

# **JCT3V-F0144 – CE3 related: Additional Depth-based DV Candidate**

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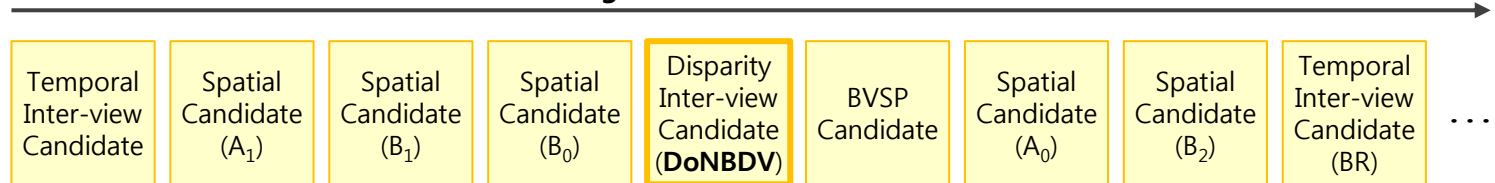
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**Samsung Electronics**

# Introduction

- ❖ In merge candidate list construction for dependent views
  - There are 2 shifted DV merge candidates
    - These candidates are generated by adding 4 to the horizontal comp. of DV

Current Merge candidates construction order



- Performance of shifted DV candidates  
(Disabled the shifted DVs vs. HTM 8.0)

	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%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	100.3%	102.8%	100.2%
Kendo	0.0%	-0.2%	0.0%	0.0%	0.0%	0.0%	100.6%	94.2%	99.9%
Newspaper_CC	0.0%	-0.2%	-0.1%	-0.1%	0.0%	-0.1%	100.0%	96.6%	98.7%
GT_Fly	0.0%	-0.1%	0.1%	0.0%	0.0%	0.0%	100.4%	102.5%	98.5%
Poznan_Hall2	0.0%	-0.3%	-0.2%	-0.1%	-0.1%	0.0%	100.4%	103.6%	100.5%
Poznan_Street	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	100.0%	100.6%	99.4%
Undo_Dancer	0.0%	-0.3%	0.2%	0.0%	0.0%	-0.1%	100.2%	103.8%	98.1%
1024x768	0.0%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	100.3%	97.9%	99.6%
1920x1088	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	100.2%	102.6%	99.1%
<b>average</b>	<b>0.0%</b>	<b>-0.2%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>100.3%</b>	<b>100.6%</b>	<b>99.3%</b>
Shark	0.0%	0.1%	-0.2%	0.0%	0.0%	0.0%	100.7%	99.1%	99.5%

or

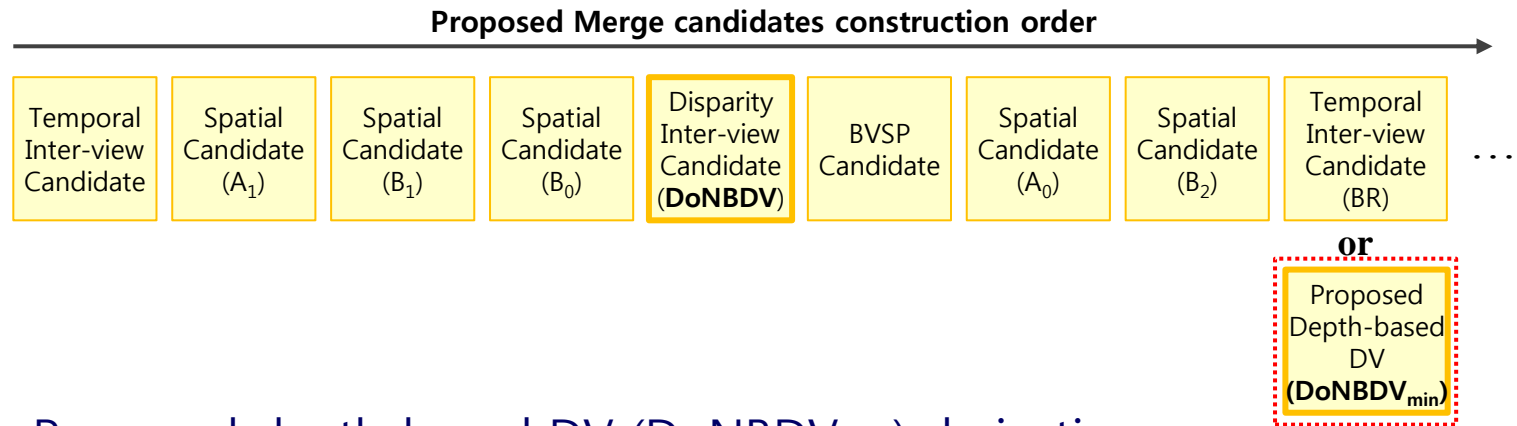
Shifted  
First  
Available  
DV

or

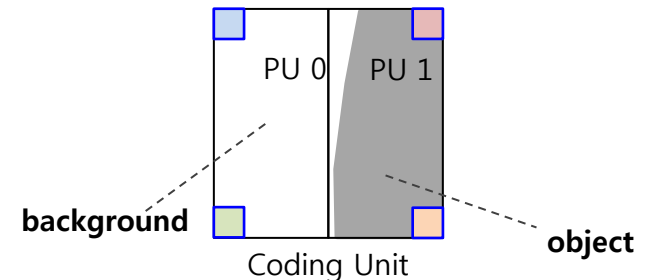
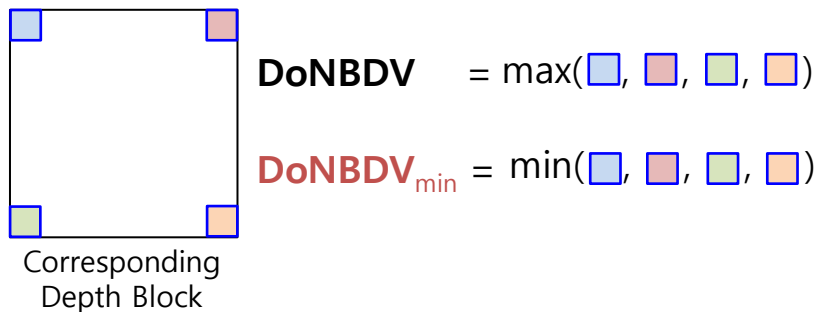
Shifted  
DoNBDV

# Proposed Method

- ❖ In order to improve the coding performance of DV candidate
  - We propose to replace shifted DVs with proposed depth-based DV



- Proposed depth-based DV (DoNBDV<sub>min</sub>) derivation
  - Choose the minimum depth value among 4 corner pixels in the depth block



# Experimental Results

## ❖ Based on CTC with HTM 8.0

### ■ 0.1% bit-saving for synthesized view

	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%	-0.1%	0.2%	0.0%	0.0%	0.0%	99.5%	94.7%	98.3%
Kendo	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	98.7%	95.5%	97.7%
Newspaper_CC	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	99.1%	95.1%	98.5%
GT_Fly	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	99.0%	96.6%	100.5%
Poznan_Hall2	0.0%	0.0%	-0.2%	0.0%	0.0%	-0.2%	98.6%	96.9%	98.6%
Poznan_Street	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	99.0%	95.6%	100.2%
Undo_Dancer	0.0%	0.0%	-0.3%	-0.1%	0.0%	-0.1%	99.1%	99.9%	97.9%
1024x768	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	99.1%	95.1%	98.2%
1920x1088	0.0%	0.0%	-0.2%	0.0%	0.0%	-0.1%	98.9%	97.3%	99.3%
<b>average</b>	<b>0.0%</b>	<b>0.0%</b>	<b>-0.1%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>-0.1%</b>	<b>99.0%</b>	<b>96.3%</b>	<b>98.8%</b>
Shark	0.0%	-0.1%	0.1%	0.0%	0.0%	0.0%	98.9%	97.3%	100.5%

## ❖ Compared with disabled the shifted DVs

### ■ 0.1% 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%	0.0%	-0.1%	-0.1%	-0.1%	99.8%	97.4%	98.5%
Kendo	0.0%	-0.1%	0.1%	0.0%	0.0%	-0.1%	99.2%	90.0%	97.6%
Newspaper_CC	0.0%	-0.2%	0.0%	-0.1%	0.0%	-0.1%	99.1%	91.8%	97.2%
GT_Fly	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	99.3%	99.1%	99.0%
Poznan_Hall2	0.0%	-0.3%	-0.4%	-0.1%	-0.2%	-0.2%	99.0%	100.4%	99.1%
Poznan_Street	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	99.0%	96.2%	99.5%
Undo_Dancer	0.0%	-0.3%	-0.1%	-0.1%	-0.1%	-0.1%	99.3%	103.7%	96.1%
1024x768	0.0%	-0.2%	0.0%	0.0%	-0.1%	-0.1%	99.4%	93.1%	97.8%
1920x1088	0.0%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	99.2%	99.8%	98.4%
<b>average</b>	<b>0.0%</b>	<b>-0.2%</b>	<b>-0.1%</b>	<b>-0.1%</b>	<b>-0.1%</b>	<b>-0.1%</b>	<b>99.3%</b>	<b>96.9%</b>	<b>98.1%</b>
Shark	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	99.7%	96.4%	100.0%

# Conclusions

- ❖ We propose to replace shifted DV candidates with proposed DV
  - 0.1% gain for synthesized view
  - Compared with disabled shifted DVs
    - ➔ 0.1% gain for both coded and synthesized views
- ❖ We recommend to adopt the proposed method into next 3D-HEVC WD

**Thanks Sharp for the cross checking (JCT3V-F0212).**

