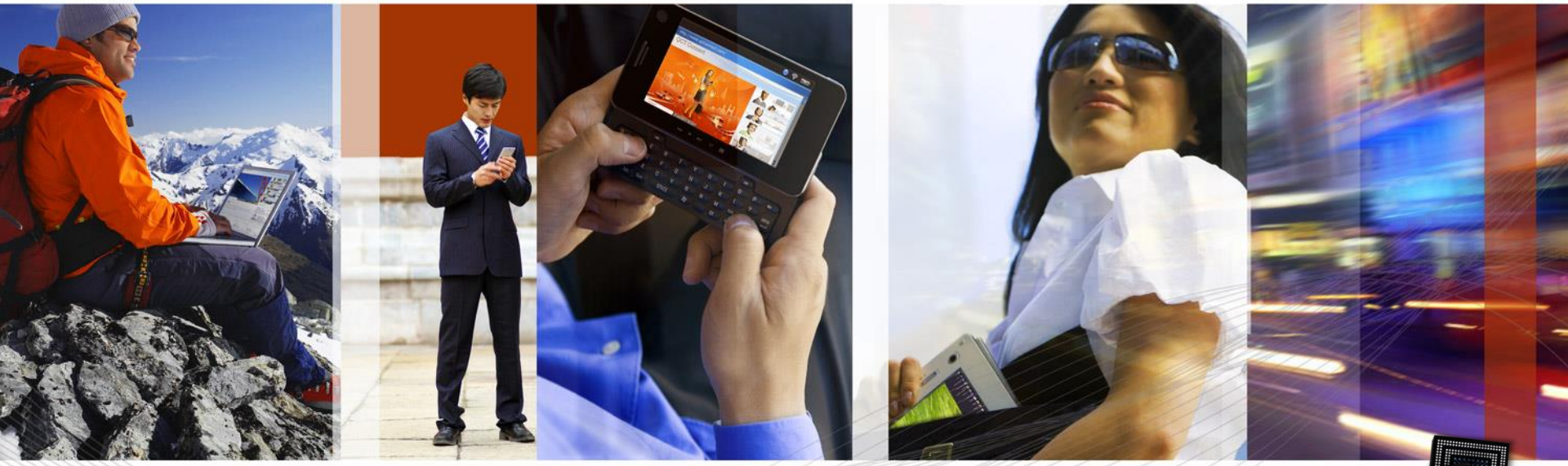


QUALCOMM CDMA Technologies

REDEFINING MOBILITY

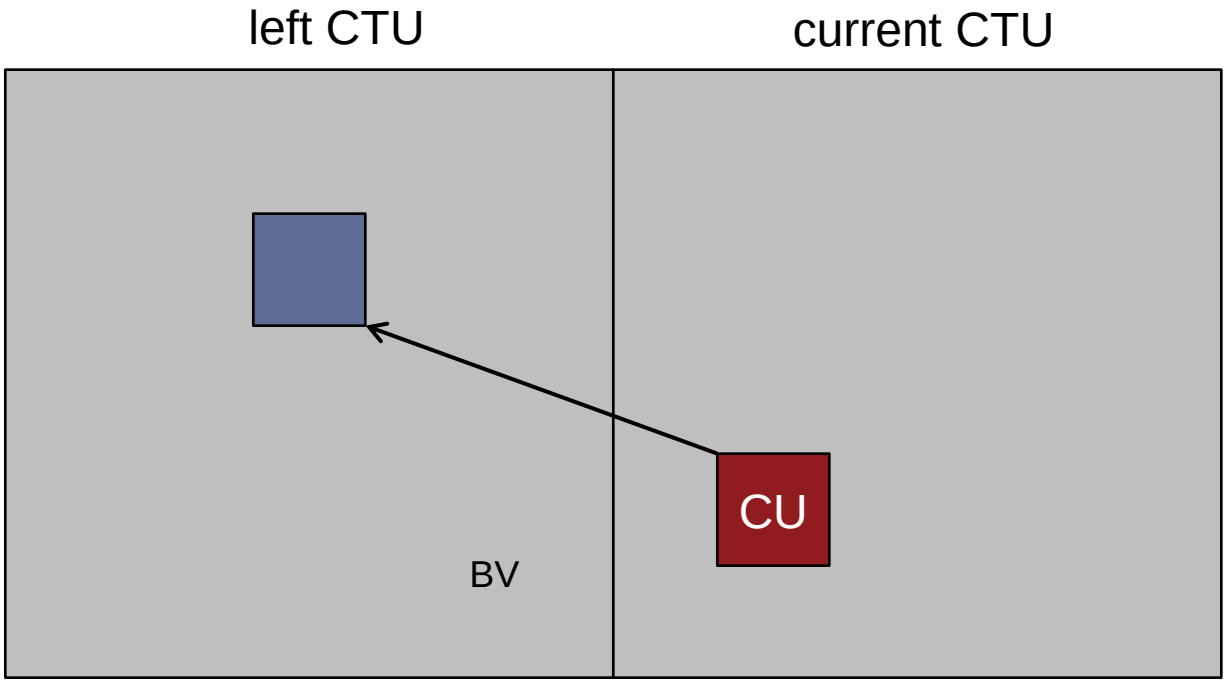
Block vector prediction method for Intra block copy

JCTVC-Q0114

Chao Pang, Joel Sole, Rajan Joshi, Marta Karczewicz

Introduction

- Intra block copy (Intra BC)
  - JCTVC-N0256



BV (block vector)

In current RExt, (-CUWidth, 0) is BV predictor for the first BV in a CTU, and the last decoded BV is used as BV predictor for the other BVs.

Proposed

- To improve BV prediction:
  - The left or above BV is selected as predictor, and resulting block vector difference (BVD) is encoded; If one of them is unavailable, (-2*PUwidth, 0) is used instead. If both of them are unavailable, (-2*PUwidth, 0) and (2*PUWidth, 0) are used instead;
  - To avoid extra line buffer to store the above MV, only the above MV inside current CTU is allowed to be used as the predictor;
  - To save extra storage, it can share the buffer used for inter MV.

Proposed vs The anchor (lossy)

	All Intra Main-tier			All Intra High-tier			All Intra Super-High-tier		
	Y	U	V	Y	U	V	Y	U	V
Class F	-0.7%	-0.7%	-0.7%	-0.6%	-0.5%	-0.5%	-0.4%	-0.4%	-0.4%
Class B	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RGB 4:4:4 SC	-1.3%	-1.4%	-1.4%	-1.1%	-1.2%	-1.1%	-0.9%	-1.0%	-0.9%
RGB 4:4:4 Animation	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
YCbCr 4:4:4 SC	-1.4%	-1.4%	-1.5%	-1.2%	-1.3%	-1.3%	-1.0%	-1.1%	-1.1%
YCbCr 4:4:4 Animation	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
RangeExt	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RGB 4:4:4 SC (Optional)	-2.2%	-2.1%	-2.3%	-2.2%	-2.3%	-2.4%	-1.8%	-1.5%	-1.5%
YCbCr 4:4:4 SC (Optional)	-2.4%	-2.3%	-2.5%	-2.2%	-2.2%	-2.2%	-1.9%	-1.9%	-1.9%
Enc Time[%]		101%			100%			99%	
Dec Time[%]		101%			100%			99%	

	Random Access Main-tier			Random Access High-tier		
	Y	U	V	Y	U	V
Class F	-0.5%	-0.4%	-0.5%	-0.4%	-0.3%	-0.3%
Class B	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RGB 4:4:4 SC	-1.1%	-1.1%	-1.1%	-0.9%	-0.9%	-0.9%
RGB 4:4:4 Animation	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%
YCbCr 4:4:4 SC	-1.0%	-1.0%	-1.1%	-0.9%	-0.9%	-1.0%
YCbCr 4:4:4 Animation	0.0%	-0.1%	-0.1%	0.0%	0.0%	0.0%
RangeExt	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RGB 4:4:4 SC (Optional)	-1.6%	-1.7%	-1.6%	-1.8%	-1.8%	-1.8%
YCbCr 4:4:4 SC (Optional)	-2.2%	-2.2%	-2.2%	-2.3%	-2.3%	-2.3%
Enc Time[%]		99%			99%	
Dec Time[%]		105%			104%	

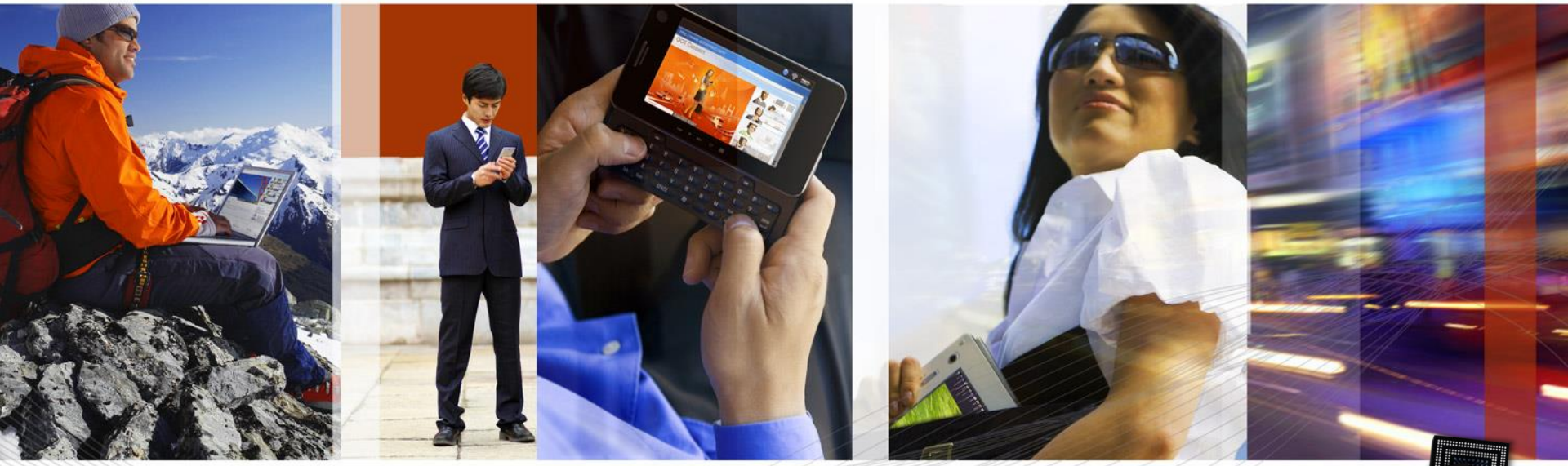
	Low delay B Main-tier			Low delay B High-tier		
	Y	U	V	Y	U	V
Class F	-0.3%	0.2%	-0.5%	-0.2%	-0.1%	-0.3%
Class B	0.0%	-0.2%	-0.3%	0.0%	-0.1%	-0.2%
RGB 4:4:4 SC	-0.6%	-0.7%	-0.7%	-0.6%	-0.7%	-0.7%
RGB 4:4:4 Animation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YCbCr 4:4:4 SC	-0.7%	-1.0%	-1.2%	-0.8%	-0.9%	-1.1%
YCbCr 4:4:4 Animation	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
RangeExt	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%
RGB 4:4:4 SC (Optional)	-1.5%	-1.5%	-1.6%	-1.9%	-1.8%	-1.8%
YCbCr 4:4:4 SC (Optional)	-1.9%	-1.8%	-1.8%	-2.4%	-2.4%	-2.3%
Enc Time[%]		99%			99%	
Dec Time[%]		101%			101%	

Proposed vs The anchor (lossless)

	Average bit-rate increase		
	AI	RA	LB
Class F	0.0%	0.1%	0.1%
Class B	0.0%	0.0%	0.0%
RGB 4:4:4 SC	-0.3%	-0.1%	-0.2%
RGB 4:4:4 Animation	0.0%	0.0%	0.0%
YCbCr 4:4:4 SC	-0.3%	-0.4%	-0.2%
YCbCr 4:4:4 Animation	0.0%	0.0%	0.0%
RangeExt	0.0%	0.0%	0.0%
RGB 4:4:4 SC (Optional)	1.3%	1.2%	2.2%
YCbCr 4:4:4 SC (Optional)	-0.7%	-0.8%	-1.0%
Enc Time[%]	107%	105%	109%
Dec Time[%]	105%	107%	110%

Conclusions

- Improved Intra BC block vector prediction method is proposed



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