

CE1.2.0.10: CU partitioning along picture boundaries (JVET-K0224)

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Overall Summary

- The proposed method supports to select either quadtree (QT) split or binary-tree (BT) split for partitioning the out-of-bounds coding units (CUs), which are not entirely contained within the current picture region
 - Involved minor modifications to the current partitioning rules for handling the regular in-bounds CUs
 - No additional constraints for processing in-bounds CUs split from a out-of-bound CTU
- Achieved average luma BD-rates
 - -0.05%, -0.30%, and -0.49% for the AI, RA, and LB, respectively, under the VTM-1.0 CTCs
 - -0.05%, -0.34%, and -0.67% for the AI, RA, and LB, respectively, under the BMS-1.0 CTCs

Proposed Method

- When a CU corresponds to a region across a current frame boundary, it is inferred to be further split
- QT split is inferred
 - The current CU is across both the right picture boundary and the bottom picture boundary or
 - The current CU size is larger than the maximum allowed CU size for BT split
- BT split is inferred
 - BT/TT depth of the current CU is larger than zero or
 - The QT depth of the current CU is not less than the maximum allowed QT depth
 - Horizontal split is inferred if the current CU is across the bottom picture boundary, and vertical split is inferred if the current CU is across the right picture boundary

Simulation Results

	All Intra Main10									
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.03%	-0.09%	-0.08%	100%	100%	-0.04%	-0.15%	-0.12%	100%	102%
Class A2	-0.03%	-0.04%	-0.03%	101%	100%	-0.02%	-0.05%	-0.04%	100%	101%
Class B	-0.09%	-0.26%	-0.25%	100%	99%	-0.10%	-0.32%	-0.30%	100%	101%
Class C	0.00%	0.00%	0.00%	100%	100%	0.00%	0.00%	0.00%	100%	100%
Class E	-0.06%	-0.08%	-0.07%	100%	99%	-0.08%	-0.12%	-0.10%	101%	102%
Overall	-0.05%	-0.11%	-0.10%	100%	100%	-0.05%	-0.14%	-0.12%	100%	101%
Class D	-0.03%	-0.05%	-0.07%	101%	99%	-0.05%	-0.08%	-0.07%	101%	101%
Class F (optional)	-0.03%	-0.08%	-0.11%	100%	100%	-0.03%	-0.11%	-0.11%	101%	100%
	Random Access Main 10									
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.37%	-0.46%	-0.36%	100%	100%	-0.37%	-0.72%	-0.52%	102%	99%
Class A2	-0.12%	-0.15%	-0.11%	100%	100%	-0.14%	-0.16%	-0.12%	101%	100%
Class B	-0.57%	-0.70%	-0.70%	101%	98%	-0.68%	-0.96%	-0.82%	102%	100%
Class C	-0.04%	-0.04%	-0.05%	102%	100%	-0.03%	-0.04%	-0.01%	102%	99%
Class E										
Overall	-0.30%	-0.37%	-0.34%	101%	99%	-0.34%	-0.51%	-0.40%	102%	99%
Class D	-0.23%	-0.12%	-0.25%	104%	99%	-0.30%	-0.57%	-0.27%	105%	100%
Class F (optional)	-0.10%	-0.14%	-0.16%	101%	98%	-0.18%	-0.21%	-0.17%	102%	100%
	Low delay B Main10									
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1										
Class A2										
Class B	-0.59%	-0.86%	-0.81%	102%	99%	-0.69%	-1.21%	-0.81%	104%	101%
Class C	-0.04%	-0.04%	0.00%	100%	99%	-0.05%	0.14%	-0.14%	102%	100%
Class E	-0.93%	-0.84%	-0.92%	102%	99%	-1.46%	-1.37%	-1.13%	103%	99%
Overall	-0.49%	-0.58%	-0.57%	101%	99%	-0.67%	-0.80%	-0.67%	103%	100%
Class D	-0.23%	-0.46%	-0.71%	103%	98%	-0.43%	0.14%	-0.26%	104%	99%
Class F (optional)	-0.28%	-0.47%	-0.44%	101%	98%	-0.20%	0.14%	0.09%	102%	100%

Conclusions

- The experimental results show that the proposed method can substantially improve efficiency in compression with only minor modifications to the existing CU partitioning rules for handling the out-of-bounds CUs
- The improvement is more significant for coding the test sequences in HD resolution.