JCT3V-F0126 (CE5 related): Generic SDC for all Intra modes in 3D-HEVC

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Summary

- Basic idea:
    - Extend intra SDC (simplified depth coding) to all depth intra modes

- Proposed method provides -0.40% (-0.55% for Shark) coding gain for synthesized views.
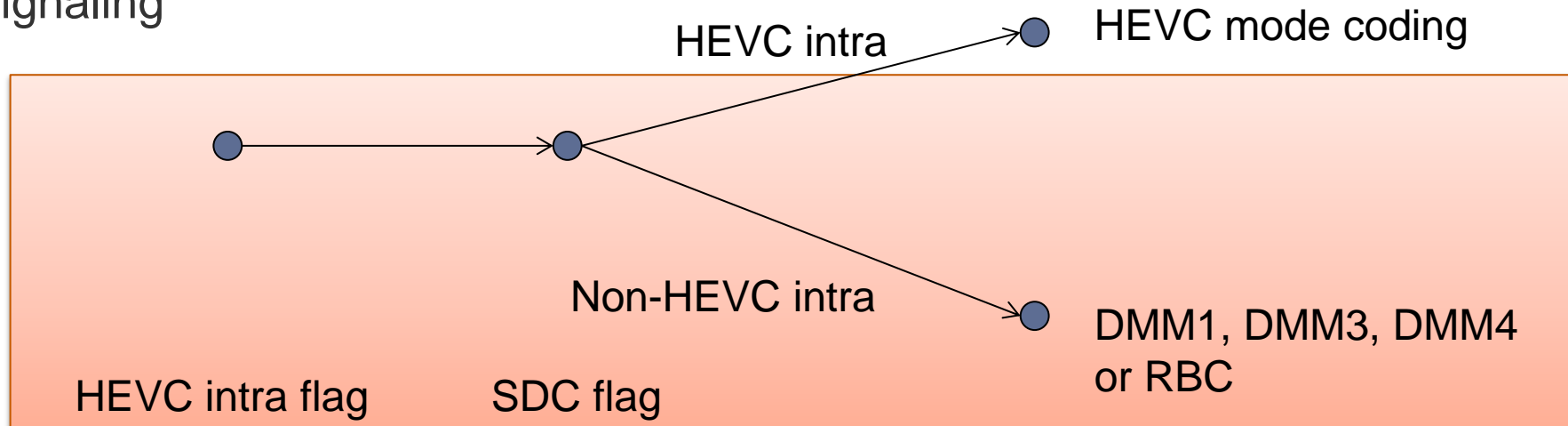
Introduction

- Intra SDC in 3D-HEVC
  - Only applied to Planar and DMM1
  - Problem
    - Can not exploit the advantage of intra SDC on other depth intra modes

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Proposed method

- SDC is extended to all depth intra modes
  - HEVC Intra modes
  - DMM and RBC
- Prediction of DC
  - HEVC intra modes (1 partition)
    - Average of four corner pixels of the pixel specific prediction block
  - DMM and RBC (2 partitions)
    - Prediction value of the partition
- Signaling

HEVC intra → HEVC mode coding

Non-HEVC intra → DMM1, DMM3, DMM4 or RBC

HEVC intra flag   SDC flag

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Experimental results

- Test conditions
  - CTC, HTM-8.0
- Coding performance (Coding gain w.r.t. anchor for 3-view case)

	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
Balloons	-0.11%	0.11%	-0.01%	-0.10%	-0.25%
Kendo	-0.04%	-0.11%	-0.04%	-0.44%	-0.54%
Newspaper_CC	0.07%	-0.02%	0.01%	-0.21%	-0.34%
GT_Fly	0.31%	0.04%	0.03%	-0.17%	-0.42%
Poznan_Hall2	0.14%	-0.22%	-0.01%	-0.20%	-0.48%
Poznan_Street	0.41%	-0.03%	0.05%	-0.06%	-0.21%
Undo_Dancer	-0.04%	-0.23%	-0.03%	-0.15%	-0.56%
1024x768	-0.02%	-0.01%	-0.01%	-0.25%	-0.38%
1920x1088	0.20%	-0.11%	0.01%	-0.15%	-0.42%
Average	**0.11%**	**-0.06%**	**0.00%**	**-0.19%**	**-0.40%**
Shark	-0.08%	0.29%	0.03%	-0.12%	-0.55%

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Experimental results

- Test conditions
  - All intra case, HTM-8.0
- Coding performance (Coding gain w.r.t. anchor for 3-view case)

	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
Balloons	0.00%	0.00%	0.00%	-0.12%	-0.27%
Kendo	0.00%	0.00%	0.00%	-0.25%	-0.35%
Newspaper_CC	0.00%	0.00%	0.00%	-0.14%	-0.34%
GT_Fly	0.00%	0.00%	0.00%	-0.09%	-0.22%
Poznan_Hall2	0.00%	0.00%	0.00%	-0.30%	-0.58%
Poznan_Street	0.00%	0.00%	0.00%	-0.09%	-0.20%
Undo_Dancer	0.00%	0.00%	0.00%	-0.18%	-0.49%
1024x768	0.00%	0.00%	0.00%	-0.17%	-0.32%
1920x1088	0.00%	0.00%	0.00%	-0.17%	-0.37%
Average	**0.00%**	**0.00%**	**0.00%**	**-0.17%**	**-0.35%**
Shark	0.00%	0.00%	0.00%	0.01%	-0.24%

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Experimental results when combined with JCT3V-F0132

- Test conditions
  - CTC, HTM-8.0
- Coding performance (Coding gain w.r.t. anchor for 3-view case)

	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
Balloons	-0.08%	-0.07%	-0.05%	-0.14%	-0.32%
Kendo	-0.07%	-0.11%	-0.04%	-0.46%	-0.67%
Newspaper_CC	-0.02%	0.05%	0.00%	-0.21%	-0.41%
GT_Fly	0.09%	0.08%	0.03%	-0.19%	-0.50%
Poznan_Hall2	0.13%	-0.10%	0.01%	-0.16%	-0.49%
Poznan_Street	0.28%	0.01%	0.06%	-0.02%	-0.22%
Undo_Dancer	-0.13%	-0.21%	-0.05%	-0.18%	-0.56%
1024x768	-0.06%	-0.04%	-0.03%	-0.27%	-0.47%
1920x1088	0.09%	-0.05%	0.01%	-0.14%	-0.44%
Average	**0.03%**	**-0.05%**	**0.00%**	**-0.19%**	**-0.45%**
Shark	0.04%	-0.07%	0.01%	-0.14%	-0.56%

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Experimental results when combined with JCT3V-F0132

- Test conditions
  - All intra case, HTM-8.0
- Coding performance (Coding gain w.r.t. anchor for 3-view case)

	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
Balloons	0.00%	0.00%	0.00%	-0.16%	-0.33%
Kendo	0.00%	0.00%	0.00%	-0.28%	-0.42%
Newspaper_CC	0.00%	0.00%	0.00%	-0.17%	-0.39%
GT_Fly	0.00%	0.00%	0.00%	-0.10%	-0.30%
Poznan_Hall2	0.00%	0.00%	0.00%	-0.30%	-0.66%
Poznan_Street	0.00%	0.00%	0.00%	-0.10%	-0.26%
Undo_Dancer	0.00%	0.00%	0.00%	-0.20%	-0.60%
1024x768	0.00%	0.00%	0.00%	-0.20%	-0.38%
1920x1088	0.00%	0.00%	0.00%	-0.18%	-0.46%
Average	**0.00%**	**0.00%**	**0.00%**	**-0.19%**	**-0.42%**
Shark	0.00%	0.00%	0.00%	-0.01%	-0.36%

- Thanks to HHI for the crosscheck! (JCT3V-F0222)

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Experimental results when combined with JCT3V-F0125

- Test conditions
  - CTC, HTM-8.0
- Coding performance (Coding gain w.r.t. anchor for 3-view case)

	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
Balloons	-0.46%	-0.33%	-0.16%	-0.23%	-0.51%
Kendo	-0.21%	-0.19%	-0.09%	-0.50%	-0.86%
Newspaper_CC	-0.10%	-0.05%	-0.03%	-0.26%	-0.62%
GT_Fly	0.00%	-0.17%	-0.03%	-0.14%	-0.61%
Poznan_Hall2	-0.26%	-0.40%	-0.13%	-0.27%	-0.81%
Poznan_Street	0.12%	0.15%	0.03%	-0.07%	-0.29%
Undo_Dancer	-0.46%	-0.32%	-0.10%	-0.19%	-0.98%
1024x768	-0.26%	-0.19%	-0.09%	-0.33%	-0.66%
1920x1088	-0.15%	-0.19%	-0.06%	-0.17%	-0.67%
Average	**-0.20%**	**-0.19%**	**-0.07%**	**-0.24%**	**-0.67%**
Shark	-0.50%	-0.10%	-0.05%	-0.09%	-0.70%

- Thanks to Hisilicon for the crosscheck! (JCT3V-F0249)

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Conclusions

- The proposed method further improves intra SDC by:
  - Extending it to all depth intra modes

- Main results
  - The coding efficiency is improved by -0.40% (-0.55% for Shark) for synthesized views

Thank you!