

**Joint Video Experts Team (JVET)
of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC
29/WG 11**

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Title: AHG10/AHG12: MTT split modes early termination

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Purpose: Proposal

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Source: Ericsson

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Abstract

This contribution presents an early termination method that is claimed to reduce encoding runtime . The cost of coding the CU without splitting the CU at all is compared to a threshold. If the cost is higher than the threshold, MTT split will not be considered, which is claimed to reduce encoding runtime. The proposal is implemented on top of ECM 9.0 software and compared to ECM-9.0, the average BDR loss and runtimes reported in this contribution are as follows:

For the worst-case RA encoding time, it is claimed that the proposed scheme reduces the runtime or the slowest chunk in Parkrunning3 QP22

It is proposed to include the in ECM for RA camera captured contents.

Introduction

ECM support QT with nested MTT partitioning structures. The MTT structure contains BTH, BTV, TTH, and TTV splitting. The QT and MTT splitting structure in ECM provide support for rectangular CUs as well as square CUs, which allows a better fit to local picture content characteristics and thus improves coding gain. However, with the variety of splitting structure in ECM, on the one hand coding gain is improved, but on the other hand, it increases the encoding time. This contribution proposes to add a criterion to decide when to early terminate the MTT partitioning.

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LINKS

CARD

JVET-AE0057

<http://vexpertise.stbit.ru/documents/JVET-AE0057>

JVET Search

W. Ahmad

P. Wittenstein

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AHG10/AHG12: MTT split modes early termination

Authors:

ABSTRACT

MEETING NOTES

SOURCE

external source

https://jvet-experts.org/doc_end_user/current_document.php?id=13005

JVET

Preview document JVET-AE0057

Document Information

Submitted by: Jorma Paavola

Title: AHG10/AHG12: MTT split modes early termination

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Associated Resources

Comments

ARCHIVE

archive

https://jvet-experts.org/doc_end_user/documents/31_Geneva/wg11/JVET-AE0057-v3.zip

FILE

ECM9_JVETAE0057.patch

DOC

JVET-AE0057-v3.docx

PPT

JVET-AE0057-v3.pptx

PPT

JVET-AE0057-v3.pptx

XLS

Test1_JVET_AE0057_ECM9.0_v3.xlsm

XLS

Test2_JVET_AE0057_ECM9.0_QP22Only_v3.xlsm

MEETING NOTES

external meeting notes

http://vexpertise.stbit.ru/meeting-notes/source/meeting_31_ae

Joint Video Experts Team (JVET)
of ITU-T SG21 WP3/21 and ISO/IEC JTC 1/SC 29
31st Meeting: Geneva, CH, July 2023

Document: JVET-AE0057

Title: Meeting Report of the 41st Meeting of the Joint Video Experts Team

Status: Report document from the chair of JVET

Purpose: Report

1 Summary

MEETING NOTES

[JVET-AE0057](#) MTT split modes early termination [W. Ahmad, P. Wennersten, K. Andersson (Ericsson)]

This contribution presents an early termination method that is claimed to reduce encoding runtime for ECM. The cost of coding the CU without splitting the CU at all is compared to a threshold. If the cost is higher than the threshold, MTT split will not be considered, which is claimed to reduce encoding runtime. The proposal is implemented on top of ECM 9.0 software and compared to ECM-9.0, the average BDR loss and runtimes reported in this contribution are as follows:

Test1 (Proposed condition is applied to all QPs)

Y 0.03%, U 0.06%, V 0.11%, EncTime 97.0%, DecTime 99.9% for the RA configuration,

Y 0.05%, U -0.06%, V -0.20%, EncTime 96.8%, DecTime 100.1% for the LDB configuration,

Test2 (Proposed condition is applied to QP 22 only)

Y 0.00%, U 0.00%, V 0.02%, EncTime 98.8%, DecTime 99.9% for the RA configuration. Overall EncT & DecT for QP22 are 95.5% , 99.7% respectively

Y -0.01%, U -0.02%, V 0.02%, EncTime 98.6%, DecTime 100.1% for the LDB configuration. Overall EncT & DecT for QP22 are 95.5% , 100.4% respectively.

For the worst-case RA encoding time, it is claimed that the proposed scheme reduces the runtime by 3% for the slowest chunk in Parkrunning3 QP22. For the worst-case LDB encoding time, it is claimed that the proposed scheme reduces the runtime by 5% for BQTerrace QP22.

It is proposed to include the Test2 in the ECM for RA and LDB camera captured contents.

It was asked if the formula (including a term (QP-22)) was tested for QPs below 22.? No, but it is believed that the threshold by tendency must be higher in lower QPs, which would be the case.

It was asked if the threshold should be bit depth dependent? Was not considered so far.

Test 1 is not QP dependent, and not class dependent.

Test 2 is QP dependent, and not class dependent.

concern was expressed by one expert that this introduces a new QP dependent encoder optimization, of which some aspects are not yet fully understood.

For AI, there would be no effect, as MTT starts at 32x32.

Generally, the tradeoff of test 1 (encoder runtime decrease vs. bit rate increase, which is consistent over classes) is asserted to be attractive.

Performance for screen content? For test 1 Class F -0.02, TGM +0.19% (which may be interpreted as very small loss, as gain/loss in TGM is usually much larger than in other classes)

Decision (SW/CTC): Adopt JVET-AE0057 Test 1. (CTC also for optional classes). Also for VTM with encoder config option, but not yet CTC for VTM, as results are not yet complete.

It was requested to conduct further study on behaviour for lower QP, and bit depth other than 10, to make an assessment about adoption for VTM CTC also for extended ranges of bit depth and QP.

Post-meeting note: A crosscheck on this contribution had originally been registered as JVET-AE0215, but was never delivered. According to a verbal report of the crosschecker, partial results were matching, and the implementation was straightforward.

CITATION

W. Ahmad, P. Wennersten, K. Andersson, "AHG10/AHG12: MTT split modes early termination", JVET-AE0057, 31st Meeting: Geneva, CH, July 2023.