

F483 -- Planar intra prediction improvement

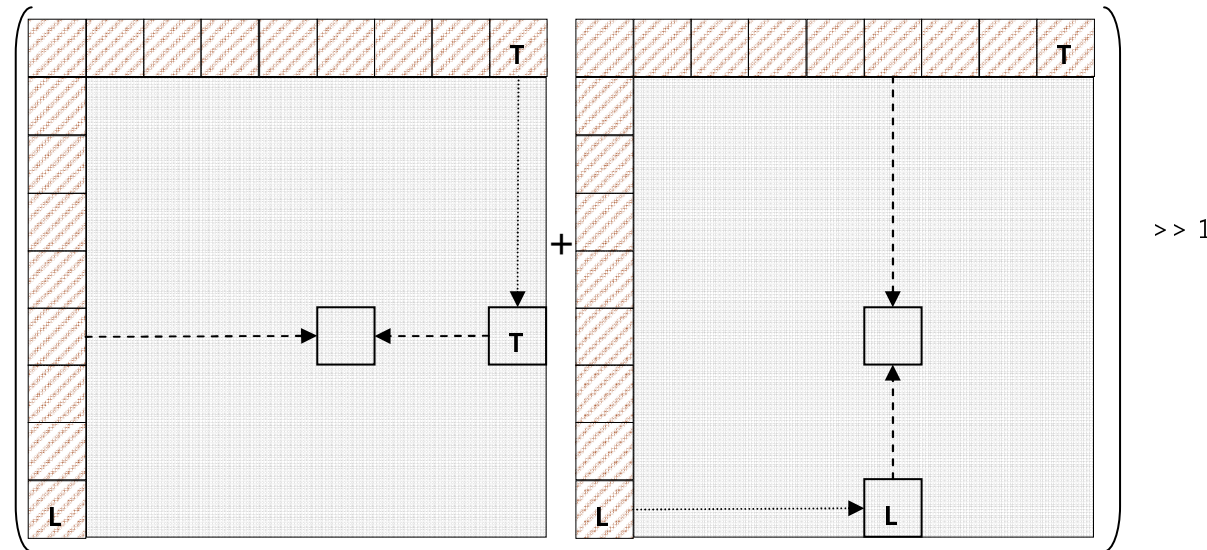
Jianle Chen, Tammy Lee
Samsung Electronics Co., Ltd

July. XX, 2011

Introduction

❖ Planar mode in HM3.0

- Average of two linear interpolations without mediate stage
 - The right-column and the bottom-row are generated by replication process from the right-top pixel of above neighboring border and the left-bottom pixel of left neighboring border.
- No smoothing filter on Planar mode
 - Planar mode is mapping to DC



MDIS on Planar mode

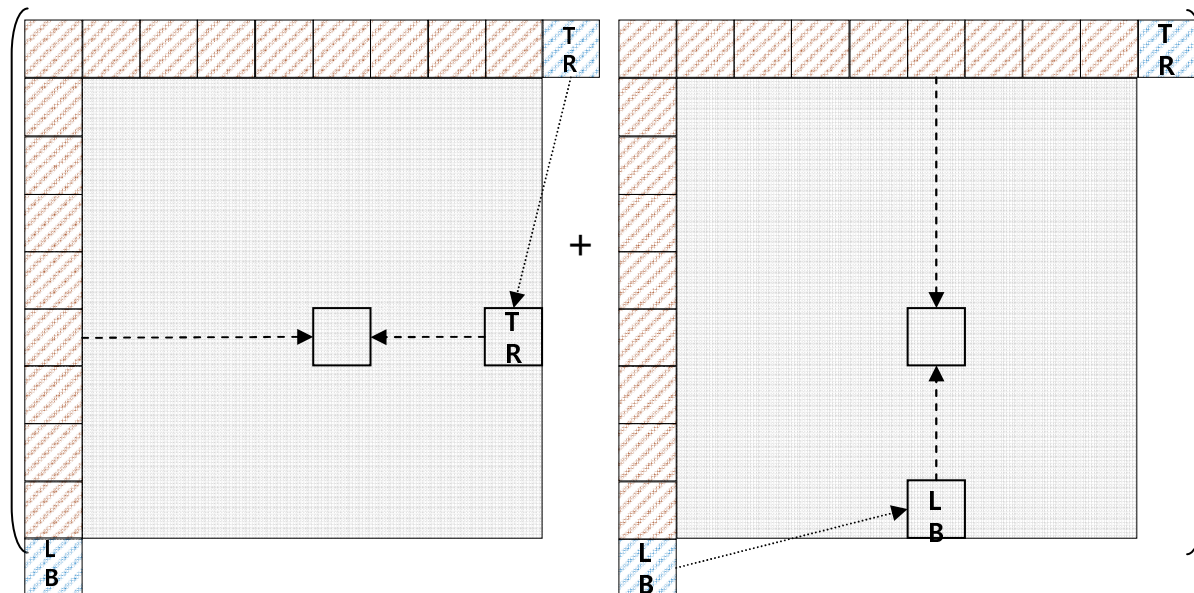
❖ Smoothing filter on Planar mode

- Filter on 16x16, 32x32 shows performance improvement
- Filter on 8x8 shows no performance change
- Filter on 4x4 shows performance loss

	All Intra HE			All Intra LC		
	Y	U	V	Y	U	V
Class A	-0.08	-0.18	-0.10	-0.09	-0.08	-0.01
Class B	-0.09	-0.13	-0.18	-0.08	-0.07	-0.05
Class C	-0.03	-0.03	0.00	-0.03	0.00	-0.05
Class D	-0.01	-0.04	-0.04	-0.03	0.00	0.00
Class E	-0.06	-0.15	-0.05	-0.06	0.01	-0.03
Overall	-0.06	-0.10	-0.08	-0.06	-0.03	-0.03
Enc Time[%]	100%			101%		
Dec Time[%]	100%			100%		

Shifting of top-right (T) and bottom-left (L) pixels

- ❖ To retain extrapolation feature
 - Using top-right pixel as right column
 - Using bottom-left pixel as bottom column



Experimental results

❖ Shifting of top-right (T) and bottom-left (L) pixels

	All Intra HE			All Intra LC		
	Y	U	V	Y	U	V
Class A	-0.06	0.17	-0.08	-0.06	0.00	-0.15
Class B	-0.09	0.08	0.00	-0.09	-0.12	-0.17
Class C	-0.08	0.01	0.01	-0.11	-0.15	-0.22
Class D	-0.08	-0.05	-0.02	-0.11	-0.14	-0.13
Class E	-0.11	0.09	0.18	-0.12	-0.44	-0.42
Overall	-0.08	0.06	0.01	-0.10	-0.15	-0.21
Enc Time[%]	100%			100%		
Dec Time[%]	100%			100%		

❖ MDIS + Shifting of top-right (T) and bottom-left (L) pixels

	All Intra HE			All Intra LC		
	Y	U	V	Y	U	V
Class A	-0.14	0.02	-0.16	-0.15	-0.07	-0.15
Class B	-0.17	-0.05	-0.10	-0.17	-0.17	-0.22
Class C	-0.11	-0.04	-0.05	-0.14	-0.17	-0.25
Class D	-0.09	-0.07	-0.07	-0.13	-0.17	-0.16
Class E	-0.17	-0.03	0.09	-0.17	-0.48	-0.44
Overall	-0.13	-0.03	-0.07	-0.15	-0.20	-0.23
Enc Time[%]	100%			100%		
Dec Time[%]	100%			100%		

Summary

❖ Modification

- Smoothing filter on 32x32 and 16x16 planar mode
- Using top-right and left-bottom for interpolation to retain extrapolation feature

❖ Coding performance

- -0.13% HE_AI and -0.15% LC_AI

❖ Recommend consideration of adopting the proposed modification into next version of HM since the gain is achieved without introducing additional complexity



Thank you !