

CE11: Context size reduction for the significance map

(JCTVC-D185)

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Panasonic ideas for life

Number of Context

Checked „**used** context size“ in HMv2

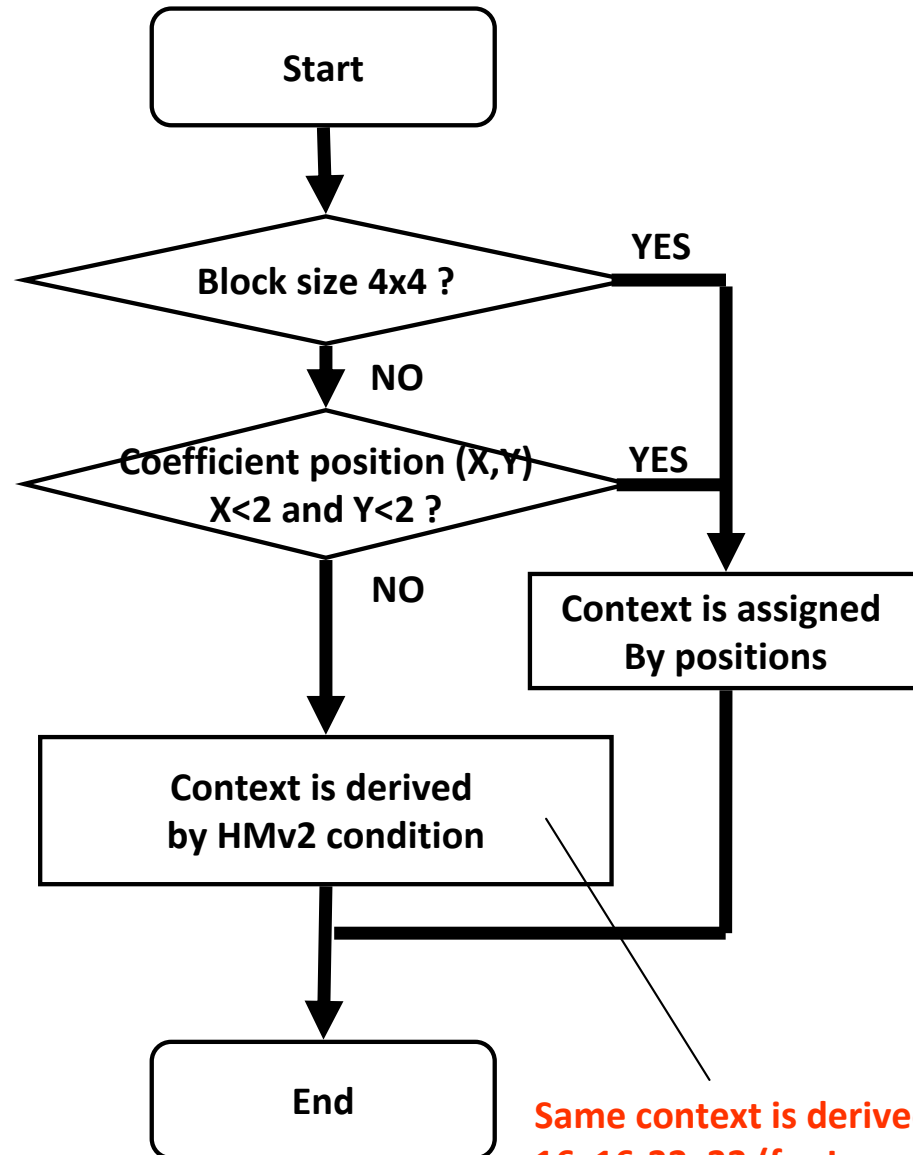
	ANCHOR			
	sig	last	coeff	total
Intra only	107	104	120	366
Random access	107	104	120	409
Low Delay	107	104	120	409

Impact of number of context

- ✓ Internal memory size
- ✓ Processing for initialization (e.g, multi-slices cases)
- ✓ Processing for pre-calculation for hardware design for real-time processing

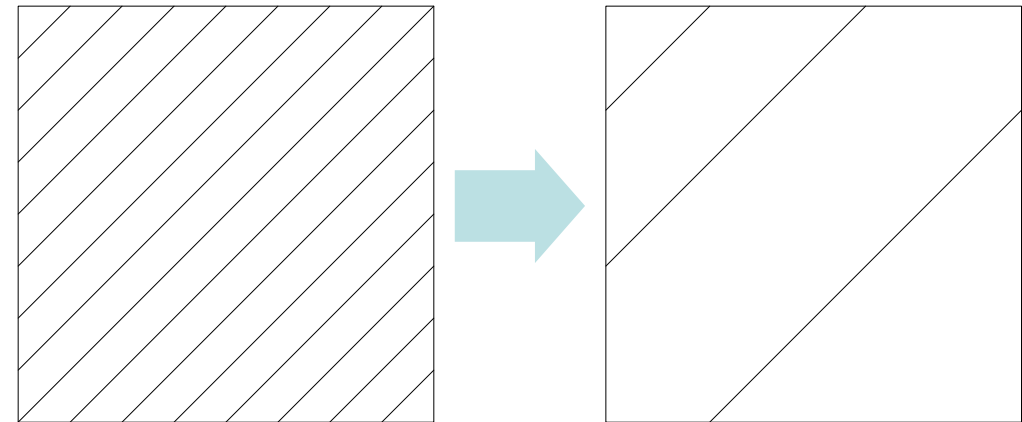
→ Small number would be desirable, if no performance drop.

Significant coeff flag (N1)



Same context is derived for
16x16-32x32 (for Luma)
8x8-16x16 (for Chroma)

Last flag (N2)



0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

0	1	2	2
1	2	2	3
2	2	3	3
2	3	3	3

0	1	2	3	4	5	6	7
1	2	3	4	5	6	7	8
2	3	4	5	6	7	8	9
3	4	5	6	7	8	9	10
4	5	6	7	8	9	10	11
5	6	7	8	9	10	11	12
6	7	8	9	10	11	12	13
7	8	9	10	11	12	13	14

0	0	1	1	1	2	2	2
0	1	1	1	2	2	2	2
1	1	1	2	2	2	2	2
1	1	2	2	2	2	2	3
1	2	2	2	2	2	3	3
2	2	2	2	2	3	3	3
2	2	2	2	3	3	3	3
2	2	2	3	3	3	3	3

Significant coeff flag (N1) : 22.4 % size reduction (6-7% of total reduction)

	Intra			Random access			Low delay		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
All average	-0.04	-0.14	-0.15	-0.08	-0.22	-0.21	-0.22	-0.40	-0.40
Enc Time[%]	100%			101%			101%		
Dec Time[%]	100%			99%			98%		

Last flag (N2) : 73.1 % size reduction (19-21% of total reduction)

	Intra			Random access			Low delay		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
All average	0.08	0.07	0.06	0.08	-0.14	-0.28	0.02	-0.22	-0.34
Enc Time[%]	100%			100%			100%		
Dec Time[%]	99%			99%			99%		

Significant coeff flag (N1) + Last flag (N2) : 24-27% total size reduction

	Intra			Random access			Low delay		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
All average	0.03	-0.05	-0.06	0.00	-0.24	-0.32	-0.14	-0.70	-0.55
Enc Time[%]	100%			100%			101%		
Dec Time[%]	99%			98%			97%		

Our proposal could reduce significant number of contexts with 0.1% performance gain.

Recommendation

To be considered this proposal in a part of next version of HM.

JCTVC-E227(N1)+E338 vs HMv2

	Intra			Random access			Low delay		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
All average	-0.08	0.05	0.03	-0.09	-0.60	-0.68	-0.10	-1.56	-1.48
Enc Time[%]	101%			101%			101%		
Dec Time[%]	99%			96%			95%		

Number of Context for D262

increase number of context	increase sig %	increase last %	increase coeff %	increase total %	increase number of context	increase sig %	increase last %	increase coeff %	increase total %
Intra only	27.1%	15.4%	0.0%	12.3%	Intra only	58.9%	15.4%	0.0%	21.6%
Random access	27.1%	15.4%	0.0%	11.0%	Random access	58.9%	15.4%	0.0%	19.3%
Low Delay	27.1%	15.4%	0.0%	11.0%	Low Delay	58.9%	15.4%	0.0%	19.3%

JCTVC-E227(N1)+E338 vs E338

	Intra			Random access			Low delay		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
All average	-0.05	0.08	0.03	-0.10	0.34	0.07	0.00	0.39	0.39
Enc Time[%]	101%			100%			100%		
Dec Time[%]	100%			97%			96%		

increase number of context	increase sig %	increase last %	increase coeff %	increase total %
Intra only	-20.0%	0.0%	0.0%	-7.6%
Random access	-20.0%	0.0%	0.0%	-7.0%
Low Delay	-20.0%	0.0%	0.0%	-7.0%