

MEDIATEK

JCTVC-T0060

CE1: Table based binarization for palette_escape_val

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Overall Summary

- Problem
 - The current binarization process for **palette_escape_val** is too complex
 - Complex method for deriving cMax
- Proposed
 - Table based binarization for **palette_escape_val**
 - Using look-up table for deriving cMax
- Results:
 - No performance change

Problem

- Currently **palette_escape_val** is binarized with Truncated Binary (TB) code
 - cMax calculation for **palette_escape_val** imposes a heavy load on parsing process
 - One division is used

1. The quantization parameter qP is derived as follows:

$$qP = (cIdx == 0) ? Qp'_Y : ((cIdx == 1) ? Qp'_{Cb} : Qp'_{Cr})$$

2. A quantization step size parameter $qStep$ is derived as follows:

$$qStep = (qP == 0) ? \text{Round}(2^{(qP-4)/6}) : 1$$

3. A maximum possible quantized value $maxValue$ is derived as follows:

$$maxValue = ((1 \ll bitDepth) - 1) / qStep$$

4. The number of bins $numBins$ of the fixed length binarization codeword is derived as follows

```
while( maxValue ) {
    maxValue = maxValue >> 1
    numBins++
}
```

5. The maximum parameter $cMax$ for the fixed length binarization is derived as follows

$$cMax = (1 \ll numBins) - 1$$

Proposed Method

- Table based binarization for `palette_escape_val`
 - cMax is fetched directly from a table indexed by QP

QP	0	1	2	3	4	5	6	7	8	9	10	11	12
cMax	255	255	255	255	255	227	204	181	127	127	127	113	102
QP	13	14	15	16	17	18	19	20	21	22	23	24	25
cMax	91	80	63	63	57	51	45	40	36	31	28	25	23
QP	26	27	28	29	30	31	32	33	34	35	36	37	38
cMax	20	18	15	14	13	11	10	9	7	7	6	6	5
QP	39	40	41	42	43	44	45	46	47	48	49	50	51
cMax	4	3	3	3	3	2	2	1	1	1	1	1	1

Experiments

■ No performance change

	All Intra			Random Access			Low delay B		
	G/Y	B/U	R/V	G/Y	B/U	R/V	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p & 720p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RGB, mixed content, 1440p & 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RGB, Animation, 720p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p & 720p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YUV, mixed content, 1440p & 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YUV, Animation, 720p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Enc Time[%]	100%			100%			99%		
Dec Time[%]	100%			99%			99%		

Conclusion

- A table based binarization method for **palette_escape_val** is proposed
- The parsing process is simplified without changing the coding performance

Thank you for your attention