

JVET-N0484

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Problem statement

- DMVR and BDOF are expensive process for decoder
- DMVR and BDOF are **BOTH** applied to a CU when
 - CU height > 4
 - CU size ≥ 64
 - Merge mode but not MMVD, sub-block or triangle partition mode
 - Bi-prediction with equal distance from current picture to two reference pictures

Sequentially applying both tools is expensive for hardware implementation

➡ It is proposed to apply only one of DMVR and BDOF to a CU



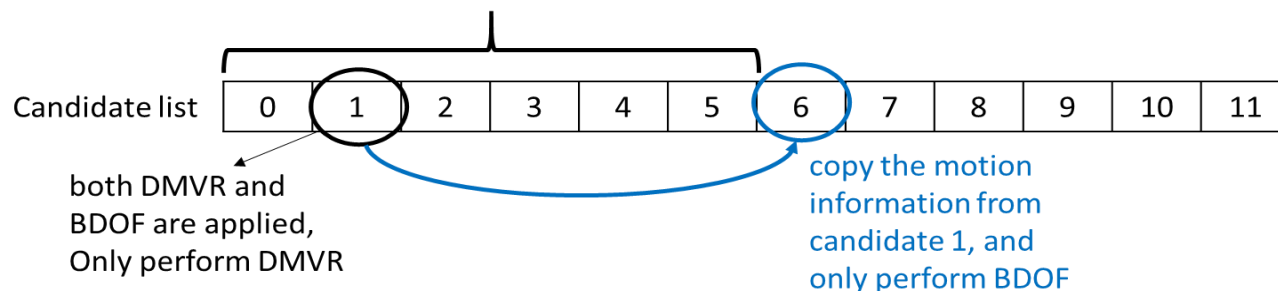
Method 1: Implicit derivation

- Disabling DMVR for a narrow-and-tall or wide-and-flat CU
 - When $\max(\text{width} / \text{height}, \text{height} / \text{width}) > \text{threshold}$, BDOF is applied
 - Otherwise, DMVR and BDOF are applied
 - Threshold is set to 4 or 8

Method 2: Explicit signaling

- Using merge index to indicate which one is applied to a CU
 - Increasing 6 **virtual** merge candidates
 - Keeping **the same complexity** for merge list construction as VVC
 - Duplicating merge candidate when DMVR and BDOF are both performed;
 - The original merge candidate only perform DMVR
 - The duplicated merge candidate only perform BDOF

the same derivation process as VVC draft 4



Simulation results (Method 1)

Threshold = 8

		Random Access			
	Y	U	V	EncT	DecT
Class A1	0.00%	0.03%	-0.02%	102%	101%
Class A2	0.01%	0.06%	0.04%	102%	102%
Class B	0.00%	0.01%	-0.01%	101%	101%
Class C	0.00%	-0.06%	-0.06%	101%	101%
Overall	0.00%	0.01%	-0.02%	101%	101%
Class D	-0.01%	-0.01%	-0.01%	102%	102%
Class F	-0.01%	-0.01%	-0.04%	101%	101%

Threshold = 4

		Random Access			
	Y	U	V	EncT	DecT
Class A1	0.02%	0.02%	0.03%	101%	102%
Class A2	0.03%	0.07%	0.07%	101%	102%
Class B	0.03%	0.02%	0.00%	100%	101%
Class C	0.03%	0.04%	-0.07%	100%	101%
Overall	0.03%	0.03%	0.00%	100%	101%
Class D	0.04%	-0.06%	-0.01%	101%	102%
Class F	0.00%	0.03%	-0.01%	100%	101%



Simulation results (Method 2)

	Random Access				
	Y	U	V	EncT	DecT
Class A1	0.30%	0.19%	0.17%	101%	98%
Class A2	0.62%	0.30%	0.20%	101%	98%
Class B	0.41%	0.26%	0.22%	100%	96%
Class C	0.49%	0.37%	0.32%	101%	93%
Overall	0.45%	0.28%	0.23%	101%	96%
Class D	0.72%	0.38%	0.33%	101%	91%
Class F	0.19%	0.09%	0.08%	100%	95%

Conclusion

- Two methods to solve sequentially process of DMVR and BDOF
- Suggest to further study in CE
 - Method 1 with threshold set to 4
 - Method 2

