



# **Non-RCE4: A combination of the four-neighbor major color index prediction in JCTVC-P0098 and a simplified transition copy mode from JCTVC-P0115 on top of RCE4 Test1**

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# Overall Summary

- A combination of the four-neighbor major color index prediction in JCTVC-P0098 and the transition copy mode in JCTVC-P0115
  - On top of RCE4 Test1 (JCTVC-P0108)

- Results

| Lossy coding BD-rate | AI-MT | RA-MT | LB-MT |
|----------------------|-------|-------|-------|
| SC YUV 444 sequences | -4.1% | -3.7% | -2.8% |

- For further study in a CE

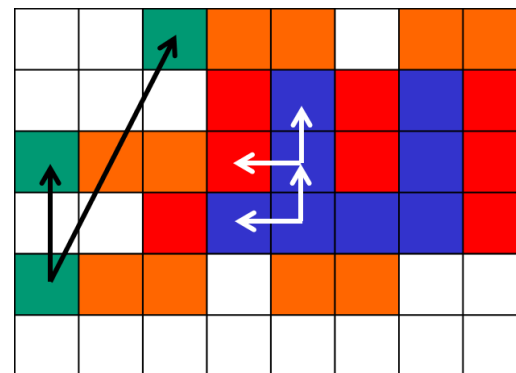
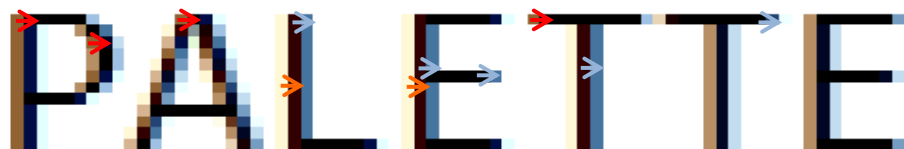
# Four-neighbor Prediction in JCTVC-P0098

- Method 1
  - Add the major color indices of the above-left (AL) sample and the above-right (AR) sample into the prediction candidate list: {A, L, no prediction, AL, AR}
  - Any redundant candidate is pruned
  - To maximize coding efficiency, use an adaptive candidate list size and adaptive codewords of the selected candidate index

|                  | Codeword |             |
|------------------|----------|-------------|
|                  | Original | If (L == A) |
| Copy above       | 1        | 1           |
| Copy left        | 00       | 10          |
| No prediction    | 010      | 010         |
| Copy above-left  | 0111     | 0111        |
| Copy above-right | 0110     | 0110        |

# Transition Copy Mode in JCTVC-P0115

- Add a new transition copy (TC) mode that takes into account a previous position of the same index
  - Search the causal area to find a matching position with the left sample of the current sample
  - The matching position is signaled and the sample to the right of the matching position is used for predicting the current sample



# Proposed Method

- Combine JCTVC-P0098 and JCTVC-P0115
  - Form an initial candidate list: {A, L, TC, AL, AR, NoPred}
  - Perform pruning
  - Signal a candidate index
- Although method-1 (adaptive candidate list size) in JCTVC-P0098 is used here as an example, method-2 (fixed candidate list size) can also be easily combined.
- Simplification of the Transition Copy (TC) candidate
  - For each coded index of a sample, its coded index of the next sample is recorded in a table and treated as a TC candidate.
  - When coding the current sample, the index of the left sample is used as the table input to find the TC candidate quickly.
  - No search in the causal area is needed.

# Lossy Coding Results

- Anchor: RCE4 Test1
- 4.1% / 3.7% / 2.8% BD-rate savings for SC YUV 444 sequences under AI-MT / RA-MT / LB-MT
- Thank Canon for cross-verification

| BD-rate Y         | AI-MT        | AI-HT        | AI-SHT       | RA-MT        | RA-HT        | LB-MT        | LB-HT        |
|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Class F           | -0.6%        | -0.6%        | -0.5%        | -0.2%        | -0.2%        | -0.2%        | -0.1%        |
| Class B           | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         |
| SC RGB 444        | -4.9%        | -4.9%        | -4.7%        | -4.3%        | -4.2%        | -3.7%        | -3.7%        |
| Animation RGB 444 | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | -0.1%        | 0.0%         |
| <b>SC YUV 444</b> | <b>-4.1%</b> | <b>-5.0%</b> | <b>-5.5%</b> | <b>-3.7%</b> | <b>-4.0%</b> | <b>-2.8%</b> | <b>-3.4%</b> |
| Animation YUV 444 | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | -0.1%        | 0.0%         |
| RangeExt          | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         |
| SC(444) GBR Opt.  | -12.3%       | -12.4%       | -12.0%       | -10.8%       | -11.7%       | -10.7%       | -11.2%       |
| SC(444) YUV Opt.  | -10.4%       | -11.8%       | -12.4%       | -8.9%        | -10.6%       | -9.2%        | -10.3%       |

# Lossless Coding Results

- Anchor: RCE4 Test1
- 4.5% / 3.6% / 3.3% bit savings for YCbCr 444 SC sequences under AI / RA / LB

|                           | AI           | RA           | LB           |
|---------------------------|--------------|--------------|--------------|
| Class F                   | -0.2%        | 0.0%         | 0.0%         |
| Class B                   | 0.0%         | 0.0%         | 0.0%         |
| RGB 4:4:4 SC              | -4.1%        | -3.3%        | -3.1%        |
| RGB 4:4:4 Animation       | -0.2%        | -0.2%        | -0.2%        |
| <b>YCbCr 4:4:4 SC</b>     | <b>-4.5%</b> | <b>-3.6%</b> | <b>-3.3%</b> |
| YCbCr 4:4:4 Animation     | -0.5%        | -0.5%        | -0.5%        |
| RangeExt                  | 0.0%         | 0.0%         | 0.0%         |
| RGB 4:4:4 SC (Optional)   | -10.3%       | -9.8%        | -11.2%       |
| YCbCr 4:4:4 SC (Optional) | -10.5%       | -9.7%        | -8.1%        |

# Conclusions

- A combination of JCTVC-P0098 and JCTVC-P0115 is proposed.
- Results on top of RCE4 Test1

| Lossy coding BD-rate | AI-MT | RA-MT | LB-MT |
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| SC YUV 444 sequences | -4.1% | -3.7% | -2.8% |

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