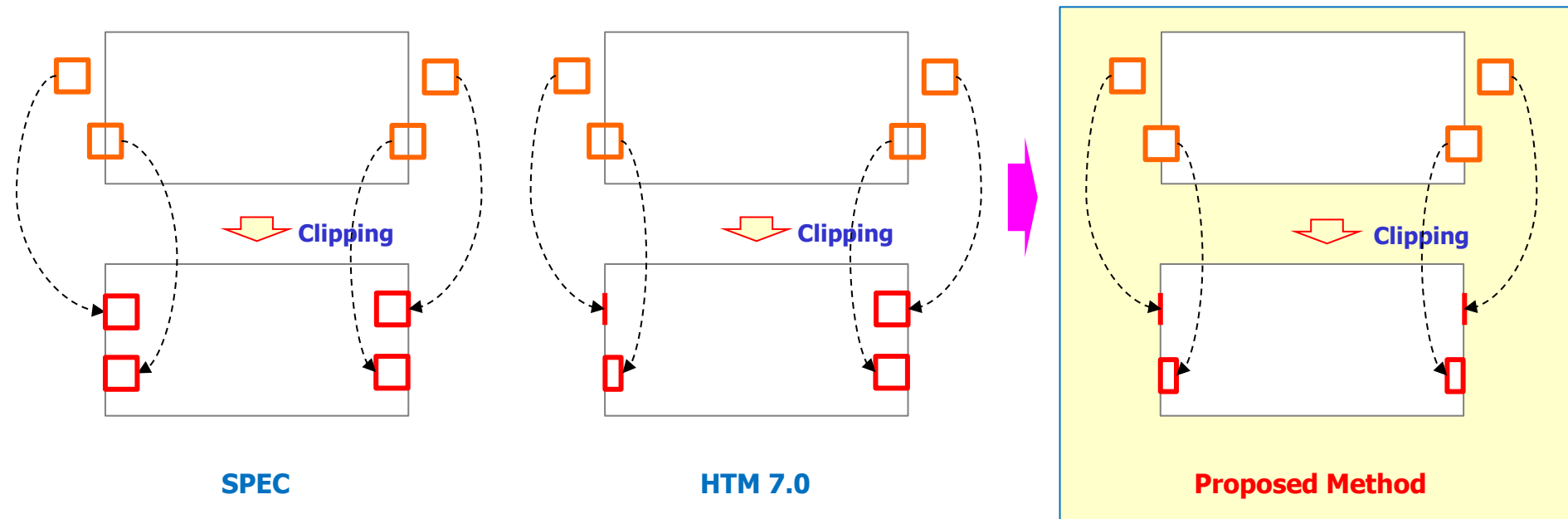
❖ Results of Bug-fix

- Based on CTC w/ HTM 7.0r1
- Aligned S/W with the Spec.
- 0.01% loss in video 2

	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	0.00%	-0.03%	0.00%	-0.01%	-0.02%	0.00%	100.0%	89.8%	98.0%
Kendo	0.00%	0.05%	-0.01%	0.01%	0.00%	-0.01%	100.5%	98.4%	99.2%
Newspaper_CC	0.00%	-0.05%	0.02%	0.00%	-0.01%	0.00%	101.0%	97.1%	99.6%
GT_Fly	0.00%	0.13%	0.00%	0.01%	0.01%	0.01%	100.2%	95.5%	101.7%
Poznan_Hall2	0.00%	-0.23%	0.13%	-0.02%	-0.01%	-0.01%	100.7%	102.0%	100.3%
Poznan_Street	0.00%	0.14%	-0.04%	0.00%	0.01%	0.01%	100.0%	101.3%	99.3%
Undo_Dancer	0.00%	0.01%	-0.03%	0.00%	0.00%	0.00%	100.1%	102.8%	99.0%
1024x768	0.00%	-0.01%	0.00%	0.00%	-0.01%	-0.01%	100.5%	95.1%	99.0%
1920x1088	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%	100.2%	100.4%	100.1%
average	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	100.3%	98.1%	99.6%

Proposed Method

- ❖ Conversely, we propose to allow the corresponding block to be located outside or on boundary of the depth picture by the proposed clipping operation
 - Like as doing in the motion compensation process
 - Proposed method can reflect an actual position of the corresponding block



Experimental Results (1)

- ❖ Based on CTC w/ HTM 7.0r1
 - When applying in the depth-based DV (DoNBVDV) derivation
 - 0.03% gain in video 2

	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	0.00%	0.00%	-0.01%	0.00%	0.01%	0.00%	98.9%	89.4%	98.2%
Kendo	0.00%	0.00%	-0.05%	-0.01%	0.00%	0.00%	99.3%	106.1%	99.4%
Newspaper_CC	0.00%	-0.01%	-0.05%	-0.01%	0.00%	0.00%	99.8%	96.6%	99.5%
GT_Fly	0.00%	0.00%	-0.13%	-0.01%	-0.01%	-0.01%	99.8%	97.6%	100.7%
Poznan_Hall2	0.00%	0.00%	0.03%	0.01%	0.01%	-0.01%	99.7%	96.8%	99.4%
Poznan_Street	0.00%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	99.4%	101.3%	100.8%
Undo_Dancer	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	99.5%	105.8%	99.2%
1024x768	0.00%	0.00%	-0.03%	-0.01%	0.00%	0.00%	99.3%	97.4%	99.0%
1920x1088	0.00%	0.00%	-0.03%	0.00%	0.00%	-0.01%	99.6%	100.4%	100.0%
average	0.00%	0.00%	-0.03%	0.00%	0.00%	0.00%	99.5%	99.1%	99.6%

Experimental Results (2)

❖ Based on CTC w/ HTM 7.0r1

- When applying in both the depth-based DV derivation and BVSP mode
- 0.02% gain in 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	0.00%	0.06%	-0.05%	0.00%	-0.01%	-0.01%	99.3%	88.1%	97.8%
Kendo	0.00%	0.03%	-0.04%	0.00%	0.00%	0.03%	99.7%	95.3%	99.3%
Newspaper_CC	0.00%	0.05%	-0.03%	0.01%	0.02%	-0.13%	100.5%	95.2%	100.5%
GT_Fly	0.00%	0.09%	-0.05%	0.01%	0.01%	0.00%	100.6%	98.9%	101.3%
Poznan_Hall2	0.00%	-0.07%	0.09%	0.00%	-0.01%	-0.04%	100.2%	95.3%	99.6%
Poznan_Street	0.00%	-0.02%	0.09%	0.01%	0.00%	0.00%	100.3%	101.1%	100.6%
Undo_Dancer	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	100.3%	105.1%	100.4%
1024x768	0.00%	0.05%	-0.04%	0.00%	0.00%	-0.03%	99.8%	92.8%	99.2%
1920x1088	0.00%	0.00%	0.03%	0.00%	0.00%	-0.01%	100.4%	100.1%	100.5%
average	0.00%	0.02%	0.00%	0.00%	0.00%	-0.02%	100.1%	97.0%	99.9%

Conclusions

- ❖ We propose a clipping method for depth-based DV derivation
 - 0.02% bit-saving for synthesized views
 - Proposed method enables to derive more accurate disparity vector at near the boundary of the picture
- ❖ We recommend to adopt the proposed method into next 3D-HEVC TM.

Thanks to LG for the cross checking (JCT3V-E0249).

