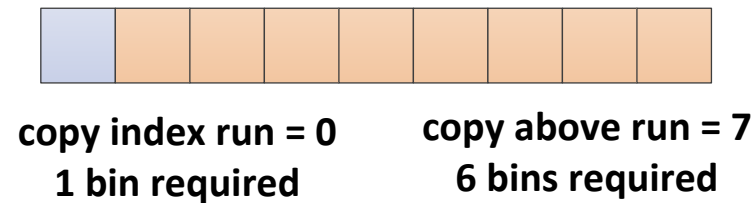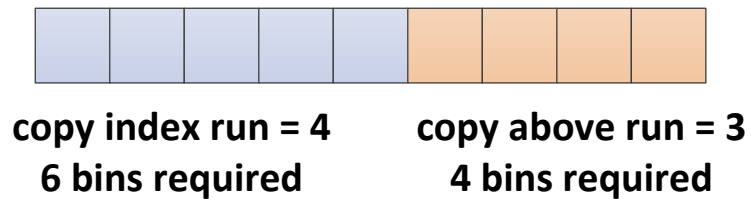# JCTVC-U0096 - CE1 Related: Improved palette encoder

Encoder Modifications

- Pixels assigned to palette indices using square error instead of absolute difference.

- When copy above run follows copy index run, the lengths of these two runs can be modified to minimize the number of bits required to represent them.

copy index run = 4
6 bins required

copy above run = 3
4 bins required

copy index run = 0
1 bin required

copy above run = 7
6 bins required

0 -> 0
10 -> 1
110x -> 2,3
1110xx -> 4,5,6,7

Encoder Modifications

- Copy index run can be converted to copy above run and two different index runs can be merged into single one.

copy index run (index=0)   **copy index run (index=1)**

copy above run   **copy index run (index=1)**

copy index run (index=0)

copy above run
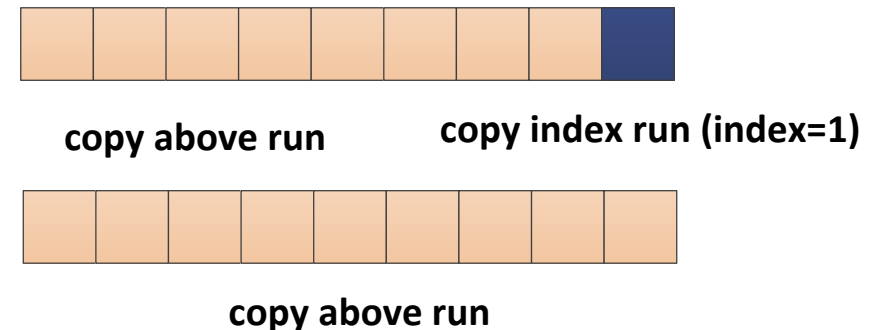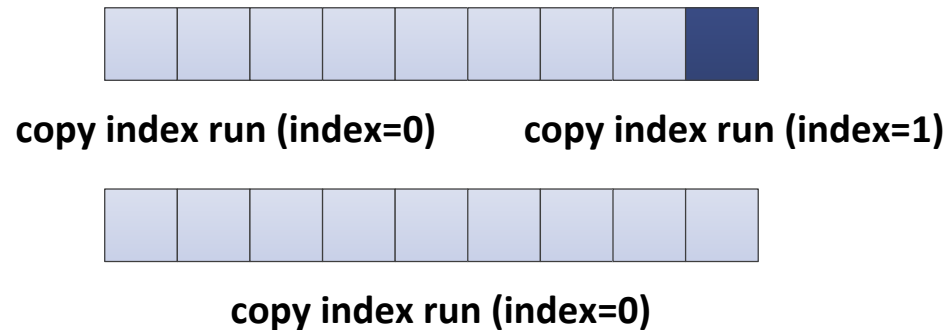
- After initial palette index calculation and index assignment to pixels, palette indices are pruned using their contribution to the RD cost. In the second pass only the remaining indices are used.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

removed indices
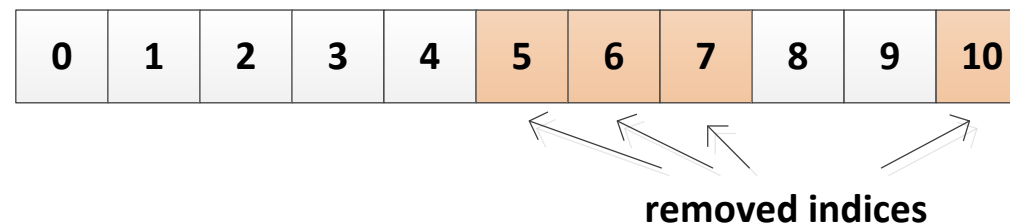
Results

	All Intra		
	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p & 720p	-1.3%	-1.6%	-1.6%
RGB, mixed content, 1440p & 1080p	-1.1%	-1.8%	-1.8%
RGB, Animation, 720p	-0.1%	-0.5%	-0.4%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p & 720p	-1.8%	-2.4%	-2.7%
YUV, mixed content, 1440p & 1080p	-1.4%	-3.2%	-3.3%
YUV, Animation, 720p	0.1%	-2.1%	-1.6%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%
Enc Time[%]		109%	
Dec Time[%]		100%	

	All Intra		
	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p & 720p	-1.5%	-1.9%	-1.9%
RGB, mixed content, 1440p & 1080p	-1.4%	-2.1%	-2.1%
RGB, Animation, 720p	-0.1%	-0.5%	-0.4%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p & 720p	-2.2%	-2.8%	-3.3%
YUV, mixed content, 1440p & 1080p	-1.9%	-3.9%	-3.9%
YUV, Animation, 720p	0.1%	-2.1%	-1.6%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%
Enc Time[%]		110%	
Dec Time[%]		101%	

Results - JCTVC-U0146
(with Scans from JCTVC-U0101)

	All Intra			All Intra		
	G/Y	B/U	R/V	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p & 720p	-1.5%	-1.9%	-1.9%	-1.8%	-2.3%	-2.2%
RGB, mixed content, 1440p & 1080p	-1.1%	-1.9%	-1.9%	-1.5%	-2.2%	-2.3%
RGB, Animation, 720p	-0.2%	-0.6%	-0.4%	-0.2%	-0.6%	-0.4%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p & 720p	-2.1%	-2.7%	-3.0%	-2.7%	-3.3%	-3.8%
YUV, mixed content, 1440p & 1080p	-1.5%	-3.4%	-3.6%	-2.0%	-4.1%	-4.2%
YUV, Animation, 720p	0.0%	-2.2%	-1.7%	0.0%	-2.2%	-1.7%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Enc Time[%]		112%			113%	
Dec Time[%]		100%			102%	

Results consistent with JCTVC-U0127