



Be Original.

CE9-related: Early termination for BD OF JVET-N0148

SHARP CORPORATION

Takeshi Chujoh and Tomohiro Ikai

- Buffing delay of the CU based early termination for BDOF was indicated at the Marrakesh Meeting.
- In this contribution, an early termination for BDOF by using SAD value of DMVR is proposed.
- As experimental results, there was no loss and 1% of encoding and decoding times were improved.
 - If early termination of BDOF was removed, there was no loss and encoding and decoding time were not increased.
- N0097 (MediaTeK), N0158 (KDDI), N0296(Itteam) and N0508 (Sony) have same concept.

- One word is replaced and 4 lines are added

8.5.3 Decoder side motion vector refinement process

8.5.3.1 General

- If `sadList[4]` is greater than or equal to `sbHeight * sbWidth`, the following applies:
 - The variable `bestIdx` is derived by invoking the array entry selection process specified in clause 8.5.3.4 with the list `sadList[i]` with $i = 0..8$ as input.
 - If `sadList[bestIdx]` is greater than or equal to `sbHeight*sbWidth*2`, `bdofApply[xSb][ySb]` is set equal to 1.
 - Otherwise `bdofApply[xSb][ySb]` is set equal to 0.
- Otherwise `bdofApply[xSb][ySb]` is set equal to 1.

By using `sadList` of DMVR,
decide whether BDOF is
on or off

8.5.7 Decoding process for inter blocks

8.5.7.1 General

- If all of the following conditions are true, `bdofFlag` is set equal to TRUE.
 - `sps_bdof_enabled_flag` is equal to 1.
 - :
 - `bdofApply[xSbIdx][ySbIdx]` is equal to 1.
- Otherwise, `bdofFlag` is set equal to FALSE.

- 1% of encoding and decoding times were improved.
- There was no loss on average.

	Random Access Main 10				
	Over VTM-4.0				
	Y	U	V	EncT	DecT
Class A1	0.00%	0.03%	-0.01%	99%	99%
Class A2	0.00%	0.05%	0.03%	99%	99%
Class B	0.01%	-0.04%	-0.01%	99%	99%
Class C	0.00%	-0.05%	-0.05%	100%	99%
Class E					
Overall	0.00%	-0.01%	-0.01%	99%	99%
Class D	0.00%	0.00%	0.02%	100%	100%
Class F	0.00%	0.00%	0.01%	100%	97%

- Disable all early terminations of BDOF
 - Decoding times were increased.

	Random Access Main 10				
	Over VTM-4.0				
	Y	U	V	EncT	DecT
Class A1	-0.02%	0.04%	0.02%	100%	107%
Class A2	-0.04%	0.02%	0.05%	100%	107%
Class B	-0.02%	-0.03%	0.01%	100%	108%
Class C	-0.01%	-0.04%	-0.05%	100%	108%
Class E					
Overall	-0.02%	-0.01%	0.00%	100%	108%
Class D	-0.02%	-0.01%	-0.07%	100%	106%
Class F	-0.01%	0.00%	0.04%	101%	116%

- Disable early termination of BDOF + N0148
- There was no loss and encoding and decoding times were not changed.

	Random Access Main 10				
	Over VTM-4.0				
	Y	U	V	EncT	DecT
Class A1	-0.04%	-0.03%	0.01%	101%	99%
Class A2	-0.03%	-0.01%	0.06%	100%	99%
Class B	-0.01%	0.00%	-0.01%	100%	100%
Class C	-0.01%	0.00%	-0.07%	101%	100%
Class E					
Overall	-0.02%	-0.01%	-0.01%	100%	100%
Class D	0.00%	-0.08%	-0.10%	101%	100%
Class F	-0.01%	-0.02%	-0.01%	100%	97%

- In this contribution, we proposed an early termination for BDOF by using SAD value of DMVR
 - No additional matching process
- As experimental results, there was no loss and 1% of encoding and decoding times were improved.
 - If early termination of BDOF has been removed, there is no loss and encoding and decoding time were not increased.
- Recommend to fix this change to WD and VTM software.
- Thank Kondo-san (Sony, JVET-N0549) for cross-checking.

SHARP

Be Original.

