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# JCT3V-E0125: CE2.h: Derived disparity vector for 3D-HEVC

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# Summary

- A follow-up proposal of JCT3V-D0194
  - A derived disparity vector is maintained and updated after one CU
  - DDV is reset to zero at the beginning of each coding tree block (CTB) row
- No need to store the implicit disparity vectors in NBDV process
- Simulation results report 0.05% coding gain for synthesized views for BVSP off case and 0.02% coding loss under CTC.

# Background

## ■ NBDV in 3D-HEVC

- Check whether a temporal neighbouring block has a disparity motion vector in pre-defined order
- Check whether a spatial neighbouring block (same as those used in merge) has a disparity motion vector
- Check whether a spatial neighbouring block (in a different checking order) has an implicit disparity motion vector and it is coded as the skip mode
  - Implicit disparity motion vector: if one PU uses the DV to derive a merge candidate and the derived candidate is finally selected, the DV is stored and called implicit disparity motion vector

## ■ Refinement of the DV derived from NBDV

- Access the depth view of coded base-view located by the DV from NBDV and convert one selected depth value to disparity vector

## ■ Problem

- IDVs may slightly increase the storage

# Proposed method

- A single Derived Disparity Vector (DDV) is maintained for the whole slice.
  - At the beginning of decoding one slice, DDV is initialized to be a zero motion vector.
  - **Before decoding the first CU in a new CTB row, DDV is reset to (0, 0).**
  - After each CU is decoded, the DDV is updated to be the derived disparity vector of that CU.
- Changes to NBDV
  - If no available disparity motion vector is found from the temporal/spatial neighboring blocks, DDV is returned as the result of NBDV.

# Simulation results

## ■ Results

- Platform: HTM 7.0r1
- Test conditions: CTC

Table 1: 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	0.22%	0.29%	0.11%	0.10%	0.05%
Kendo	0.44%	0.32%	0.15%	0.16%	0.11%
Newspapercc	0.21%	0.12%	0.06%	0.06%	-0.23%
GhostTownFly	0.07%	0.14%	0.02%	0.02%	0.03%
PoznanHall2	-0.08%	0.02%	-0.02%	-0.03%	0.04%
PoznanStreet	0.11%	0.27%	0.05%	0.04%	0.05%
UndoDancer	0.12%	0.03%	0.02%	0.01%	0.09%
1024x768	0.29%	0.25%	0.11%	0.11%	-0.02%
1920x1088	0.06%	0.11%	0.02%	0.01%	0.05%
<b>average</b>	0.16%	0.17%	0.05%	0.05%	<b>0.02%</b>

# Simulation results

## ■ Results

- Platform: HTM 7.0r1
- Test conditions: CTC with BVSP and Do-NBDV off

Table 2: 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	0.18%	-0.57%	-0.09%	-0.08%	-0.12%
Kendo	0.08%	-0.11%	-0.01%	-0.02%	0.01%
Newspapercc	-0.49%	-0.67%	-0.24%	-0.19%	-0.21%
GhostTownFly	-0.08%	0.17%	0.01%	0.02%	-0.01%
PoznanHall2	0.29%	-0.46%	-0.02%	-0.01%	-0.10%
PoznanStreet	0.02%	0.18%	0.02%	0.02%	0.07%
UndoDancer	0.14%	-0.05%	0.00%	0.00%	0.01%
1024x768	-0.08%	-0.45%	-0.11%	-0.10%	-0.11%
1920x1088	0.09%	-0.04%	0.00%	0.01%	-0.01%
<b>average</b>	0.02%	-0.22%	-0.05%	-0.04%	<b>-0.05%</b>

# Simulation results

- JCT3V-E0125 vs JCT3V-D0194

Table 3: Coding gain under CTC

	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
1024x768	0.02%	0.02%	0.01%	0.00%	0.00%
1920x1088	0.00%	0.01%	0.00%	0.00%	0.00%
average	0.01%	0.01%	0.00%	0.00%	0.00%

Table 4: Coding gain under CTC with BVSP off

	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
1024x768	0.02%	0.00%	0.00%	0.00%	0.00%
1920x1088	0.00%	-0.01%	0.00%	0.00%	0.00%
average	0.01%	-0.01%	0.00%	0.00%	0.00%

- Thanks NTT for the cross-check (JCT3V-E0218 )

# Thank you!