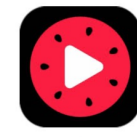


JVET-AE0257

Non-EE2: Peak Memory Reduction for ECM

Wenbin Yin, Kai Zhang, Li Zhang,
Bytedance Inc.



Summary

■ Motivation

- Co-Variance Matrix Require a Huge Memory Cost at Encoder Side
- Reduce Memory Cost for ECM

■ Proposed Solution

- Enlarge Filtering Unit Size for ALF
- Enlarge Filtering Unit Size for CCALF

ALF and CCALF in ECM-9.0

■ ECM-9.0 Memory Cost

- 4K Sequence May Require up to 24GB at Encoder in RA

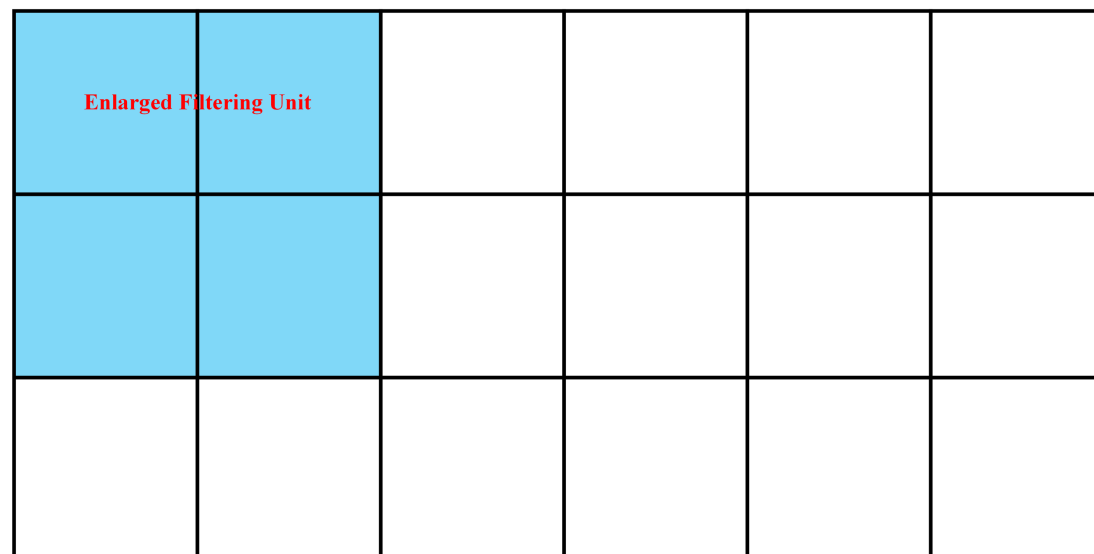
■ Luma-ALF, Chroma-ALF, CCALF

- Need to Build Up Co-Variance Matrix for each CTU for each Encoder Selection Candidate
- Luma-ALF need to Consider Different Classifiers, Fix-Filter-Sets
- Chroma-ALF need to Consider Different Alternative Settings
- CCALF need to Consider Each Chroma Component Independently

Proposed Methods

■ ALF and CCALF

- Allow the Filtering Unit Size Larger than the CTU
- A SPS Flag is Signaled to Control the Proposed Method
- Signal Parameter/Indications for Each Filtering Unit
- Reduce Memory Cost at Encoder from 23.2GB to 19.6GB for 4K in RA



Simulation Results

- Anchor is ECM-9.0
- Table Shows the Performance of the Proposed Method

	RA				
	Y	U	V	EncT	DecT
Class-A1	0.06%	0.09%	0.41%	99.1%	100.2%
Class-A2	*0.04%	0.31%	0.64%	98.6%	99.7%
Class-B	0.00%	0.00%	0.00%	99.9%	100.0%
Class-C	0.00%	0.00%	0.00%	99.7%	99.9%
Class-E					
Overall	*0.02%	0.08%	0.21%	99.4%	99.9%
Class-D	0.00%	0.00%	0.00%	100.0%	100.2%
Class-F	0.00%	0.00%	0.00%	100.4%	100.4%

Conclusion

- Memory Reduction for ECM is Proposed by Enlarging Filtering Unit for ALF/CCALF
- Reduction of Memory Cost at Encoder
- Very Limited Coding Performance Impact with Reduced Encoding Time
- Recommended to Include into ECM and CTC
- Thanks Sharp for Cross-Checking

Thanks!