

JCTVC-F173

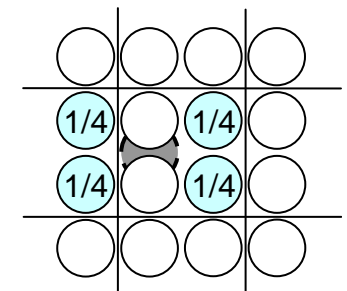
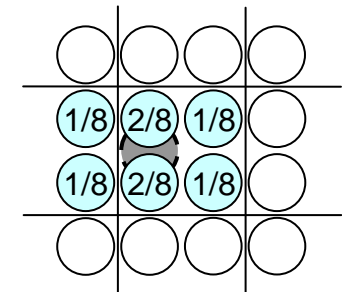
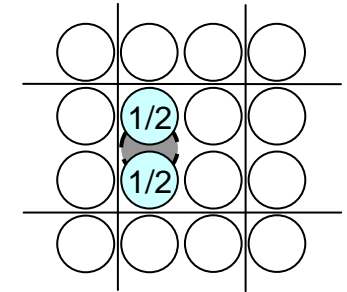
An improvement to chroma intra prediction from luma

Akira Minezawa, Kazuo Sugimoto,
Shun-ichi Sekiguchi

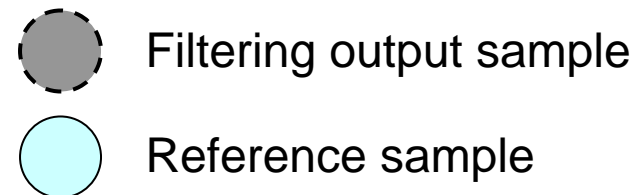
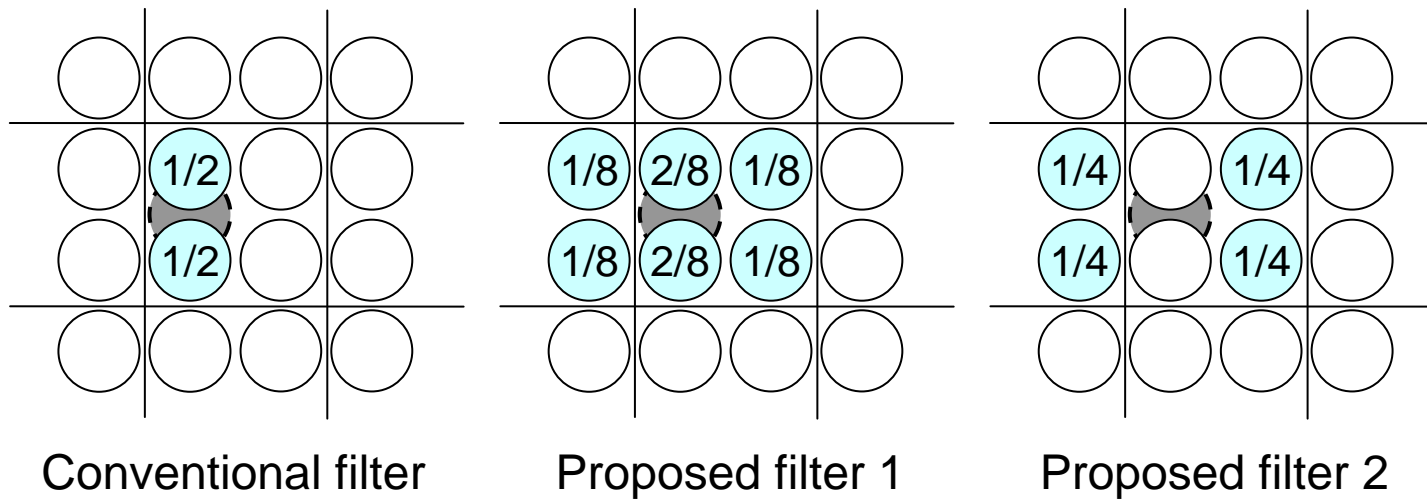
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Overall Summary

- In HM-3, chroma intra prediction technique using reconstructed luma samples is adopted
 - Perform luma down-sampling process for the prediction
 - This down-sampling process suffers from horizontal aliasing
- We propose a modification of down-sampling filter
 - use two-dimensional filters instead of the conventional ones
- The proposed schemes improve coding efficiency
 - 0.1%, 0.6% and 0.4% gains for AI/HE, 0.1%, 0.9% and 0.7% gains for AI/LC, respectively for Y, U and V
 - ENC/DEC times increase are negligible (0%)
- Crosscheck
 - JCTVC-F647 (Samsung)
- Propose the scheme to be adopted to HM-4

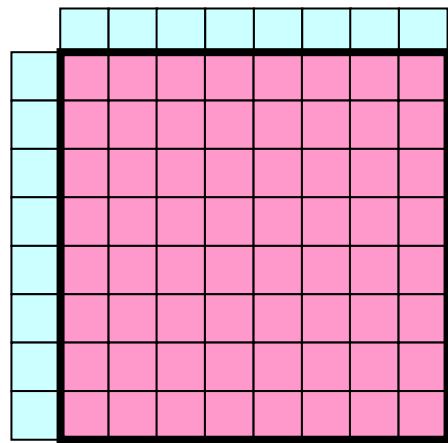


Comparison of down-sampling filters





Proposed scheme

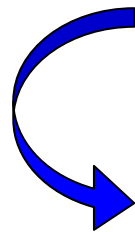
Down-sampled luma block



Prediction block

-  The samples used for calculation of the parameters α and β (Group A)
-  The samples used for calculation of prediction values (Group B)

The number of operations
for the filtering is reduced



Proposed scheme 1

Group A and B : Proposed filter 1

Proposed scheme 2

Group A : Proposed filter 2 (4taps)

Group B : Proposed filter 1 (6taps)

Simulation Results (1)

- Anchor: HM3.0 Intra Only default conditions
- Tested: Proposed scheme 1 implemented on HM3.0

	All Intra HE			All Intra LC		
	Y	U	V	Y	U	V
Class A	0.0	-0.1	0.6	0.0	-0.1	0.7
Class B	-0.1	-0.2	-0.2	-0.1	-0.6	-0.4
Class C	-0.3	-1.1	-1.0	-0.3	-1.7	-1.5
Class D	-0.2	-0.8	-0.8	-0.2	-1.2	-1.2
Class E	0.0	-0.2	-0.4	0.0	-0.3	-0.5
Overall	-0.1	-0.5	-0.3	-0.1	-0.8	-0.6
Enc Time[%]	100%			100%		
Dec Time[%]	100%			101%		

0.3% ~ 0.8% gain on average compared to the anchor for chroma component

Simulation Results (2)

- Anchor: HM3.0 Intra Only default conditions
- Tested: Proposed scheme 2 implemented on HM3.0

	All Intra HE			All Intra LC		
	Y	U	V	Y	U	V
Class A	0.0	-0.4	0.4	0.0	-0.5	0.3
Class B	-0.1	-0.3	-0.2	-0.1	-0.7	-0.4
Class C	-0.3	-1.1	-1.1	-0.3	-1.8	-1.7
Class D	-0.2	-0.7	-0.7	-0.2	-1.1	-1.1
Class E	0.0	-0.2	-0.4	0.0	-0.3	-0.6
Overall	-0.1	-0.6	-0.4	-0.1	-0.9	-0.7
Enc Time[%]	100%			100%		
Dec Time[%]	100%			100%		

0.4% ~ 0.9% gain on average compared to the anchor for chroma component

Conclusions

- The proposed schemes improve coding efficiency
 - Proposed scheme 1
 - 0.1%, 0.5% and 0.3% gains for AI/HE, 0.1%, 0.8% and 0.6% gains for AI/LC, respectively for Y, U and V components
 - ENC/DEC times increase are negligible
 - Proposed scheme 2
 - 0.1%, 0.6% and 0.4% gains for AI/HE, 0.1%, 0.9% and 0.7% gains for AI/LC, respectively for Y, U and V components
 - The number of operations for the filtering is smaller than “proposed scheme 1”
- Propose the scheme #2 to be adopted to HM-4