Consistent Usage of Intra Boundary-Filter Disabling

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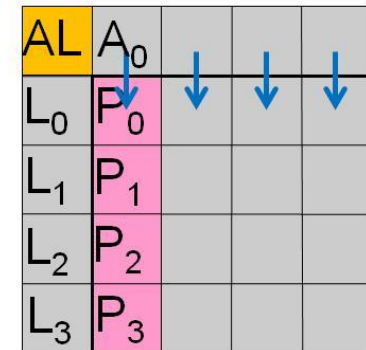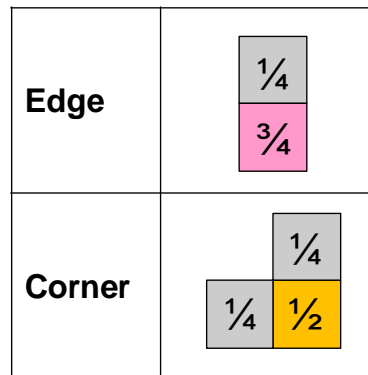17th JCT Meeting in Valencia

27 March – 4 April, 2014

Outline

- Background
  - Intra boundary filters in HEVC-RExt.
- Proposed Method 1 and 2
- Experimental Results

Background:
Intra boundary filters in HEVC-RExt

- ## Intra DC boundary filters

  - Always enabled, no disabling mechanism

Edge	¼ ³⁄₄
Corner	¼ ¼ ½
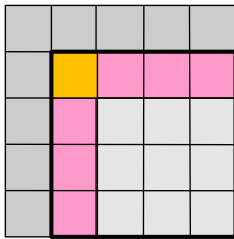
- ## Intra Hor/Ver gradient filters

  - Disabled if

    - (implicit_rdpcm_enabled_flag && cu_transquant_bypass_flag)

  - No disabling mechanism under current lossy conditions

Proposed Modifications

- Method 1:
  - **Intra DC** and gradient filters are both disabled under the same derivation of *disableIntraBoundaryFilter*

  (implicit_rdpcm_enabled_flag && cu_transquant_bypass_flag)

- Method 2:
  - Disabling the Intra boundary filters under new flag control
  - Capability to disable them for **lossy**

Experimental Results (AHG8 CTC)

- ## Method 1 (lossless)

  – There is 0.2% average bit saving on YUV444 SC set in RA

  – No loss for other videos.

- ## Method 2

	All Intra Main-tier		
	Y	U	V
Class F	-0.1%	-0.1%	0.0%
Class B	0.5%	0.2%	0.3%
RGB 4:4:4 SC	-1.6%	-1.3%	-1.3%
RGB 4:4:4 Animation	-0.5%	-0.5%	-0.4%
YCbCr 4:4:4 SC	-0.5%	-0.2%	-0.4%
YCbCr 4:4:4 Animation	0.1%	-0.1%	0.0%
RangeExt	0.4%	0.3%	0.2%
RGB 4:4:4 SC (Optional)	-1.2%	-1.0%	-1.0%
YCbCr 4:4:4 SC (Optional)	-1.3%	-1.1%	-1.1%
Enc Time[%]	100%		
Dec Time[%]	99%		

	Low delay B Main-tier		
	Y	U	V
Class F	-0.1%	0.2%	0.1%
Class B	0.1%	-0.2%	0.0%
RGB 4:4:4 SC	-0.6%	-0.6%	-0.6%
RGB 4:4:4 Animation	-0.2%	-0.2%	-0.1%
YCbCr 4:4:4 SC	-0.2%	-0.3%	-0.4%
YCbCr 4:4:4 Animation	0.1%	0.0%	0.1%
RangeExt	0.2%	0.2%	0.2%
RGB 4:4:4 SC (Optional)	-0.2%	-0.2%	-0.3%
YCbCr 4:4:4 SC (Optional)	-0.8%	-0.6%	-0.7%
Enc Time[%]	100%		
Dec Time[%]	101%		

	Random Access Main-tier		
	Y	U	V
Class F	0.0%	0.1%	0.3%
Class B	0.2%	0.0%	0.1%
RGB 4:4:4 SC	-1.3%	-1.0%	-1.0%
RGB 4:4:4 Animation	-0.3%	-0.3%	-0.3%
YCbCr 4:4:4 SC	-0.2%	-0.1%	0.0%
YCbCr 4:4:4 Animation	0.0%	-0.2%	-0.1%
RangeExt	0.3%	0.2%	0.1%
RGB 4:4:4 SC (Optional)	-0.8%	-0.7%	-0.8%
YCbCr 4:4:4 SC (Optional)	-0.9%	-0.7%	-0.6%
Enc Time[%]	100%		
Dec Time[%]	100%		

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Experimental Results (SCC_CFP CTC)

- **Method 1 (lossless)**
  - There is 0.1% average bit saving on Mixed Content RGB 1440p SC set in AI
  - No loss for other videos.

- **Method 2**

	All Intra		
	Y	U	V
RGB, text & graphics with motion, 1080p	-1.1%	-0.9%	-0.9%
RGB, text & graphics with motion, 720p	-1.5%	-1.3%	-1.4%
RGB, mixed content, 1440p	-2.0%	-1.9%	-1.8%
RGB, mixed content, 1080p	-1.1%	-1.0%	-1.0%
RGB, Animation, 720p	-0.6%	-0.7%	-0.6%
YUV, text & graphics with motion, 1080p	-0.8%	-0.6%	-0.5%
YUV, text & graphics with motion, 720p	-0.3%	0.1%	-0.1%
YUV, mixed content, 1440p	0.0%	-0.3%	0.0%
YUV, mixed content, 1080p	-0.2%	-0.3%	-0.2%
YUV, Animation, 720p	0.2%	-0.1%	0.1%
Enc Time[%]	100%		
Dec Time[%]	99%		

	Low delay B		
	Y	U	V
RGB, text & graphics with motion, 1080p	-0.3%	-0.2%	-0.2%
RGB, text & graphics with motion, 720p	-0.5%	-0.6%	-0.6%
RGB, mixed content, 1440p	-0.9%	-0.8%	-0.7%
RGB, mixed content, 1080p	-0.2%	-0.2%	-0.2%
RGB, Animation, 720p	-0.1%	-0.1%	-0.1%
YUV, text & graphics with motion, 1080p	0.1%	0.1%	0.0%
YUV, text & graphics with motion, 720p	0.1%	0.1%	-0.3%
YUV, mixed content, 1440p	-0.1%	-0.4%	-0.3%
YUV, mixed content, 1080p	0.0%	-0.2%	0.0%
YUV, Animation, 720p	0.1%	-0.1%	0.2%
Enc Time[%]	100%		
Dec Time[%]	97%		

	Random Access		
	Y	U	V
RGB, text & graphics with motion, 1080p	-0.5%	-0.4%	-0.3%
RGB, text & graphics with motion, 720p	-1.1%	-0.9%	-0.9%
RGB, mixed content, 1440p	-1.2%	-1.1%	-1.1%
RGB, mixed content, 1080p	-0.6%	-0.6%	-0.6%
RGB, Animation, 720p	-0.4%	-0.4%	-0.4%
YUV, text & graphics with motion, 1080p	-0.3%	-0.2%	-0.2%
YUV, text & graphics with motion, 720p	-0.2%	-0.1%	0.1%
YUV, mixed content, 1440p	-0.1%	-0.3%	0.0%
YUV, mixed content, 1080p	0.0%	-0.2%	0.0%
YUV, Animation, 720p	0.1%	-0.1%	-0.1%
Enc Time[%]	99%		
Dec Time[%]	98%		

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