

MV CODING OPTIMIZATIONS (JVET-C0068)

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SUMMARY



- › Three tools proposed for motion vector coding:
 - MV sign hiding
 - Prediction from one bi-predicted motion vector to the other
 - Half-pixel rounding for full-pixel motion vector prediction

- › Test Results:
 - -0.5/-0.5/-0.5 % YUV for RA
 - -0.1% / -0.2% / -0.1% luma gain for the tools separately

MV SIGN HIDING



- › Derive the sign of the a motion vectors x-component based on the magnitude of x and y, the PU size and the reference index

$\text{Sign}(x) = (\text{Magnitude}(x) \text{ XOR } \text{Magnitude}(y) \text{ XOR } \text{PartSize} \text{ XOR } \text{RefIdx}) \text{ AND } 0x01$

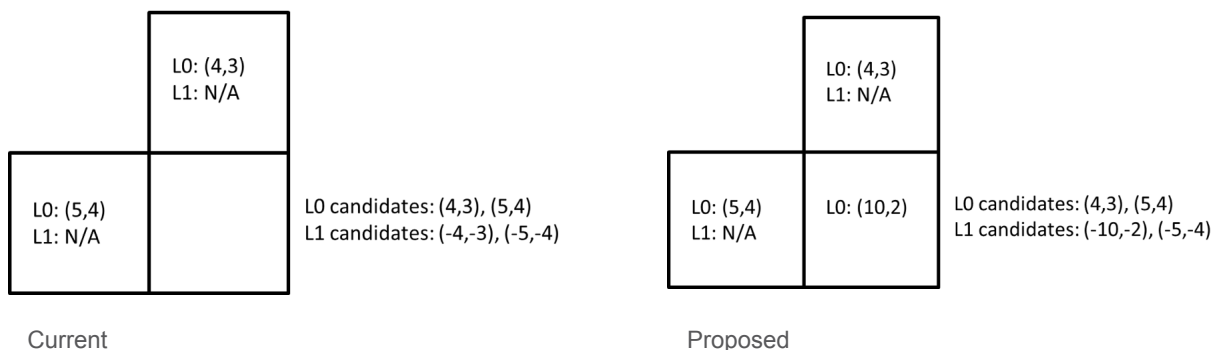
- › Results in checkerboard pattern of possible MVs, flipped by changing partSize or refIdx

	Random Access Main 10				
	Y	U	V	EncT	DecT
Class A1	-0,07%	0,07%	-0,23%	100%	97%
Class A2	-0,19%	-0,22%	-0,20%	101%	100%
Class B	-0,05%	0,06%	0,10%	100%	96%
Class C	-0,10%	-0,08%	-0,10%	100%	96%
Class D	-0,14%	-0,25%	-0,29%	100%	99%
Overall (Ref)	-0,11%	-0,09%	-0,14%	100%	98%

PREDICTION LIST CANDIDATE UPDATE



- › Add a scaled version of the first motion vector in a bi-prediction pair to the prediction list for second motion vector



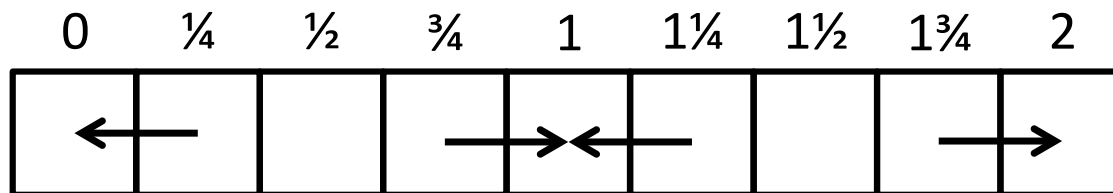
- › Also, switch MV reconstruction order based on the available prediction candidates.

		Random Access Main 10			
		Y	U	V	
		EncT	DecT		
Class A1		-0,11%	-0,03%	-0,15%	108% 106%
Class A2		-0,49%	-0,50%	-0,45%	112% 111%
Class B		-0,22%	-0,12%	-0,08%	107% 104%
Class C		-0,17%	-0,17%	-0,22%	107% 100%
Class D		-0,21%	-0,20%	-0,33%	106% 100%
Overall (Ref)		-0,24%	-0,20%	-0,24%	108% 104%

FULL- AND HALF-PIXEL CANDIDATE ROUNDING



- › When full-pixel motion coding is used, the second predictor is now rounded to half-pixel resolution
- › Rounding scheme prefers full-pixel positions to avoid filtering



		Random Access Main 10				
		Y	U	V	EncT	DecT
Class A1		-0,09%	-0,15%	-0,20%	106%	100%
Class A2		-0,22%	-0,17%	-0,02%	104%	101%
Class B		-0,04%	-0,07%	-0,04%	103%	97%
Class C		-0,06%	0,00%	-0,10%	103%	102%
Class D		-0,05%	-0,27%	-0,28%	102%	104%
Overall (Ref)		-0,09%	-0,13%	-0,13%	103%	100%

RESULTS AND PROPOSAL



	Random Access Main 10				
	Y	U	V	EncT	DecT
Class A1	-0,24%	-0,21%	-0,50%	124%	114%
Class A2	-0,86%	-0,88%	-0,79%	119%	110%
Class B	-0,40%	-0,40%	-0,26%	112%	97%
Class C	-0,38%	-0,27%	-0,46%	112%	99%
Class D	-0,40%	-0,48%	-0,55%	112%	100%
Overall (Ref)	-0,46%	-0,46%	-0,50%	115%	103%

	Low delay P Main10				
	Y	U	V	EncT	DecT
Class B	-0,11%	-0,12%	-0,17%	121%	109%
Class C	-0,07%	-0,15%	-0,22%	106%	101%
Class D	-0,18%	0,61%	0,17%	87%	86%
Class E	-0,09%	-0,07%	-0,10%	117%	108%
Overall (Ref)	-0,11%	0,07%	-0,09%	107%	101%

› We propose including these three modifications in JEM.



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