

REDEFINING MOBILITY



# JCT3V-C0052: 3D-CE6.h: Results on distortion calculation simplification for Depth Modeling Mode (DMM) 3

Xin Zhao, Li Zhang, Ying Chen and Marta Karczewicz

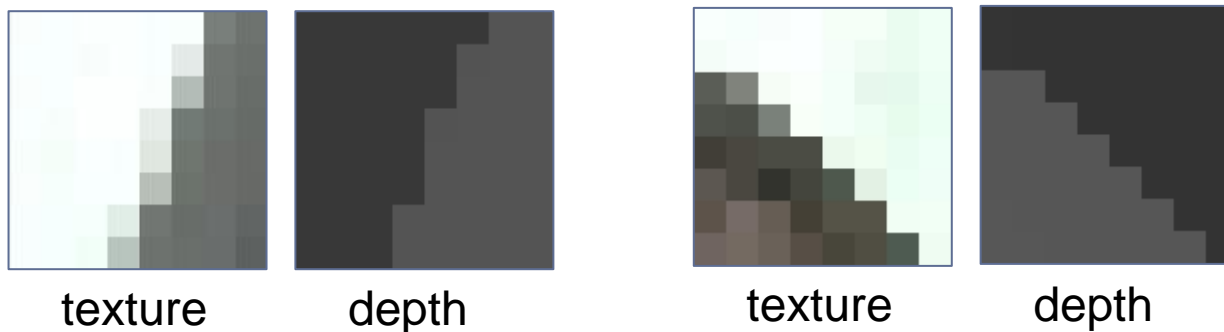
# Summary

- Distortion calculation is calculated based on neighbouring pixels.
- Coding performance
  - Average 0.04% and 0.01% BD rate increase for “coded and synthesized” under “CTC” and “All Intra”, respectively
  - Both encoding and decoding runtime are saved for “CTC” and “All Intra”.

# Introduction

## ■ Depth modeling mode 3

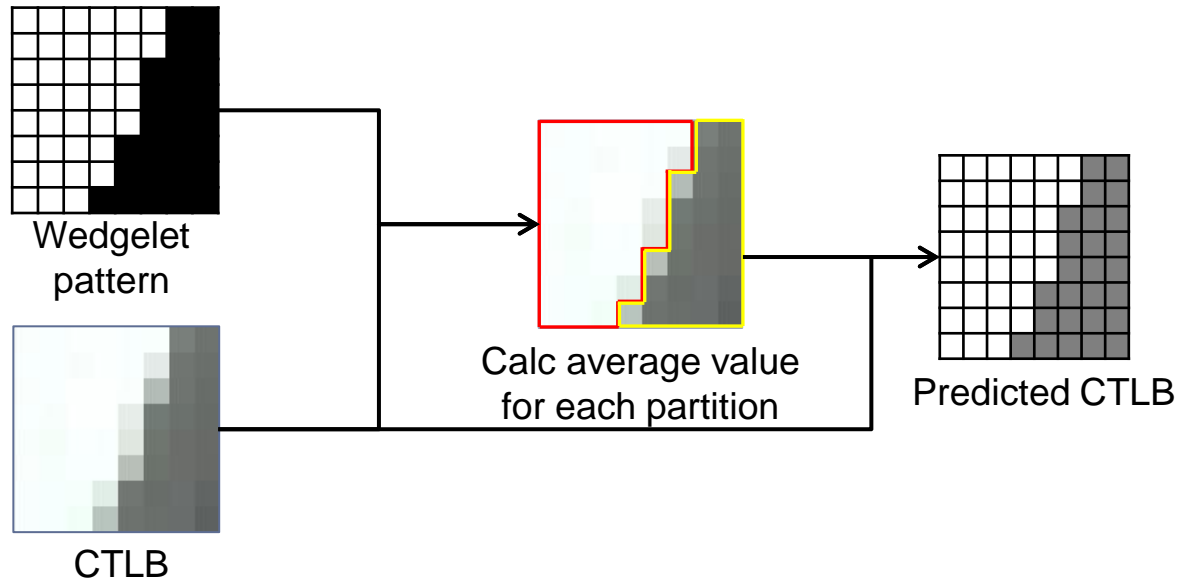
- Due to the correlation between texture and depth, a Wedgelet partition pattern applied on depth PU is identified using co-located texture luma block (CTLB)



- A distortion value is calculated for each Wedgelet pattern and the one with minimum distortion is selected for DMM 3
- For each Wedgelet pattern, two steps to get the distortion value
  - Generate a predicted CTLB
  - Calculate block-based SAD between CTLB and predicted CTLB

# Introduction

- Two steps for distortion calculation
  - Generate a predicted CTLB
    - Average value calculation of each partition



- Calculate block-based SAD between CTLB ( $T_{rec}$ ) and predicted CTLB ( $T_{pred}$ )

$$SAD = \sum_{i=0}^{N-1} \sum_{j=0}^{N-1} |T_{rec}(i,j) - T_{pred}(i,j)|$$

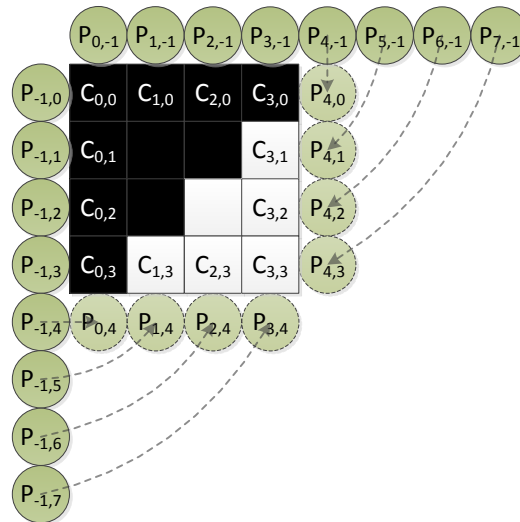
# Introduction

## ■ Problem

- The distortion calculation is still relatively high-complexity because it needs at least the following operations for each iteration of the pattern search:
  - Access to each pixel of the co-located texture block
  - Divisions to calculate average value for each partition of CTB
  - Additional memory to store CTB
  - Block-based SAD calculation

# Proposal

- Simplified distortion calculation in DMM 3
  - Map the reference samples to the PU boundary
    - Reference samples are the neighboring ones used for Intra prediction
    - No access of pixels in the texture block



$$D = |P_{4,0} - P_{4,1}| + |P_{0,4} - P_{1,4}|$$

- Distortion calculation using two pairs of reference samples which are located at the change position of partition value
- The Wedgelet pattern with maximum  $D$  is selected for DMM 3

# Results

- Common test condition, 3 view test case

	video only	synthesized only	coded & synthesized	enc time	dec time	enc time crosscheck	dec time crosscheck
Balloons	0.0%	0.06%	0.06%	97.0%	95.6%	99.8%	92.2%
Kendo	0.0%	-0.07%	-0.04%	94.7%	91.4%	99.4%	95.9%
Newspapercc	0.0%	0.02%	0.01%	93.7%	92.0%	99.9%	100.2%
GhostTownFly	0.0%	-0.07%	-0.04%	97.0%	97.0%	99.6%	93.1%
PoznanHall2	0.0%	-0.01%	-0.01%	95.5%	93.0%	99.5%	91.0%
PoznanStreet	0.0%	0.02%	0.01%	102.9%	102.6%	99.5%	92.3%
UndoDancer	0.0%	0.44%	0.29%	90.5%	93.6%	99.9%	99.1%
1024x768	0.0%	0.01%	0.01%	95.1%	93.0%	99.7%	96.0%
1920x1088	0.0%	0.09%	0.07%	96.4%	96.5%	99.6%	93.8%
average	0.0%	0.06%	0.04%	95.8%	95.0%	99.6%	94.8%

# Results

## ■ All Intra, 3 view test case

	video only	synthesized only	coded & synthesized	enc time	dec time	enc time crosscheck	dec time crosscheck
<b>Balloons</b>	0.00%	0.01%	0.00%	94.3%	96.8%	95.8%	91.6%
<b>Kendo</b>	0.00%	-0.01%	-0.01%	97.8%	97.2%	96.0%	98.8%
<b>Newspapercc</b>	0.00%	0.01%	0.01%	96.3%	95.7%	97.5%	93.2%
<b>GhostTownFly</b>	0.00%	0.11%	0.08%	96.5%	95.6%	97.0%	95.3%
<b>PoznanHall2</b>	0.00%	0.00%	0.00%	97.0%	97.3%	96.4%	98.0%
<b>PoznanStreet</b>	0.00%	0.00%	0.00%	99.8%	98.7%	97.1%	91.8%
<b>UndoDancer</b>	0.00%	0.03%	0.03%	97.1%	95.9%	96.6%	94.0%
<b>1024x768</b>	0.00%	0.00%	0.00%	96.1%	96.6%	96.4%	94.5%
<b>1920x1088</b>	0.00%	0.04%	0.03%	97.6%	96.8%	96.8%	94.7%
<b>average</b>	<b>0.00%</b>	<b>0.02%</b>	<b>0.01%</b>	<b>97.0%</b>	<b>96.7%</b>	<b>96.6%</b>	<b>94.6%</b>

## ■ Thank HHI for crosscheck (JCT3V-C0147)



# Thanks!