

Non-SCCE3: Modified Escaped pixel mode in palette based coding[JCTVC-R0080]

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■ Palette base coding tools in SCCE3.

- A pre-defined parameter, `max_palette_size`, is used.
- If the number of distinct pixel values in a CU is less than or equal to `max_palette_size`, all distinct pixel values will be included in palette.

C8	C0	C1	C2	C2	C1	C0	C3
C0	C0	C1	C2	C2	C1	C0	C0
C0	C0	C1	C2	C2	C1	C0	C0
C0	C0	C1	C2	C2	C1	C0	C0
C0	C0	C1	C2	C2	C1	C0	C0
C6	C6	C0	C0	C1	C1	C7	C7
C6	C6	C6	C0	C0	C0	C7	C7
C4	C4	C4	C4	C4	C0	C0	C5

`max_palette_size=32`

Palette={C0,C1,C2,C3,C4,C5,C6,C7,C8}

Our Proposal

- If palette size is less than `max_palette_size`,
 - scan CU to get {index,run} pairs. If all of the following conditions are true, the corresponding `palette_entry` is removed from palette, i.e. it becomes escaped pixel.
 - The {index,run} pair occurs only once in whole CU.
 - The `palette_entry` corresponding above {index,run} pair can not be predicted.
 - {escaped pixel value,run} is coded for escaped pixels.
 - predictor of palette is generated using two parts. One part is palette, the other is reconstructed pixel values in “escape_mode”.

C8	C0	C1	C2	C2	C1	C0	C3
C0	C0	C1	C2	C2	C1	C0	C0
C0	C0	C1	C2	C2	C1	C0	C0
C0	C0	C1	C2	C2	C1	C0	C0
C0	C0	C1	C2	C2	C1	C0	C0
C6	C6	C0	C0	C1	C1	C7	C7
C6	C6	C6	C0	C0	C0	C7	C7
C4	C4	C4	C4	C4	C0	C0	C5

`max_palette_size=32`

Palette={C0,C1,C2, C6,C7}

Coded escaped pixels: {C8,1}, {C3,1},{C4,5},{C5,1}

Predictor for next CU:{C0,C1,C2,C6,C7, C8,C3,C4,C5}

Simulation results(AI-lossless)

■ Anchor: SCCE3 (2CTU IBC) anchor

	All Intra			
	Bit-rate saving (Total)	Bit-rate saving (Average)	Bit-rate saving (Min)	Bit-rate saving (Max)
RGB, text & graphics with motion, 1080p	1.7%	1.7%	1.0%	2.2%
RGB, text & graphics with motion,720p	0.7%	0.5%	0.0%	0.9%
RGB, mixed content, 1440p	0.3%	0.4%	0.1%	0.7%
RGB, mixed content, 1080p	0.4%	0.4%	0.4%	0.4%
RGB, Animation, 720p	0.0%	0.0%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	1.6%	1.8%	0.9%	3.2%
YUV, text & graphics with motion,720p	0.4%	0.4%	0.0%	0.7%
YUV, mixed content, 1440p	0.3%	0.4%	0.1%	0.6%
YUV, mixed content, 1080p	0.4%	0.4%	0.4%	0.4%
YUV, Animation, 720p	0.0%	0.0%	0.0%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%
Enc Time[%]	100%			
Dec Time[%]	112%			

Simulation results(RA-lossless)

■ Anchor: SCCE3 (2CTU IBC) anchor

	Random Access			
	Bit-rate saving (Total)	Bit-rate saving (Average)	Bit-rate saving (Min)	Bit-rate saving (Max)
RGB, text & graphics with motion, 1080p	1.1%	1.0%	0.9%	1.1%
RGB, text & graphics with motion, 720p	0.1%	0.2%	0.0%	0.3%
RGB, mixed content, 1440p	0.0%	0.0%	0.0%	0.1%
RGB, mixed content, 1080p	0.1%	0.1%	0.1%	0.1%
RGB, Animation, 720p	0.0%	0.0%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	0.8%	1.0%	0.7%	1.5%
YUV, text & graphics with motion, 720p	0.1%	0.1%	0.0%	0.3%
YUV, mixed content, 1440p	0.0%	0.0%	0.0%	0.1%
YUV, mixed content, 1080p	0.1%	0.1%	0.1%	0.1%
YUV, Animation, 720p	0.0%	0.0%	0.0%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%
Enc Time[%]	97%			
Dec Time[%]	113%			

Simulation results(LB-lossless)

■ Anchor: SCCE3 (2CTU IBC) anchor

	Low Delay B			
	Bit-rate saving (Total)	Bit-rate saving (Average)	Bit-rate saving (Min)	Bit-rate saving (Max)
RGB, text & graphics with motion, 1080p	1.0%	0.8%	0.6%	1.0%
RGB, text & graphics with motion,720p	0.1%	0.1%	0.0%	0.3%
RGB, mixed content, 1440p	0.0%	0.0%	0.0%	0.0%
RGB, mixed content, 1080p	0.0%	0.0%	0.0%	0.0%
RGB, Animation, 720p	0.0%	0.0%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	0.6%	0.8%	0.6%	1.2%
YUV, text & graphics with motion,720p	0.0%	0.1%	0.0%	0.3%
YUV, mixed content, 1440p	0.0%	0.0%	0.0%	0.0%
YUV, mixed content, 1080p	0.0%	0.0%	0.0%	0.0%
YUV, Animation, 720p	0.0%	0.0%	0.0%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%
Enc Time[%]	93%			
Dec Time[%]	109%			

Simulation results(AI-lossy)

■ Anchor: SCCE3 (2CTU IBC) anchor

	All Intra		
	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	-1.0%	-1.1%	-1.0%
RGB, text & graphics with motion,720p	-0.4%	-0.4%	-0.4%
RGB, mixed content, 1440p	-0.3%	-0.2%	-0.2%
RGB, mixed content, 1080p	-0.3%	-0.4%	-0.4%
RGB, Animation, 720p	0.0%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	-0.9%	-0.8%	-0.9%
YUV, text & graphics with motion,720p	-0.4%	-0.4%	-0.4%
YUV, mixed content, 1440p	-0.2%	-0.3%	-0.2%
YUV, mixed content, 1080p	-0.3%	-0.5%	-0.5%
YUV, Animation, 720p	0.0%	0.0%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%
Enc Time[%]	102%		
Dec Time[%]	102%		

Simulation results(RA-lossy)

■ Anchor: SCCE3 (2CTU IBC) anchor

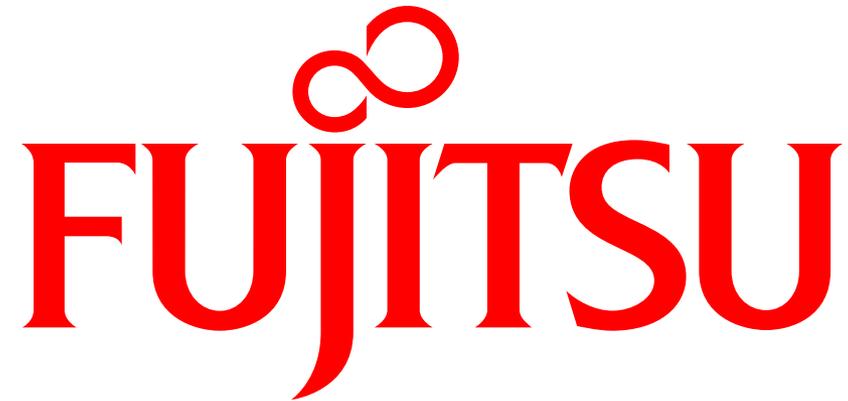
	Random Access		
	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	-0.4%	-0.5%	-0.5%
RGB, text & graphics with motion,720p	-0.2%	-0.3%	-0.2%
RGB, mixed content, 1440p	-0.1%	-0.1%	-0.1%
RGB, mixed content, 1080p	-0.2%	-0.2%	-0.3%
RGB, Animation, 720p	0.0%	-0.1%	0.0%
RGB, camera captured, 1080p	0.0%	0.1%	0.0%
YUV, text & graphics with motion, 1080p	-0.3%	-0.3%	-0.4%
YUV, text & graphics with motion,720p	-0.3%	-0.2%	-0.2%
YUV, mixed content, 1440p	-0.1%	-0.2%	-0.2%
YUV, mixed content, 1080p	-0.2%	-0.2%	-0.3%
YUV, Animation, 720p	0.0%	0.0%	-0.2%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%
Enc Time[%]	101%		
Dec Time[%]	104%		

Simulation results(LB-lossy)

■ Anchor: SCCE3 (2CTU IBC) anchor

	Low delay B		
	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	-0.5%	-0.5%	-0.5%
RGB, text & graphics with motion,720p	-0.4%	-0.2%	-0.2%
RGB, mixed content, 1440p	-0.2%	-0.1%	0.0%
RGB, mixed content, 1080p	-0.1%	-0.3%	0.0%
RGB, Animation, 720p	0.0%	0.1%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	-0.2%	-0.2%	-0.2%
YUV, text & graphics with motion,720p	0.0%	0.2%	0.1%
YUV, mixed content, 1440p	0.0%	0.0%	-0.3%
YUV, mixed content, 1080p	-0.2%	-0.6%	-0.7%
YUV, Animation, 720p	0.0%	0.0%	-0.1%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%
Enc Time[%]	101%		
Dec Time[%]	102%		

- Gain is showed for the modified escaped pixel mode.
- Suggest to list this proposal to future CE.



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