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**CODING OF MOVING PICTURES AND AUDIO**

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| **Source:** | **3DG** |
| **Title:** | **Description of Exploration Experiment 13.2 for G-PCC on Inter-prediction for Attribute Coding** |

**Description of Exploration Experiment 13.24 for G-PCC on Inter-prediction for Attribute Coding**

# Abstract

This document provides a description of G-PCC Exploration Experiment (EE) 13.2 on Inter-prediction for Attribute Coding.

# Introduction

The goal of 13.2 is to further study and evaluate the inter-prediction scheme proposed in [1][2].

The experimental results of the EE will be evaluated by the 3DG/PCC AhG.

# Information about proposed tools

## m49599: [EE13-2] Report on Inter-prediction for Attribute Coding [1]

In this contribution, the result of studying the mandates of EE13-2 is reported. The results regarding the second mandate reveals that interframe coding even without any motion-compensation brings sizeable coding gains both for geometry and attribute coding. In addition, the current global motion-compensation in the interEM SW does not bring an additional coding gain for either the geometry or attribute while the local motion-compensation does to a degree both for the geometry and attribute. The results show that additional coding gains (3%~4% for CY, 1 ~2% bpp for CW) for attributes were obtained by local motion-compensation for ford\_01 and ford\_02 sequence cases.

## m47838: Interframe Prediction for Attribute Coding [2]

In this contribution, it is proposed to use an attribute-value from other point-cloud frames at different time instances in addition to the attribute-values from within the same point-cloud frame for prediction. The method can improve prediction performance especially when point-cloud samples are sparse within the current frame by providing sample attribute-values from corresponding locations in other frames.For the CY (near-lossless attribute coding) test category under the CTC, it achieves the Hausdorff BD-rate savings of -9.1% for the Category3 reflectance data set. For the CW (lossless attribute coding) tests under the CTC, it achieves 5.3% bpp reduction on average.

## 

# Description of Exploration Experiments

## Mandates

Mandates for EE13.2 are as follows:

1. Further evaluate the coding performance of inter-prediction as proposed in [1][2].

- Test the impact of the number of reference frames and the number of neighborhoods in the nearest-neighborhood search, and the number of maximum prediction candidate in the Predict-Transform scheme.

- (Optional) Test non-IPPP GOP structure such as bi-prediction

2. Improve motion-estimation and compensation algorithms available in the current interEM SW [3][4].

3. Study and implement different variations of modified nearest-neighborhood search and prediction-candidate list building.

## Participants

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## Software

The proposed tools shall be implemented on top of interEM V1.0 or later [3][4].

## Test configurations

Parameters and configurations for interEM Vx.0 software will be provided by the proponent.

## Evaluation Method

Tests will be performed basically following the G-PCC test conditions specified in CTC [8]. Conditions CW (lossless geometry, lossless attribute) and CY (lossless geometry, lossy attributes) will be tested.

Tests will be performed using dynamic content from CTC category 3, namely the Ford (fps=10) and QNX (fps=5) test sequences. In inter mode, a GOP size of 8 frames with the IPPP structure will be used leading to an inter frame period between 1 and 2 seconds.

Objective results will be provided using the result spreadsheet template. Coding efficiency vs. complexity (e.g., number of calculations, memory usage) aspects will also be studied and reported.

## EE.13.2 Coordinators

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# Timeline:

* **2019-09-17**: Deliver source code and results for cross check
* **2019-09-24**: Report of preliminary cross check results
* **2019-10-02**: MPEG document upload deadline

# References

[1] Report on Inter-prediction for Attribute Coding, ISO/IEC JTC1/SC29 WG11 input document m49599, Gothenburg, SE, July 2019

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[4] An exploratory model for inter geometry-based PCC, ISO/IEC JTC1/SC29 WG11 m44754, Macau, CN, October 2018.

[5] Global motion compensation for point cloud compression in TM3, ISO/IEC JTC1/SC29 WG11 m44751, Macau, CN, October 2018.

[6] On motion compensation for geometry coding in TM3, ISO/IEC JTC1/SC29 WG11 m42521, San Diego, USA, April 2018.

[7] PCC Test Model Category 13 v7, ISO/IEC JTC1/SC29/WG11 w18664, Gothenburg, SE, July 2019.

[8] Common Test Conditions for PCC, ISO/IEC JTC1/SC29 WG11 w18665, Gothenburg, SE, July 2019.