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**Email of convenor:** [**ostermann@tnt.uni-hannover.de**](mailto:ostermann@tnt.uni-hannover.de)

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**CODING OF MOVING PICTURES AND AUDIO**

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1. **Introduction**

This document provides a description of the core experiment 13.34 for filter based attribute prediction scheme on G-PCC proposed in [1]. In this contribution, we propose to use a set of three filter parameters to smooth selected neighbours’ attributes before doing the adaptive predictor selector in color pred scheme. All floating-point operations related to this algorithm have been removed. Three filter parameters are off-line trained based on the local geometry distribution of selected neighbours. Furthermore, there is no change in HLS structure. The goal of CE13.34 is to further study and evaluate the fixed-point version of the filter based attribute prediction scheme.  
There still exists some issues related with the CE and those issues need to be solved.

1. **Mandates**

The mandates for CE 13.34 are as follows:

* To reduce redundant operations in the current design.
* To evaluate the performance of the proposed prediction scheme on reflectance coding.
* To investigate the performance of the proposed prediction scheme on lossy attribute coding conditions.
* To evaluate the complexity of the filter based attribute prediction scheme.
* To compare the performance of the lifting transform and predicting transform with the proposed method at low QP values.

1. **Participants**

| Participant | Contact | E-mail address | Type |
| --- | --- | --- | --- |
| Peking University Shenzhen Graduate School | Chuang Ma Yiting Shao | machuang@pku.edu.cn ytshao@pku.edu.cn | Proponent |
| Apple | David Flynn | davidflynn@apple.com | Crosscheck |
| Northwestern Polytechnical University | Zhecheng Wang | zhecheng.wang@mail.nwpu.edu.cn | Crosscheck |

1. **Method to be evaluated**

A fixed-point version of filter-based enhanced intra prediction method for point cloud attribute compression need to be evaluated upon updated test model of G-PCC under the latest CTC.

1. **Information about proposed tools**

The neighbour searching-based pred scheme for attribute compression in TMC13v10 only considers the Euclidean distance between neighbours and current point without full consideration of the geometry distribution of those neighbours with respect to current point. When the nearest neighbors are selected in the pred mode based on Euclidean distance, we cannot guarantee that all the neighbors are evenly distributed around the current point.

Considering this motivation, we propose filter-based attribute prediction method scheme upon TMC13v10. Modifications of pred scheme in the encoder and decoder side are shown in Fig 1 and Fig 2, respectively.



Fig.1 Proposed filter-based enhanced pred scheme in the encoder.



Fig.2 Proposed filter-based enhanced pred scheme in the decoder.

In this implementation, we remove all floating-point operations in the algorithm.

1. **Test model, anchors and CTC**

The latest G-PCC reference software [2] will be used as the anchor for this CE.

All tests will be conducted on categories 1 and 3-fused average datasets under the latest CTC [3].

1. **Timeline:**

* **2020-07-29**: Expected date for release of cross-verified new G-PCC software and anchor;
* **2020-09-04**: Deliver source code and results for crosscheck;
* **2020-09-18**: Preliminary feedback from cross-checkers to proponents
* **2020-10-07**: MPEG document upload deadline.

1. **References**
2. “[G-PCC] CE13.34 report on filter based attribute prediction scheme”, ISO/IEC JTC1/SC29/WG11 input document. M54587, Online, June 2020.
3. “G-PCC Test Model v11”, ISO/IEC JTC1/SC29/WG11 MPEG Doc. w19517, Online, July 2020.
4. “Common Test Conditions for G-PCC”, ISO/IEC JTC1/SC29/WG11 MPEG Doc. w19584, Online, July 2020.