

JCTVC-L0103

Inter-layer inferred prediction mode and motion compensation restrictions in SHVC

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Proposal overview

■ TE 5.3.3 interlayer base mode:

- Inherit motion from current reference layer frame
- Base Mode is a flag located just after the skip flag
- Coefficient coding is done as if intra
- Residual is computed using Generalized Residual Inter-Layer Prediction, i.e. DCT-IF interpolation

■ Modifications compared to TE 5.3.3

1. DCT-IF are replaced by bilinear in both enhancement and reference layers,
2. Motion syntax inheriting is performed on a 8x8 basis

Bilinear interpolation

■ Motion compensation in GRILP:

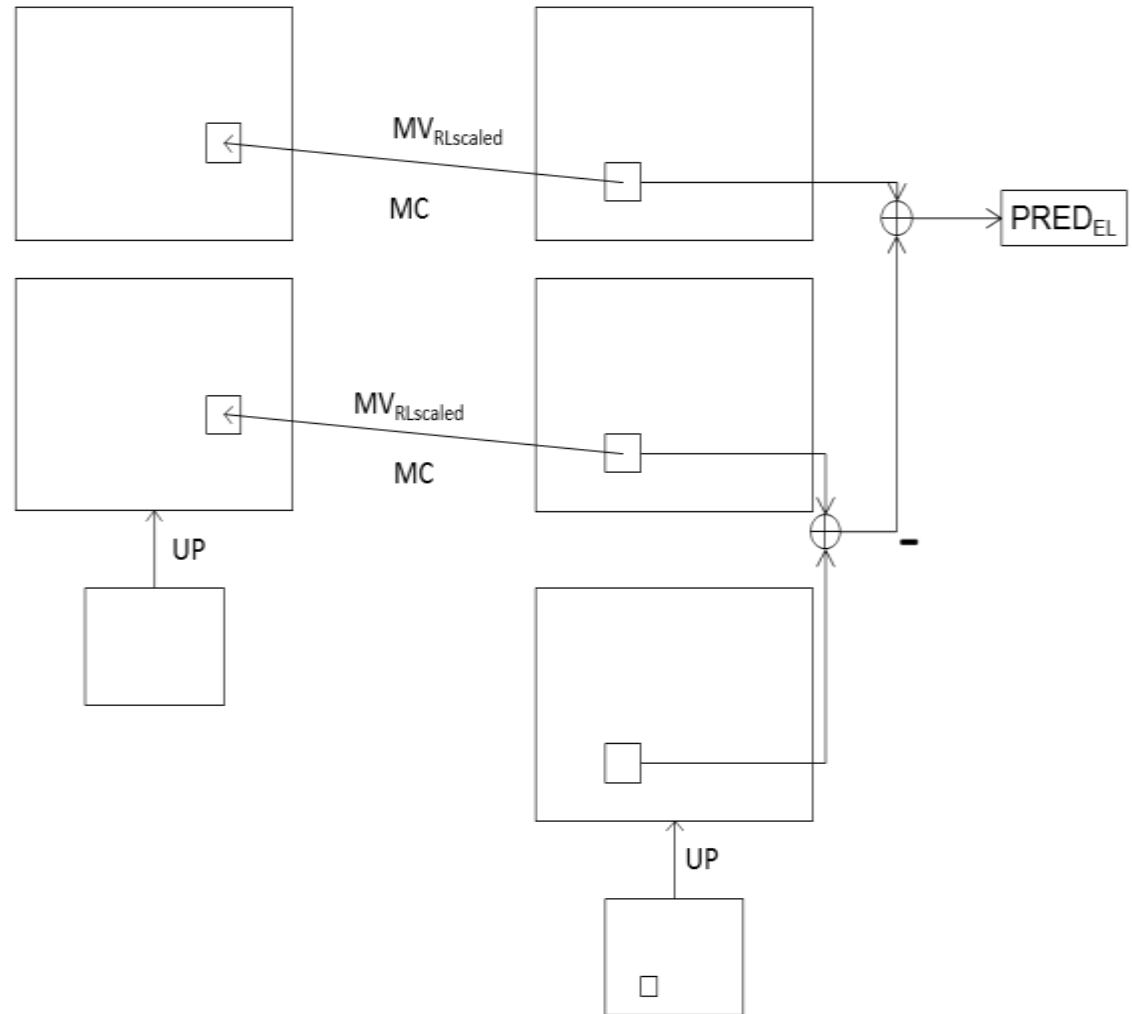
- Enhancement layer
- Reference layer

■ Base mode:

- Use scaled MV from reference layer

■ DCT-IF vs bilinear:

- Luma: 8 vs. 2 taps
- Chroma: 4 vs. 2 taps



Motion restriction in core HEVC

■ Issue with motion inheriting

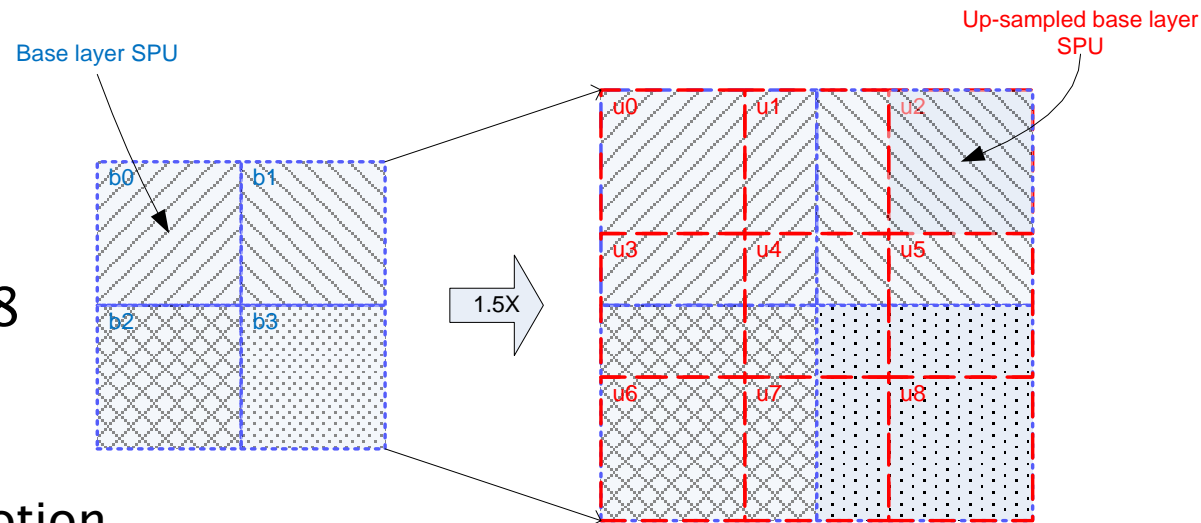
● Current minimal PU size:

- Unipred L0 or L1:
8x4 or 4x8
- Bipred: 8x8

● Case for ratio 1.5:

- b0, b1, b2, b3 are 8x8 bipred PUs
- What motion for u4?

- Potentially illegal motion
- Only one candidate among motions from b0, b1, b2 and b3
- Basically, fixing the lookup per 8x8 block
- Internal tests show little change by trying to produce 4x8 or 8x4 unipred PUs



Experiments results

■ TE 5.3.3

	RA HEVC 2x			RA HEVC 1.5x			RA HEVC SNR		
	Y	U	V	Y	U	V	Y	U	V
Class A	-3,7%	-8,4%	-7,8%				-3,8%	-9,9%	-10,0%
Class B	-3,0%	-4,9%	-5,4%	-3,7%	-5,9%	-6,8%	-3,3%	-4,3%	-5,1%
Overall (EL+BL)	-3,2%	-5,9%	-6,1%	-3,7%	-5,9%	-6,8%	-3,4%	-5,9%	-6,5%
Overall (EL)	-6,1%	-11,3%	-11,6%	-9,9%	-16,1%	-17,9%	-7,3%	-12,5%	-13,5%
Enc Time[%]		101,8%			99,6%			100,9%	
Dec Time[%]		135,1%			182,6%			137,3%	
Enc Mem[%]		#DIV/0!			#DIV/0!			#DIV/0!	
BL Match		Matched			Matched			Matched	

	LD-P HEVC 2x			LD-P HEVC 1.5x			LD-P HEVC SNR		
	Y	U	V	Y	U	V	Y	U	V
Class A	-2,8%	-5,8%	-5,3%				-3,7%	-6,9%	-6,6%
Class B	-2,5%	-2,9%	-3,0%	-3,0%	-3,9%	-3,9%	-3,2%	-3,2%	-3,6%
Overall (EL+BL)	-2,5%	-3,7%	-3,7%	-3,0%	-3,9%	-3,9%	-3,3%	-4,3%	-4,5%
Overall (EL)	-4,8%	-7,1%	-7,0%	-7,3%	-10,4%	-10,5%	-6,5%	-8,8%	-9,0%
Enc Time[%]		101,8%			99,7%			102,1%	
Dec Time[%]		132,5%			170,3%			130,4%	
Enc Mem[%]		#DIV/0!			#DIV/0!			#DIV/0!	
BL Match		Matched			Matched			Matched	

■ This proposal

	RA HEVC 2x			RA HEVC 1.5x			RA HEVC SNR		
	Y	U	V	Y	U	V	Y	U	V
Class A	-3,8%	-8,8%	-8,2%				-3,7%	-9,6%	-9,6%
Class B	-3,0%	-4,9%	-5,2%	-3,5%	-5,7%	-6,4%	-3,6%	-3,9%	-4,9%
Overall (EL+BL)	-3,3%	-6,0%	-6,1%	-3,5%	-5,7%	-6,4%	-3,7%	-5,5%	-6,2%
Overall (EL)	-6,3%	-11,5%	-11,5%	-9,1%	-15,6%	-17,0%	-7,6%	-12,1%	-13,1%
Enc Time[%]		100,7%			98,6%			100,4%	
Dec Time[%]		116,6%			117,8%			122,6%	
Enc Mem[%]		#DIV/0!			#DIV/0!			#DIV/0!	
BL Match		Matched			Matched			Matched	

	LD-P HEVC 2x			LD-P HEVC 1.5x			LD-P HEVC SNR		
	Y	U	V	Y	U	V	Y	U	V
Class A	-3,6%	-6,7%	-6,0%				-3,6%	-6,6%	-6,3%
Class B	-3,2%	-3,0%	-2,7%	-3,6%	-4,0%	-3,9%	-3,9%	-3,5%	-4,1%
Overall (EL+BL)	-3,4%	-4,1%	-3,7%	-3,6%	-4,0%	-3,9%	-3,8%	-4,4%	-4,7%
Overall (EL)	-6,1%	-7,9%	-7,2%	-8,2%	-10,9%	-10,7%	-7,0%	-8,8%	-9,2%
Enc Time[%]		101,3%			98,8%			101,4%	
Dec Time[%]		112,2%			117,5%			112,1%	
Enc Mem[%]		#DIV/0!			#DIV/0!			#DIV/0!	
BL Match		Matched			Matched			Matched	