

JCTVC-F542

ALF with low latency and reduced complexity for HEVC

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Summary

- ALF independently for each sub-block (64x64 or 128x128)
- Allows for sub-frame delay
- Single-pass
- No variance classes
- 5x5 diamond-shaped pixel matrix
- No temporal coding of coefficients
- Significant reduction in code size (~10 000 -> ~400)
- BD-rate gains: 0.7% – 2.0%

Low latency ALF process

For each block (64x64 or 128x128):

- Estimate ALF coefficients
(5x5 diamond shape, no classification)
- RDO-decision for ALF on or off (one bit).
- If ALF on
 - Quantize and transmit coefficients
(6 out of 7 unique coefficients, UVLC + sign)
 - Apply quantized coefficients

Results – HM3.0 ALF

- Anchor: LC configuration
- Test: LC configuration, HM3.0 ALF

Class	AI	RA	LB
Class A	-3.8	-6.2	-4.8
Class B	-2.2	-4.3	-3.8
Class C	-2.0	-3.0	-2.5
Class D	-0.9	-2.7	-6.0
Class E	-3.3		
Average	-2.4	-4.1	-4.2

Results - low latency ALF (64x64)

- Anchor: LC configuration
- Test: LC configuration, low latency ALF

Class	AI	RA	LB
Class A	-1.3	-1.5	
Class B	-0.6	-0.9	-1.1
Class C	-0.7	-1.0	-1.8
Class D	-0.3	-1.0	-0.9
Class E	-0.9		0.0
Average	-0.7	-1.1	-1.0

Results - low latency ALF (128x128)

- Anchor: LC configuration
- Test: LC configuration, low latency ALF

Class	AI	RA	LB
Class A	-2.0	-3.2	
Class B	-1.1	-2.0	-2.3
Class C	-0.7	-1.4	-1.9
Class D	-0.2	-1.3	-1.0
Class E	-1.5		-3.1
Average	-1.1	-2.0	-2.0

Conclusion

- Block-based ALF with sub-frame delay
- Significant simplification
- BD-rate gains: 0.7% - 2.0%
- Proposal: To study further in a CE