

REDEFINING MOBILITY



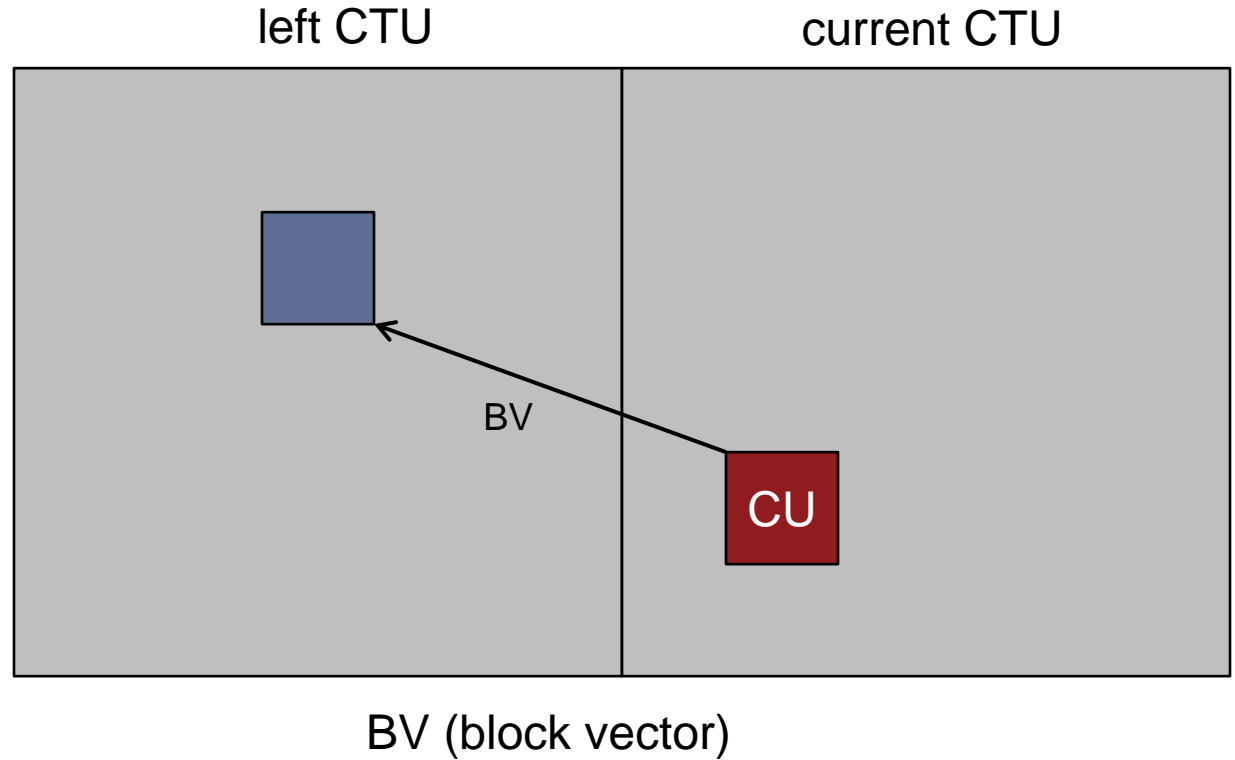
Intra block copy with encoder search using chroma component

JCTVC-Q0175

Chao Pang, Joel Sole, Marta Karczewicz

Introduction

- Intra block copy (Intra BC)



Proposed

- Intra BC encoder search with chroma component

- Step 1: The best N (e.g. 4) BVs are selected according to their R-D cost, which is calculated as

$$\text{RD_Cost} = \text{SAD}_{\text{Luma}} + \text{Lambda} * \text{Bvbits}$$

- Step 2: The BV with the minimum R-D cost out of the N BVs is selected as the final BV, and the R-D cost is calculated as

$$\text{RD_Cost} = \text{SAD}_{\text{Luma}} + \text{SAD}_{\text{Chroma}} + \text{Lambda} * \text{BVbits}$$

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	-0.1%	-0.4%	-0.4%	-0.1%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%
Class B	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RGB 4:4:4 SC	-1.6%	-1.8%	-1.9%	-1.3%	-1.5%	-1.5%	-1.0%	-1.2%	-1.1%
RGB 4:4:4 Animation	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%
YCbCr 4:4:4 SC	-1.3%	-2.1%	-2.1%	-1.4%	-2.0%	-1.9%	-1.3%	-1.6%	-1.7%
YCbCr 4:4:4 Animation	0.0%	-0.3%	-0.2%	0.0%	-0.2%	-0.2%	0.0%	-0.1%	-0.1%
RangeExt	0.0%	-0.1%	-0.1%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%
RGB 4:4:4 SC (Optional)	-6.1%	-6.2%	-6.3%	-5.7%	-6.1%	-6.4%	-4.0%	-3.4%	-3.6%
YCbCr 4:4:4 SC (Optional)	-1.6%	-2.0%	-1.9%	-1.2%	-1.5%	-1.4%	-0.9%	-1.1%	-1.1%
Enc Time[%]	100%			100%			100%		
Dec Time[%]	98%			97%			98%		

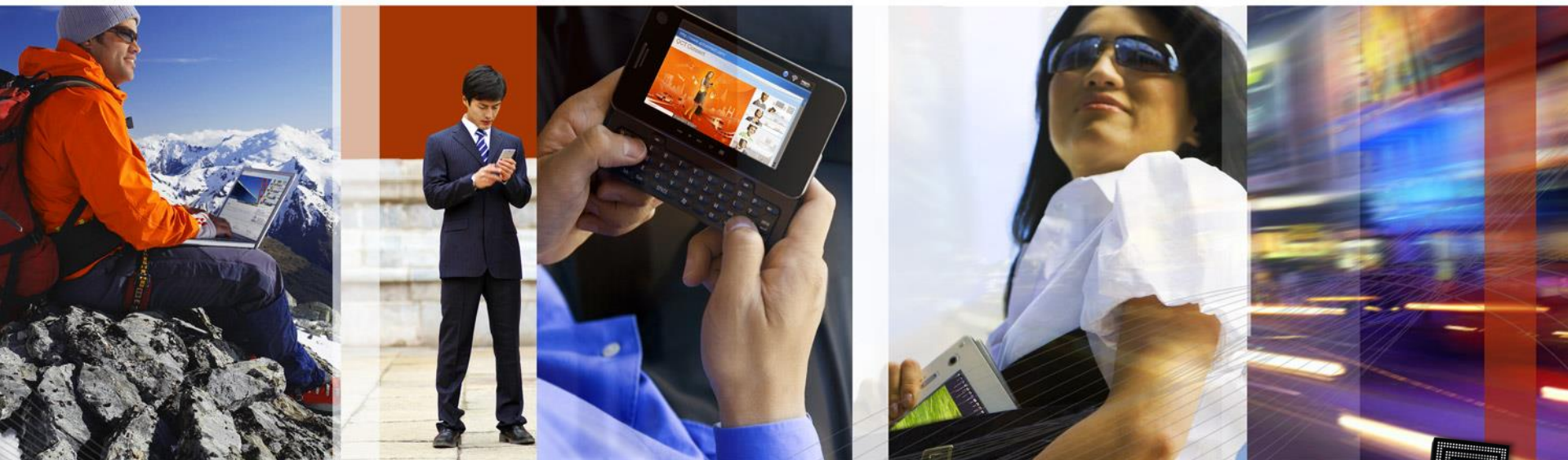
	Random Access Main-tier			Random Access High-tier				Low delay B Main-tier			Low delay B High-tier		
	Y	U	V	Y	U	V		Y	U	V	Y	U	V
Class F	0.0%	-0.2%	-0.2%	-0.1%	-0.2%	-0.2%	Class F	-0.1%	-0.2%	-0.4%	-0.1%	-0.2%	-0.2%
Class B	0.0%	-0.2%	0.0%	0.0%	-0.1%	-0.1%	Class B	0.0%	-0.2%	-0.3%	0.0%	-0.1%	-0.1%
RGB 4:4:4 SC	-1.3%	-1.5%	-1.5%	-1.0%	-1.2%	-1.2%	RGB 4:4:4 SC	-0.9%	-1.1%	-1.1%	-0.8%	-0.9%	-0.9%
RGB 4:4:4 Animation	0.0%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%	RGB 4:4:4 Animation	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%
YCbCr 4:4:4 SC	-0.8%	-1.4%	-1.5%	-0.9%	-1.3%	-1.4%	YCbCr 4:4:4 SC	-0.9%	-1.4%	-1.3%	-0.9%	-1.3%	-1.3%
YCbCr 4:4:4 Animation	-0.1%	-0.3%	-0.4%	0.0%	-0.2%	-0.2%	YCbCr 4:4:4 Animation	0.0%	-0.2%	-0.2%	0.0%	0.0%	-0.1%
RangeExt	0.0%	-0.1%	-0.1%	0.0%	0.0%	-0.1%	RangeExt	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%
RGB 4:4:4 SC (Optional)	-5.2%	-5.4%	-5.4%	-4.6%	-5.2%	-5.3%	RGB 4:4:4 SC (Optional)	-5.0%	-5.1%	-5.2%	-4.9%	-4.8%	-5.0%
YCbCr 4:4:4 SC (Optional)	-1.4%	-1.6%	-1.8%	-1.3%	-1.5%	-1.6%	YCbCr 4:4:4 SC (Optional)	-1.7%	-1.8%	-1.9%	-1.1%	-1.2%	-1.0%
Enc Time[%]	99%			100%			Enc Time[%]	100%			100%		
Dec Time[%]	99%			99%			Dec Time[%]	99%			99%		

Proposed vs The anchor (lossless)

	Average bit-rate increase		
	AI	RA	LB
Class F	0.1%	0.1%	0.1%
Class B	0.0%	0.0%	0.0%
RGB 4:4:4 SC	-0.2%	-0.1%	0.0%
RGB 4:4:4 Animation	0.0%	0.0%	0.0%
YCbCr 4:4:4 SC	-0.4%	-0.3%	-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)	2.1%	1.8%	1.8%
YCbCr 4:4:4 SC (Optional)	0.2%	0.3%	0.3%
Enc Time[%]	102%	103%	103%
Dec Time[%]	105%	101%	110%

Conclusions

- Chroma component is used to improve Intra block copy encoder search.



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