

JCTVC-L0193

Base Layer residue upsampling and skip mode

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technicolor



Objectives and Performances

Objectives

- Alternative to GRP
- Reduced complexity (single MC)

Performances

- Marginal gain vs SVC_MVP hook

SMUC 0.1.1 and SVC_MVP

SVC_MVP

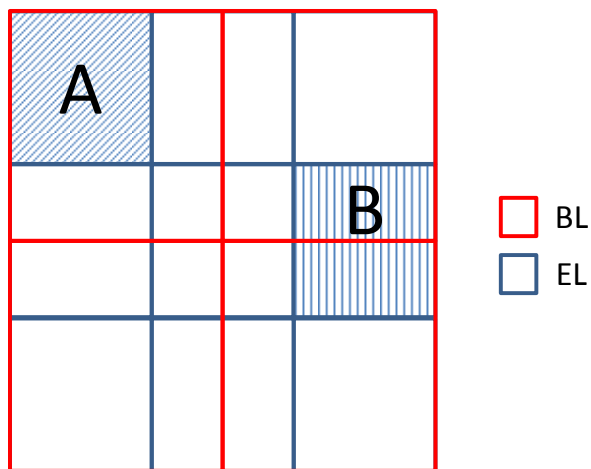
- Find the colocated PU in the base layer
- If this base layer PU is not in Intra or Intra_BL mode, upscaled colocated BL MV is added in first position into the MV candidate list

Current proposal

- Add upscaled BL residual to this upscaled BL MV
- Enable and signal this mode only for specific configurations

Single or Multiple PUs in the BL

- Depending on the geometric considerations and decisions at the BL layer, the EL block overlaps a single BL block (case A) or multiple BL blocks (case B)



Upscaled BL MV consistency

Case A : Single PU in the BL

- If the BL block is coded in Intra mode
 - No upscaled BL MV is available
- If the BL block is coded in Inter mode, consider the upsampled BL residue :
 - $\text{Pred} = \text{MC}(\text{Ref}_{\text{EL}}, \text{Upscale}(\text{MV}_{\text{BL}})) + \text{Upscale}(\text{Residue}_{\text{BL}})$
 - →simplified GRP

Case B : Multiple PU in BL

- Expected that the BL MV and references of these multiple PU are different. In this case, the BL residues are not coherent with the chosen BL MV.
 - ignore the residue : bit saving since no need to transmit whether upsampled BL residue is used or not

Results

SVC_MVP vs SMUC 0.1.1

	RA HEVC 2x			RA HEVC 1.5x		
	Y	U	V	Y	U	V
Class A	-0.9%	-2.0%	-1.9%			
Class B	-1.8%	-2.9%	-3.2%	-1.8%	-2.9%	-3.2%
Overall (EL+BL)	-1.6%	-2.7%	-2.8%	-1.8%	-2.9%	-3.2%
Overall (EL)	-4.1%	-6.5%	-6.9%	-5.0%	-7.5%	-8.1%
Enc Time[%]	95.4%			94.2%		
Dec Time[%]	101.6%			101.1%		
Enc Mem[%]	-			-		
BL Match	Matched			Matched		

	LD-P HEVC 2x			LD-P HEVC 1.5x		
	Y	U	V	Y	U	V
Class A	-0.1%	-0.7%	-0.6%			
Class B	-0.8%	-1.5%	-1.7%	-0.8%	-1.5%	-1.7%
Overall (EL+BL)	-0.6%	-1.3%	-1.4%	-0.8%	-1.5%	-1.7%
Overall (EL)	-1.4%	-2.7%	-2.9%	-1.9%	-3.3%	-3.6%
Enc Time[%]	96.2%			95.4%		
Dec Time[%]	98.6%			101.8%		
Enc Mem[%]	-			-		
BL Match	Matched			Matched		

Proposal vs SMUC 0.1.1

	RA HEVC 2x			RA HEVC 1.5x		
	Y	U	V	Y	U	V
Class A	-0.9%	-2.0%	-1.9%			
Class B	-1.8%	-3.0%	-3.3%	-1.8%	-3.0%	-3.3%
Overall (EL+BL)	-1.6%	-2.7%	-2.9%	-1.8%	-3.0%	-3.3%
Overall (EL)	-4.1%	-6.7%	-7.2%	-5.0%	-7.7%	-8.5%
Enc Time[%]	96.0%			94.4%		
Dec Time[%]	129.3%			129.9%		
Enc Mem[%]	-			-		
BL Match	Matched			Matched		

	LD-P HEVC 2x			LD-P HEVC 1.5x		
	Y	U	V	Y	U	V
Class A	-0.1%	-0.8%	-0.6%			
Class B	-0.9%	-1.6%	-1.7%	-0.9%	-1.6%	-1.7%
Overall (EL+BL)	-0.6%	-1.3%	-1.4%	-0.9%	-1.6%	-1.7%
Overall (EL)	-1.5%	-2.8%	-3.1%	-2.0%	-3.4%	-3.8%
Enc Time[%]	96.8%			95.5%		
Dec Time[%]	128.1%			131.3%		
Enc Mem[%]	-			-		
BL Match	Matched			Matched		

Conclusion

- Current proposal allows to add upsampled BL residue when upscaled MV BL is chosen as MVP
- Signalization of this mode is conditional to the overlapping of current block and BL PUs
- Gain vs SMUC 0.1.1 anchor varies from 0.6% to 3.3%
- Gain is limited to 0.1% (best case) vs SVC_MVP configuration

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Implementation in Skip mode

