

JCT3V-F0143 – CE2 related: Default Disparity Vector Improvement

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Current NBDV Derivation

❖ NBDV derivation

- Search for DV from 2 temporal DCP neighboring blocks
- Search for DV from 2 spatial DCP neighboring blocks
- Search for DV from 2 spatial MCP neighboring blocks (**DV-MCP process**)
- If DV is unavailable, DV is set to (0, 0) by default

❖ DV-MCP process needs

- additional storage to store DVs and their availability flags of spatial neighboring blocks
- large number of operations, especially comparisons
 - Whole NBDV derivation process: 101 comparisons
 - ⊕ Based on 3D-HEVC specification
 - For DM-MCP process: 59 comparisons
 - ⊕ Based on 3D-HEVC specification

Proposed Method

- ❖ In order to simplify NBDV derivation
 - We propose to remove DV-MCP process from NBDV derivation
- ❖ In order to make up for the DV-MCP performance
 - We propose to change the default DV from (0, 0) to depth value 128
 - and to use the default DV for the residual prediction
- ❖ Proposed NBDV derivation
 - Search for DV from 2 temporal DCP neighboring blocks
 - Search for DV from 2 spatial DCP neighboring blocks
 - ~~■ Search for DV from 2 spatial MCP neighboring blocks (DV-MCP process)~~
 - If DV is unavailable, DV is set to DV of the depth value 128 by default and DV is set as available

Experimental Results

❖ Based on CTC with HTM 8.0 – No coding loss

	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%	0.11%	0.20%	0.07%	0.08%	0.00%	99.9%	87.7%	98.3%
Kendo	0.00%	0.25%	0.12%	0.08%	0.05%	-0.01%	98.8%	92.7%	97.2%
Newspaper_CC	0.00%	0.05%	-0.02%	0.01%	-0.01%	-0.04%	99.9%	94.3%	97.9%
GT_Fly	0.00%	0.07%	0.06%	0.00%	0.00%	-0.02%	99.4%	101.3%	100.9%
Poznan_Hall2	0.00%	0.09%	0.06%	0.03%	0.03%	-0.03%	99.2%	92.5%	98.3%
Poznan_Street	0.00%	0.41%	0.28%	0.10%	0.10%	0.05%	99.7%	100.0%	101.1%
Undo_Dancer	0.00%	0.27%	-0.11%	0.02%	0.02%	0.07%	99.4%	102.3%	101.7%
1024x768	0.00%	0.14%	0.10%	0.05%	0.04%	-0.02%	99.5%	91.6%	97.8%
1920x1088	0.00%	0.21%	0.07%	0.04%	0.04%	0.02%	99.4%	99.0%	100.5%
average	0.00%	0.18%	0.09%	0.04%	0.04%	0.00%	99.5%	95.8%	99.3%
Shark	0.00%	0.00%	-0.03%	-0.01%	-0.02%	-0.03%	98.5%	98.7%	100.4%

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

	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%	-0.46%	-0.16%	-0.11%	-0.09%	-0.16%	100.9%	96.2%	99.3%
Kendo	0.00%	-0.18%	-0.18%	-0.07%	-0.01%	-0.09%	100.3%	106.4%	98.2%
Newspaper_CC	0.00%	-0.69%	-0.70%	-0.29%	-0.23%	-0.24%	100.5%	104.6%	98.8%
GT_Fly	0.00%	0.20%	0.08%	0.04%	0.03%	0.02%	99.9%	104.4%	100.1%
Poznan_Hall2	0.00%	1.58%	0.43%	0.45%	0.41%	0.31%	100.6%	94.3%	99.7%
Poznan_Street	0.00%	0.82%	0.50%	0.25%	0.23%	0.17%	99.7%	97.5%	99.0%
Undo_Dancer	0.00%	0.47%	-0.01%	0.08%	0.08%	0.03%	99.7%	95.6%	100.0%
1024x768	0.00%	-0.45%	-0.35%	-0.16%	-0.11%	-0.17%	100.6%	102.4%	98.7%
1920x1088	0.00%	0.77%	0.25%	0.21%	0.19%	0.13%	100.0%	98.0%	99.7%
average	0.00%	0.25%	-0.01%	0.05%	0.06%	0.01%	100.2%	99.9%	99.3%
Shark	0.00%	0.57%	0.22%	0.10%	0.09%	0.06%	100.4%	97.8%	100.7%

Conclusions

- ❖ We propose to remove DV-MCP and to improve the default DV
 - Changing default DV from (0, 0) to DV of depth value 128
 - Using default DV for RP
 - Additional storage for NBDV derivation can be removed
 - Number of comparison operations can be saved by 58%.
 - No coding loss on common test conditions

- ❖ We recommend to adopt the proposed method into next 3D-HEVC WD

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