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Title: AHG11: Complexity Reduction on Neural-Network Loop Filter

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Abstract

JVET-AA0080 proposes to use CP decomposition plus fusing adjacent 1x1 convolution to reduce the complexity of NNLF. In addition, it also proposes to split architecture for luma and chroma components between input network and output network. Simulation shows that using JVET-X0140 low complexity model (EE1-1.4.1) as baseline, whose worst case block level complexity is 33.6 KMAC/Pixel, the proposal can achieve the AI luma gain about 5% with worst case complexity of 17.7 KMAC/pixel for (24L,8C) split. This contribution applies the same techniques proposed in JVET-AA0080 and investigates the RA case. The same baseline model shows the BD-rate saving of (Y, Cb, Cr, respectively) for RA compared to EE1. For the proposed complexity reduction techniques, when compared against EE1, the BD-Rate saving for RA (Y, Cb Cr, respectively) is:

CP decomposition with fusing: with worst case block level complexity of 16.2 KMAC/Pixel
(24L, 8C) + CP decomposition with fusion: with worst case block level complexity of 17.7 KMAC/Pixel

Introduction

JVET-AA0080 [1] proposes to use CP decomposition plus fusing adjacent 1x1 convolution to reduce the complexity of NNLF. In addition, it also proposes to split architecture for luma and chroma components between input network and output network. The proposed techniques shows that in AI case the luma gain is about 5% with worst case complexity of 17.7 KMAC/pixel for (24L,8C) split. The architecture retains majority of the luma gain and achieve higher chroma gain with worst case complexity further reduced to 14.2 KMAC/Pixel for (20L,8C) split and 11.3 KMAC/Pixel for (16L,8C) split, respectively.

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ABSTRACT

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