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Title: AHG12: Cross-component residual model (CCRM) for inter prediction

Status: Input document to JVET

Purpose: Proposal

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Source: Nokia

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Abstract

This contribution proposes to apply a cross-component residual model (CCRM) based chroma prediction to improve compression efficiency of inter slices in ECM. The proposed method uses 8-tap convolutional filter to map reconstructed luma into an improved chroma prediction when the CCRM prediction mode is activated by a TU level flag. The filter input consists of 6 spatial luma samples, a nonlinear term, and a bias term. Filter coefficients are derived for each block separately using the prediction signals and the filters are applied to the reconstructed luma signal. The impact on coding efficiency and runtimes over ECM-8.0 is reportedly {for Y, U, V, EncT, DecT}:

RA {-0.15%, -1.37%, -1.74%, 106%, 100%},

LD-B {0.03%, -3.21%, -3.20%, 106%, 100%},

LD-P {0.02%, -3.65%, -3.54%, 107%, 100%}.

Proposed method

Built from JVET-AD0108-v3.docx

MEETING NOTES

[JVET-AD0108](#) AHG12: Cross-component residual model (CCRM) for inter prediction [P. Astola, J. Lainema (Nokia)]

This contribution proposes to apply a cross-component residual model (CCRM) based chroma prediction to improve compression efficiency of inter slices in ECM. The proposed method uses 8-tap convolutional filter to map reconstructed luma into an improved chroma prediction when the CCRM prediction mode is activated by a TU level flag. The filter input consists of 6 spatial luma samples, a nonlinear term, and a bias term. Filter coefficients are derived for each block separately using the prediction signals and the filters are applied to the reconstructed luma signal. The impact on coding efficiency and runtimes over ECM-8.0 is reportedly {for Y, U, V, EncT, DecT}:

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The additional signalling could be the reason for the relative imbalance between luma loss and chroma gain in some classes and some sequences. Overall, several experts commented there is probably interesting gain.

It was agreed to investigate this in an EE. Also study possibility of reducing encoding time. Also benefit for different block sizes should be studied

It was suggested to better use denomination as “inter CCCM”

CITATION

P. Astola, J. Lainema, "AHG12: Cross-component residual model (CCRM) for inter prediction", JVET-AD0108, 30th Meeting: Antalya, TR, April 2023.