JCT3V-D0170
Enhanced Disparity Vector Prediction

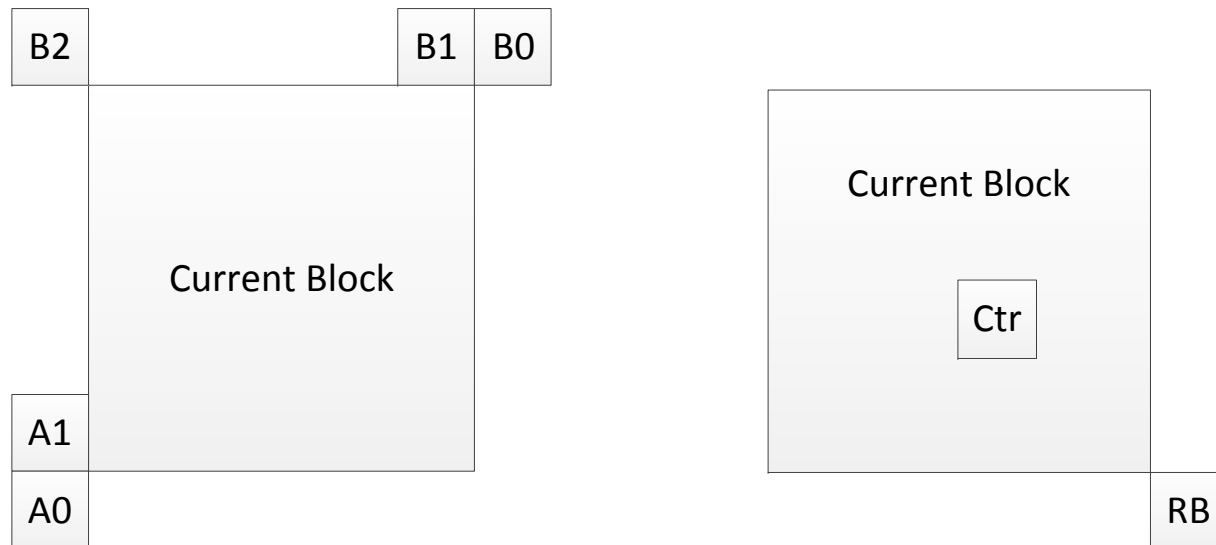Yichen Zhang, Yin Zhao, Lu Yu

Zhejiang Unviersity

Summary

- Part1: disparity vector derivation
  - ForWard Disparity Vector (FWDV)
- Part2: position of disparity vector in merge list
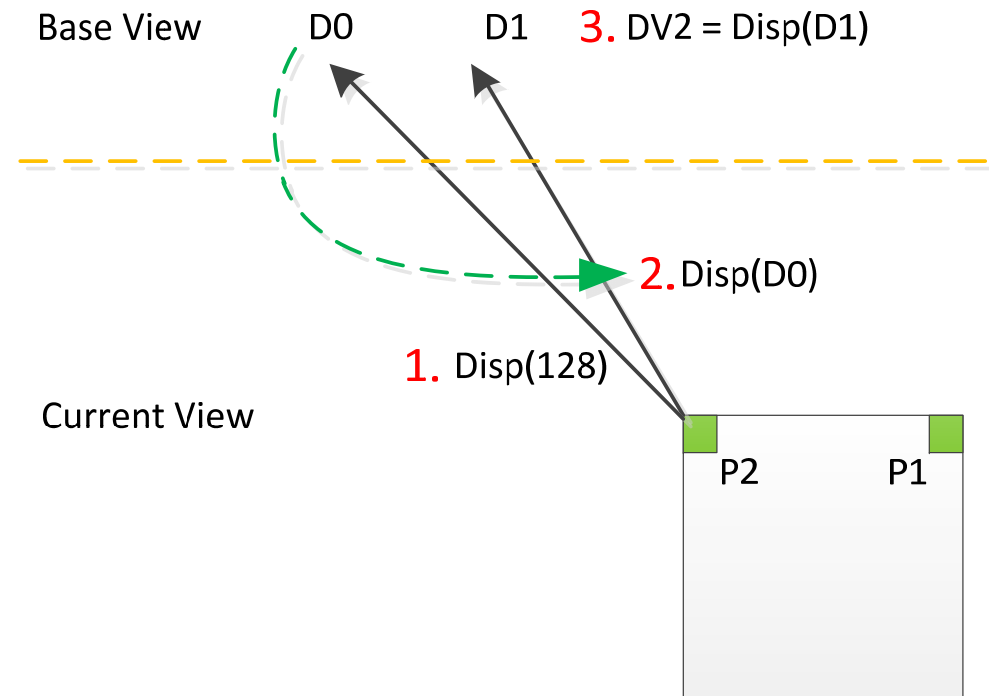 - Adaptive DV candidate position adjustment

Part 1: FWDV - Introduction

- DoNBDV
  - DV from temporal/spatial neighboring blocks.
  - If no DV is retrieved, a zero DV is used.

B2		B1	B0

Current Block

A1

A0

Current Block

Ctr

RB

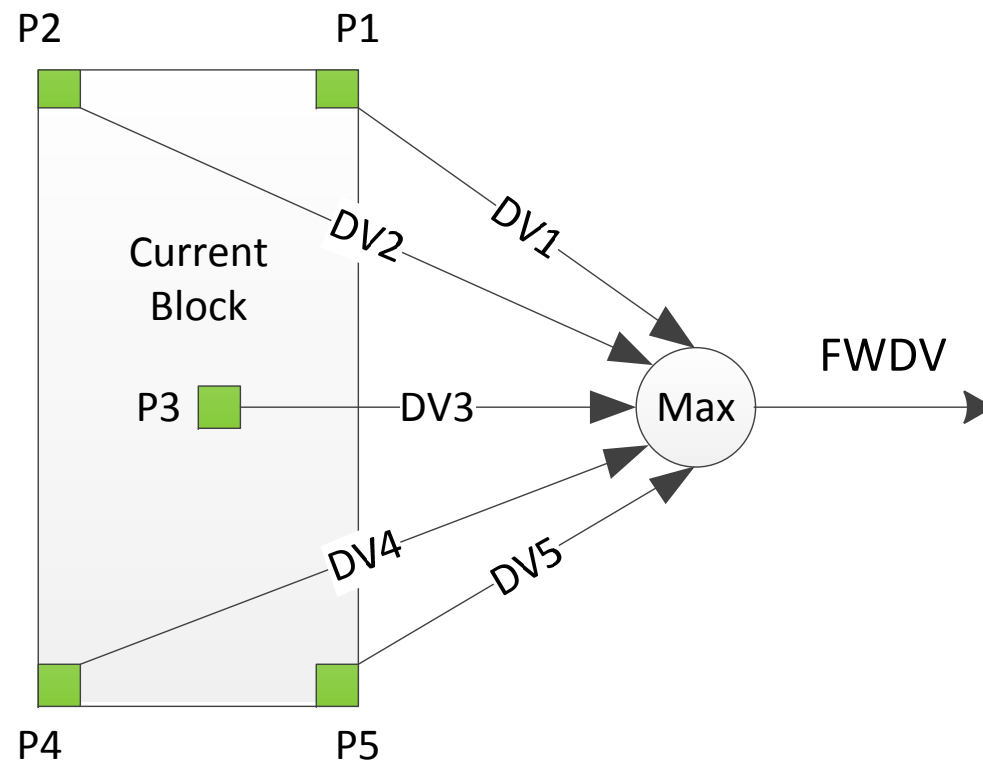# FWDV - Description

- Derived from depth map of base view and no dependency on neighboring blocks.
- 1. locate D0 by Disp(128)
- 2. locate D1 by Disp(D0)
- 3. DV2 = Disp(D1)

Base View   D0   D1   **3.** DV2 = Disp(D1)

2. Disp(D0)

1. Disp(128)

Current View

P2   P1

FWDV - Description

- DV of 4 corner pixels + 1 center pixel
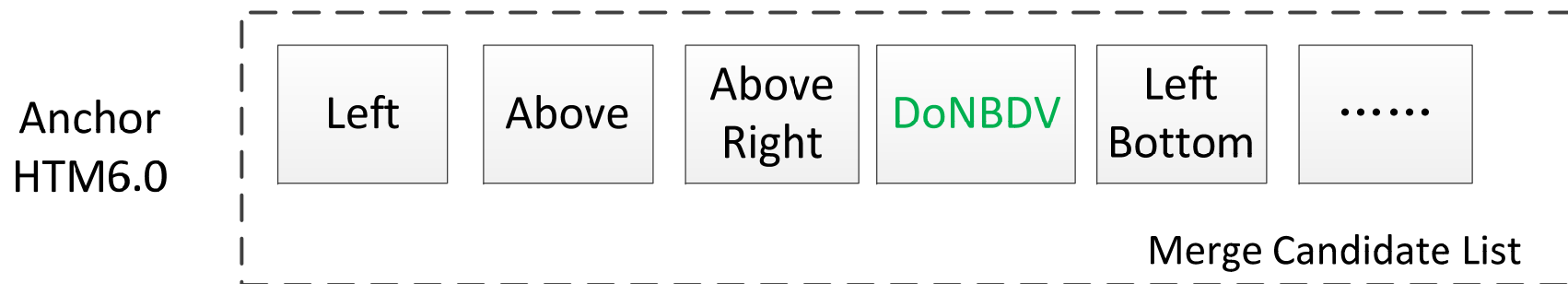- FWDV = Max (DV1, DV2, DV3, DV4, DV5)

FWDV - Experimental results

- Scheme 1 (5 DVs)

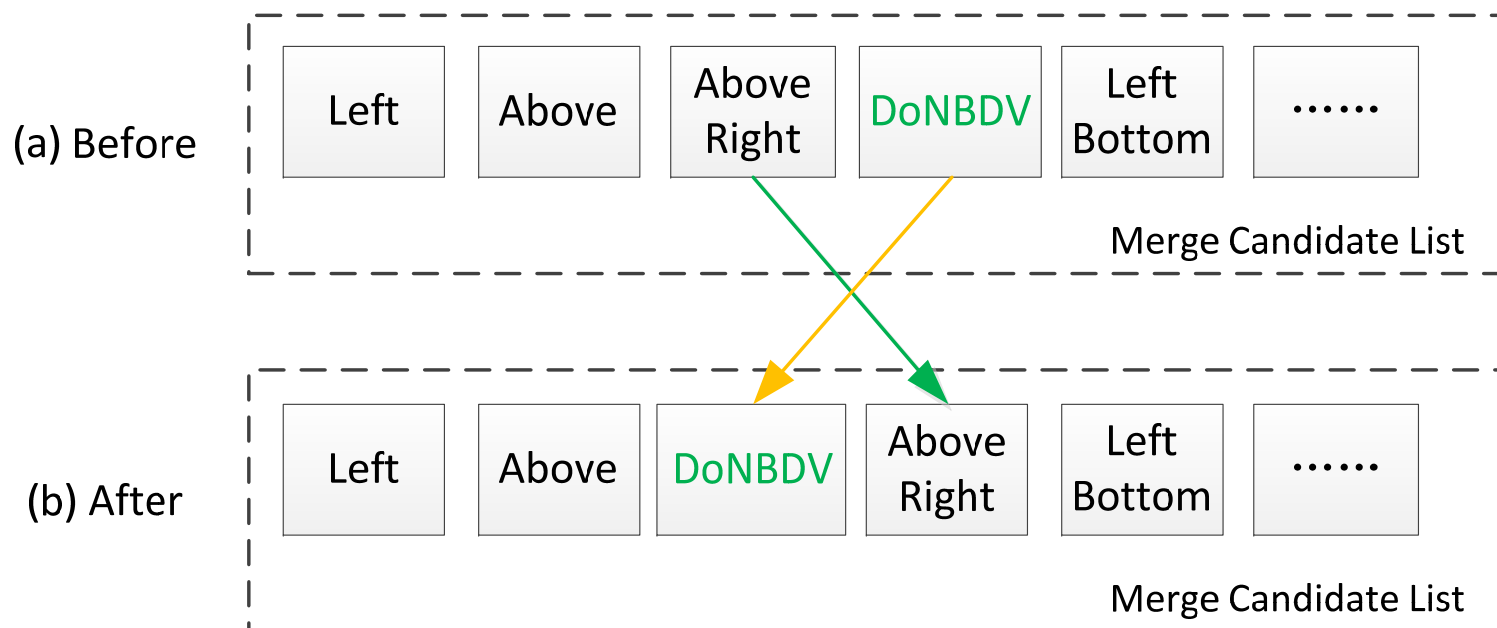|	Video 0	Video 1	Video 2	Video PSNR / Video bitrate	Video PSNR / Total bitrate	Synth PSNR / Total bitrate	Encoding Time	Decoding Time
Balloons	0.00%	-0.15%	-0.20%	-0.07%	-0.05%	-0.11%	102.8%	101.4%
Kendo	0.00%	0.03%	-0.03%	0.00%	0.02%	0.05%	73.1%	102.7%
Newspaper_CC	0.00%	-0.24%	-0.27%	-0.09%	-0.05%	-0.08%	84.4%	106.6%
GT_Fly	0.00%	0.05%	0.10%	0.01%	0.01%	-0.04%	94.0%	99.5%
Poznan_Hall2	0.00%	-0.24%	-0.45%	-0.16%	-0.15%	-0.11%	109.9%	102.0%
Poznan_Street	0.00%	0.30%	-0.16%	0.02%	0.01%	0.01%	107.9%	98.3%
Undo_Dancer	0.00%	-0.10%	-0.39%	-0.09%	-0.09%	-0.25%	96.8%	103.0%
1024x768	0.00%	-0.12%	-0.17%	-0.05%	-0.02%	-0.05%	86.8%	103.6%
1920x1088	0.00%	0.00%	-0.22%	-0.05%	-0.05%	-0.10%	102.2%	100.7%
average	**0.00%**	**-0.05%**	**-0.20%**	**-0.05%**	**-0.04%**	**-0.08%**	**95.6%**	**101.9%**

Part 2: DV position - Introduction

- Current design in 3D-HEVC
    - DoNBDV is placed after candidate from above right block, fixed position.
    - When left/above blocks is interview predicted, the probability of current blocks being interview predicted is very high.

Anchor HTM6.0

| Left | Above | Above Right | DoNBDV | Left Bottom | ...... |

Merge Candidate List

DV position - Description

- If the left or above neighboring blocks are inter-view predicted, the position of DoNBDV and candidate from above right block is switched.

(a) Before

| Left | Above | Above Right | DoNBDV | Left Bottom | ...... |

Merge Candidate List

(b) After

| Left | Above | DoNBDV | Above Right | Left Bottom | ...... |

Merge Candidate List

DV position - Experimental results

	Video 0	Video 1	Video 2	Video PSNR / Video bitrate	Video PSNR / Total bitrate	Synth PSNR / Total bitrate	Encoding Time	Decoding Time
Balloons	0.00%	-0.03%	-0.06%	-0.03%	-0.04%	-0.08%	95.2%	105.6%
Kendo	0.00%	0.13%	-0.02%	0.01%	0.00%	0.08%	80.9%	99.2%
Newspaper_CC	0.00%	-0.02%	0.10%	0.03%	0.04%	-0.02%	103.7%	104.4%
GT_Fly	0.00%	0.02%	0.05%	0.01%	0.01%	0.01%	95.3%	102.5%
Poznan_Hall2	0.00%	-0.10%	0.02%	-0.05%	-0.04%	0.05%	132.9%	102.2%
Poznan_Street	0.00%	0.13%	0.10%	0.04%	0.02%	0.02%	99.4%	98.3%
Undo_Dancer	0.00%	-0.05%	-0.02%	-0.01%	-0.01%	-0.48%	96.4%	100.1%
1024x768	0.00%	0.03%	0.01%	0.01%	0.00%	-0.01%	93.3%	103.0%
1920x1088	0.00%	0.00%	0.04%	0.00%	0.00%	-0.10%	106.0%	100.8%
average	**0.00%**	**0.01%**	**0.02%**	**0.00%**	**0.00%**	**-0.06%**	**100.5%**	**101.8%**

Experiment Results

- Part 1 (5 DVs) + Part 2

	Video 0	Video 1	Video 2	Video PSNR / Video bitrate	Video PSNR / Total bitrate	Synth PSNR / Total bitrate	Encoding Time	Decoding Time
Balloons	0.00%	-0.27%	-0.11%	-0.07%	-0.05%	-0.10%	86.8%	100.9%
Kendo	0.00%	-0.08%	-0.15%	-0.06%	-0.05%	-0.01%	79.9%	99.8%
Newspaper_CC	0.00%	-0.28%	-0.15%	-0.08%	-0.06%	-0.11%	86.5%	102.0%
GT_Fly	0.00%	-0.12%	-0.10%	-0.03%	-0.04%	-0.08%	93.9%	99.2%
Poznan_Hall2	0.00%	-0.21%	-0.41%	-0.16%	-0.13%	-0.19%	105.6%	101.6%
Poznan_Street	0.00%	0.12%	0.09%	0.03%	0.01%	0.00%	96.5%	100.9%
Undo_Dancer	0.00%	-0.20%	-0.41%	-0.09%	-0.10%	-0.64%	92.6%	99.0%
1024x768	0.00%	-0.21%	-0.14%	-0.07%	-0.05%	-0.07%	84.4%	100.9%
1920x1088	0.00%	-0.10%	-0.21%	-0.06%	-0.07%	-0.23%	97.2%	100.2%
average	0.00%	-0.15%	-0.18%	-0.07%	-0.06%	-0.16%	91.7%	100.5%

Experimental results

- Summary

	Video 0	Video 1	Video 2	Video PSNR / Video bitrate	Video PSNR / Total bitrate	Synth PSNR / Total bitrate	Encoding Time	Decoding Time
Part 1 5 DVs	0.00%	-0.05%	-0.20%	-0.05%	-0.04%	-0.08%	95.6%	101.9%
Part 2	0.00%	0.01%	0.02%	0.00%	0.00%	-0.06%	100.5%	101.8%
5 DVs + Part 2	0.00%	-0.15%	-0.18%	-0.07%	-0.06%	-0.16%	91.7%	100.5%

Thanks Huawei (JCT3V-D0291) for cross-checking our proposal