

Non-RCE1: On MV resolution and motion vector predictor number

JCTVC-Q0067

G. Laroche, T. Poirier, C. Gisquet,

P. Onno

17th Meeting: Valencia, ES, 27 March – 4 April 2014

RCE1: Adaptive MV resolution

- JCTVC–Q0155: Adaptive MV resolution at Slice/Frame level
 - Inter
 - Merge
 - Merge Skip

- JCTVC–Q0049: Adaptive MV resolution at CU level
 - Inter
 - Merge
 - Merge Skip

Proposal

- Adaptive MV resolution at PU level:
 - Inter
- Use only one predictor for integer-pel
 - No *mvp_lx_flag* transmitted
- No rounding of MV predictor when *mvd_l1_zero_flag* is on
- Signaling: *pu_imv_flag*
 - CABAC no neighboring dependencies.

Experimental results

- Test 1: Proposed modifications with a **full estimation**
 - 2x MV estimation + CU residual
- Test 2: Proposed modifications with a « **fast** » estimation
 - 2x MV estimation when the 1st MV estimation obtains a $MV \neq (0,0)$
- Test 3: Test 2 without normative changes
- Test 4: Test 2 with 2 predictors for AMVP
 - (Adaptive MV res at PU level)

Experimental results AhG8

■ Anchor: Rext 6.0

	MV RES Inter/ AMVP PU	1 Pred	Fast Estimation	Average BDR	Average BDR +optional	Enc Time	Dec Time
Test 1	✓	✓		-1.6%	-2.1%	120%	95%
Test 2	✓	✓	✓	-1.1%	-1.7%	110%	94%
Test 3	✓		✓	-0.7%	-1.1%	110%	98%
Test 4			✓	-0.1%	-0.1%	110%	99%
RCE1 Test2 MV1				-0.6%	-0.7	148%	101%
RCE1 Test2 MV2				-0.9%	-1.2%	142%	95%

Experimental results AhG8

■ Test 2

	Random Access Main-tier			Random Access High-tier		
	Y	U	V	Y	U	V
Class F	-1.4%	-1.5%	-1.5%	-1.2%	-1.3%	-1.3%
Class B	-0.6%	-0.6%	-0.6%	-0.4%	-0.3%	-0.3%
RGB 4:4:4 SC	-1.4%	-1.4%	-1.4%	-1.3%	-1.3%	-1.3%
RGB 4:4:4 Animation	-1.5%	-1.6%	-1.8%	-1.2%	-1.3%	-1.4%
YCbCr 4:4:4 SC	-1.3%	-1.3%	-1.3%	-1.2%	-1.2%	-1.2%
YCbCr 4:4:4 Animation	-1.8%	-1.8%	-1.8%	-1.2%	-1.3%	-1.3%
RangeExt	-0.4%	-0.6%	-0.7%	-0.2%	-0.1%	-0.3%
RGB 4:4:4 SC (Optional)	-2.1%	-2.1%	-2.1%	-2.0%	-1.9%	-1.9%
YCbCr 4:4:4 SC (Optional)	-2.8%	-2.3%	-2.3%	-2.7%	-2.4%	-2.4%
Enc Time[%]	108%			108%		
Dec Time[%]	94%			95%		
	Low delay B Main-tier			Low delay B High-tier		
	Y	U	V	Y	U	V
Class F	-1.7%	-1.5%	-1.4%	-1.4%	-1.3%	-1.2%
Class B	-0.6%	-0.5%	-0.1%	-0.3%	-0.3%	-0.2%
RGB 4:4:4 SC	-2.0%	-1.9%	-2.0%	-1.6%	-1.6%	-1.6%
RGB 4:4:4 Animation	-1.4%	-1.3%	-1.3%	-1.2%	-1.0%	-1.0%
YCbCr 4:4:4 SC	-2.3%	-2.3%	-2.1%	-2.0%	-1.9%	-2.0%
YCbCr 4:4:4 Animation	-1.1%	-1.5%	-1.3%	-0.8%	-1.2%	-1.0%
RangeExt	-0.3%	-0.5%	-0.5%	-0.1%	-0.1%	-0.1%
RGB 4:4:4 SC (Optional)	-4.7%	-4.6%	-4.7%	-3.8%	-3.7%	-3.7%
YCbCr 4:4:4 SC (Optional)	-5.5%	-5.2%	-5.1%	-5.6%	-5.4%	-5.3%
Enc Time[%]	112%			111%		
Dec Time[%]	93%			94%		

Experimental results AhG5

■ Test 1

	Random Access Main-tier			Random Access High-tier		
	Y	U	V	Y	U	V
RGB 4:4:4	-1.0%	-0.9%	-1.0%	-0.7%	-0.6%	-0.8%
YCbCr 4:4:4	-0.9%	-1.4%	-1.3%	-0.6%	-0.8%	-1.0%
YCbCr 4:2:2	-0.5%	-0.8%	-0.8%	-0.4%	-0.4%	-0.5%
Enc Time[%]	118%			116%		
Dec Time[%]	98%			98%		
	Low delay B Main-tier			Low delay B High-tier		
	Y	U	V	Y	U	V
RGB 4:4:4	-1.8%	-1.4%	-1.8%	-1.3%	-0.8%	-1.3%
YCbCr 4:4:4	-0.8%	-1.2%	-1.2%	-0.6%	-0.8%	-1.0%
YCbCr 4:2:2	-0.5%	-0.8%	-0.6%	-0.4%	-0.4%	-0.5%
Enc Time[%]	121%			119%		
Dec Time[%]	96%			97%		

Experimental results AhG5

■ Test 2

	Random Access Main-tier			Random Access High-tier		
	Y	U	V	Y	U	V
RGB 4:4:4	-0.5%	-0.4%	-0.4%	-0.2%	-0.2%	-0.3%
YCbCr 4:4:4	-0.7%	-0.8%	-0.9%	-0.4%	-0.4%	-0.5%
YCbCr 4:2:2	-0.4%	-0.6%	-0.5%	-0.2%	-0.3%	-0.3%
Enc Time[%]	109%			108%		
Dec Time[%]	98%			98%		
	Low delay B Main-tier			Low delay B High-tier		
	Y	U	V	Y	U	V
RGB 4:4:4	-0.6%	-0.3%	-0.5%	-0.3%	-0.1%	-0.2%
YCbCr 4:4:4	-0.5%	-0.6%	-0.6%	-0.2%	-0.2%	-0.3%
YCbCr 4:2:2	-0.3%	-0.5%	-0.4%	-0.1%	-0.1%	-0.2%
Enc Time[%]	114%			112%		
Dec Time[%]	97%			98%		

Conclusion

■ Proposal:

- Adaptive MV resolution at **PU** level
- 1 predictor when Inter-pel

■ Results:

- Higher gains with less complexity than RCE1 tests.
- Systematic gain for natural sequences

■ Recommend to adopt this Adaptive MV resolution a PU level with only one predictor for Integer pel.