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| *Title:* | **Non-CE6: Improved binarization and signaling of index coding for transition copy mode** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Proposal | | |
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# Abstract

A CU level flag **use\_trans\_flag** is proposedto indicate the use of transition copy mode for palette coding. When **use\_trans\_flag** is 1, for index coding, an **equal\_to\_transition** flag is coded in bypass mode to indicate whether the index is equal to the transition index. The simulation results reportedly show that the proposed method achieves 0.2% and 0.3% BD-rate savings for 720p text and graphics RGB and YUV, respectively, when compared against CE6 Test C.2 for All-Intra lossy configuration. The worst-case context coded bins complexity is asserted to be better than CE6 test C.2.

# Introduction

In the 18th JCT-VC meeting in Sapporo, CE6 [1] was established to study different palette representation methods. Test C.2 in CE6 proposed the transition copy mode for palette coding. This mode is signalled via sPoint as follows:

|  |  |  |
| --- | --- | --- |
| Mode | Bin 0 | Bin 1 |
| INDEX | 0 | N/A |
| COPY\_ABOVE | 1 | 0 |
| TRANSITION\_COPY | 1 | 1 |

Table 1: SPoint signalling when using transition mode

Bin 1 is also context-coded. This increases the number of context coded bins per pixel by 1 in the worst-case. We simplify the transition mode and index signalling as follows:

The sPoint signalling is identical to that in SCM-2.0. The transition mode can be switched ON or OFF using a flag '**use\_trans\_flag'** at the Coding Unit (CU) level. This flag is context-coded. If **use\_trans\_flag** is 0, there is no TRANSITION\_COPY mode and the signalling is identical to SCM-2.0. If **use\_trans\_flag** is 1, the transition mode is signalled as 'INDEX' mode. When coding the index, another flag **equal\_to\_transition** is coded in bypass mode to indicate whether the index is a transition index. If this flag is 1, index is equal to the transition index and no further signalling is necessary. If the flag is 0, the index value is sent using truncated binary. The maximum number of symbols and index is adjusted appropriately to account for the fact that the index may not equal the transition index. At the encoder, a rate estimation step is used to determine whether the current block should use transition mode or not.

# Simulation results

The proposed scheme is implemented on top of SCM-2.0 and tested using the common test condition defined in [2]. Table 2 compares the coding performance under full-frame Intra BC test conditions for CE6 test C.2 and the proposed method. It can be seen that the proposed method matches or exceeds the performance of CE6 test C.2.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | CE6 Test C.2 | | Proposed | | |
|  | **All Intra** | | | **All Intra** | | |
|  | G/Y | B/U | R/V | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p | -1.1% | -1.2% | -1.2% | -1.1% | -1.2% | -1.2% |
| RGB, text & graphics with motion,720p | -0.8% | -0.8% | -0.8% | -1.0% | -1.0% | -1.0% |
| RGB, mixed content, 1440p | -0.1% | -0.1% | -0.1% | -0.1% | -0.1% | -0.1% |
| RGB, mixed content, 1080p | -0.2% | -0.3% | -0.3% | -0.2% | -0.4% | -0.3% |
| RGB, Animation, 720p | 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% |
| YUV, text & graphics with motion, 1080p | -1.2% | -1.4% | -1.4% | -1.2% | -1.5% | -1.5% |
| YUV, text & graphics with motion,720p | -0.4% | -0.8% | -1.0% | -0.7% | -0.9% | -1.0% |
| YUV, mixed content, 1440p | 0.0% | -0.2% | -0.2% | 0.0% | -0.3% | -0.3% |
| YUV, mixed content, 1080p | -0.1% | -0.4% | -0.4% | -0.2% | -0.5% | -0.4% |
| YUV, Animation, 720p | 0.0% | 0.0% | 0.0% | 0.0% | -0.1% | 0.0% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 105% | | | 104% | | |
| Dec Time[%] | 101% | | | 100% | | |

Table 2: Comparison of BD-rate performance of the CE6 C.2 (left) and proposed method (right) (All-Intra lossy)

# Conclusions

A CU level flag **use\_trans\_flag** is proposedto indicate the use of transition copy mode for palette coding. When **use\_trans\_flag** is 1, for index coding, an **equal\_to\_transition** flag coded in bypass mode is used to indicate whether the index is equal to the transition index. The simulation results show that the proposed method achieves 0.2% and 0.3% BD-rate savings for 720p text and graphics RGB and YUV, respectively, when compared with CE6 Test C.2 for All-Intra lossy configuration. The worst case context-coded bins complexity is improved with respect to CE6 test C.2.

# Patent rights declaration(s)

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# References

[1]. Y. Huang, P. Onno, R. Cohen, V. Seregin, X. Xiu and Z. Ma, “Description of Core Experiment 6 (CE6): Improvements of palette mode”, JCTVC-R1106.

[2]. H. Yu, R. Cohen, K. Rapaka, J. Xu , “Common conditions for screen content coding tests”, JCTVC-R1015, Sapporo, Japan, June 2014.