

JCTVC-R0201



Block vector predictor selection for intra block copy

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Summary

- This contribution proposes to extend the candidate block vector predictor (BVp) to other CTUs (i.e., increase number of block vector predictor (BVp) candidates up to 128)
- Goal
 - Allow BV of other CTU(s) to be BVp candidate for current IntraBC PU
 - Increase number of BVp candidates from 1 (SCM 1.0) to 128 (proposed)
 - Previously decoded BVs are ordered in inverse decoding order
 - Smaller index is assigned to a nearer coded BV from current PU
- Performance
 - BD-rate gain of 1.3%, 0.8%, 0.5% for AI, RA, LD lossy, respectively
 - Especially in “text & graphics with motion 1080p” sequences (3.4%, 1.7%, 1.2% respectively for AI, RA, LD)
 - Considering this method in SCCE is recommend

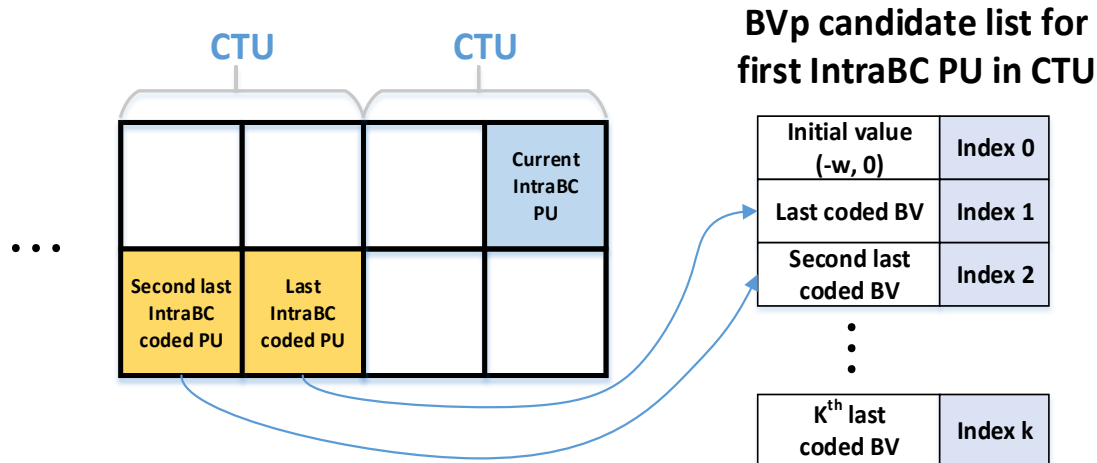
BVp candidate list generation (1)

- Coded BV's are stored in buffer (having max size for 128 coded BVs)
 - This coded BV buffer is reset at the end of each slice

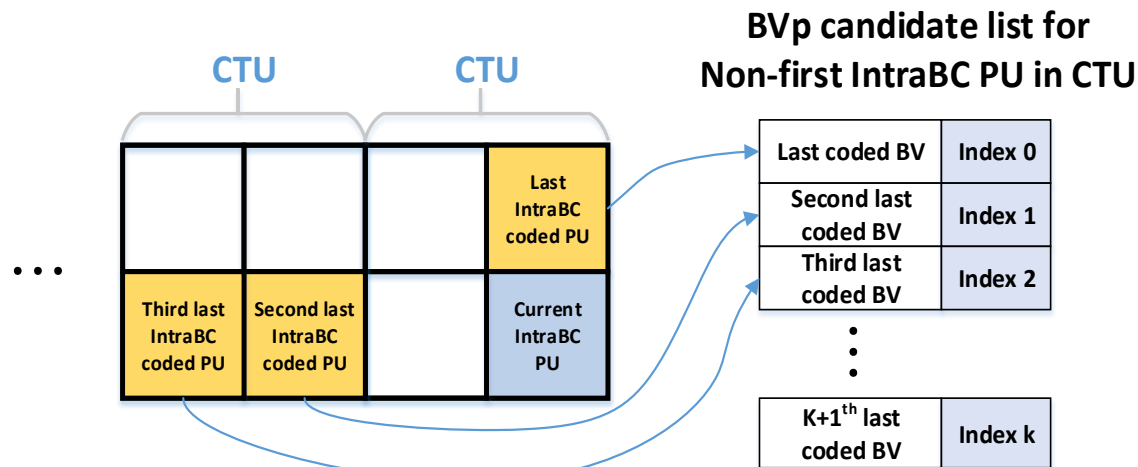
- BVp of index 0 in the candidate list depends on whether IntraBC PU is the first in a given CTU or not
 - Case 1: First IntraBC PU in CTU
 - Initial BVp value (-w, 0) is allocated to BVp index 0 (where 'w' is CU width)
 - Following, index 1 is assigned to Last coded BV, and following indices are assigned to other previously coded BV's in inverse decoding order
 - Case 2: Non-first IntraBC PU in CTU
 - Referring to coded BV buffer, Index 0 is assigned to Last coded BV, and following indices are assigned to other coded BV's in inverse decoding order

BVp candidate list generation (2)

- Example of BVp candidate list for first IntraBC PU in CTU



- Example of BVp candidate list for non-first IntraBC PU in CTU



BVp index signaling

- Truncated-binary coding
 - Sharing BVd contexts (in a similar way as BVd signaling)

bvp_index(x0, y0, refList) {	Descriptor
bvpindex_greater0_flag	ae(v)
if(bvpindex_greater0_flag)	
bvpindex_greater1_flag	ae(v)
if(bvpindex_greater0_flag) {	
if(bvpindex_greater1_flag)	
bvpindex_minus2	ae(v)
}	
}	



Misc.

- Mode decision process in encoder
 - No modification of BV searching process
 - For BVp decision, proposed BVp selection scheme follows MVp selection scheme in HM
 - MVp decision for AMVP
 - MV decision by motion estimation → MVp decision based on RD cost
 - BVp decision by proposed method
 - BV decision by searching → BVp decision based on RD cost
- No encoder optimization
 - BVp is not considered in BV cost estimation

Experimental result - Lossy

- Test condition: common conditions for screen content coding tests
- Anchor: SCM 1.0
 - Full search based IntraBC

	All Intra			Random Access			Low delay B		
	G/Y	B/U	R/V	G/Y	B/U	R/V	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	-3.2%	-3.3%	-3.2%	-1.7%	-1.6%	-1.7%	-1.2%	-1.1%	-1.1%
RGB, text & graphics with motion, 720p	-1.5%	-1.5%	-1.5%	-1.0%	-1.0%	-1.0%	-0.3%	-0.2%	-0.3%
RGB, mixed content, 1440p	-1.2%	-1.2%	-1.2%	-0.7%	-0.7%	-0.7%	-0.5%	-0.6%	-0.3%
RGB, mixed content, 1080p	-1.4%	-1.4%	-1.4%	-0.9%	-1.0%	-0.9%	-0.4%	-0.3%	-0.6%
RGB, Animation, 720p	-0.1%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	-0.1%	0.1%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	-3.6%	-3.6%	-3.6%	-1.8%	-1.7%	-1.8%	-1.2%	-1.2%	-1.2%
YUV, text & graphics with motion, 720p	-1.8%	-1.9%	-1.9%	-1.1%	-1.0%	-1.2%	-0.5%	-0.5%	-0.5%
YUV, mixed content, 1440p	-1.5%	-1.5%	-1.5%	-0.8%	-1.0%	-1.1%	-0.7%	-0.6%	-0.3%
YUV, mixed content, 1080p	-1.7%	-1.7%	-1.7%	-1.2%	-0.9%	-1.3%	-0.5%	-0.6%	0.0%
YUV, Animation, 720p	-0.1%	-0.1%	0.0%	0.0%	-0.3%	0.2%	0.0%	-0.5%	-0.2%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Enc Time[%]	101%			101%			100%		
Dec Time[%]	100%			100%			100%		

- BD-rate gain: 1.3%, 0.8%, 0.5% for AI, RA, LD lossy, respectively



Experimental result - Lossless

- Lossless result will be updated

Conclusion

- Increased IntraBC performance by using BVp of other CTU(s).
- BD-rate gain of 1.3%, 0.8%, 0.5% for AI, RA, LD lossy, respectively
 - Especially in “text & graphics with motion 1080p” sequences (3.4%, 1.7%, 1.2% respectively for AI, RA, LD)
- Considering this method for SCCE is suggested