Overview of the MPEG Activity on Point Cloud Compression

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Abstract: We present an overview of the MPEG activity on Point Cloud Compression (PCC). This activity aims to satisfy the growing need for lossless and lossy PCC in industry. It follows recent advances in consumer electronics in 3D reconstruction and capturing. We present the preliminary architecture, test datasets and the test model reference software implementation. Contributions beyond the state of the art in PCC include lossy coding of color attributes and lossy inter-predictive coding.

1. Summary

Point cloud data sources are found in many applications. The Moving Picture Experts Group (3D Graphics subgroup) has started an activity to develop standardized 3D point cloud compression (PCC). This will support efficient and interoperable storage and exchange of 3D point clouds. The activity is embedded in the larger MPEG-4 standard which defines the following requirements for PCC. Firstly, *lossless* and/or *lossy* coding of geometry coordinates. Secondly, *lossless* and/or *lossy* coding of point cloud attributes data. Thirdly, time varying point clouds will be supported. These cover applications like 3D printing, 3D mixed reality, 3D content authoring, mobile 3D Capture and 3D CAD.

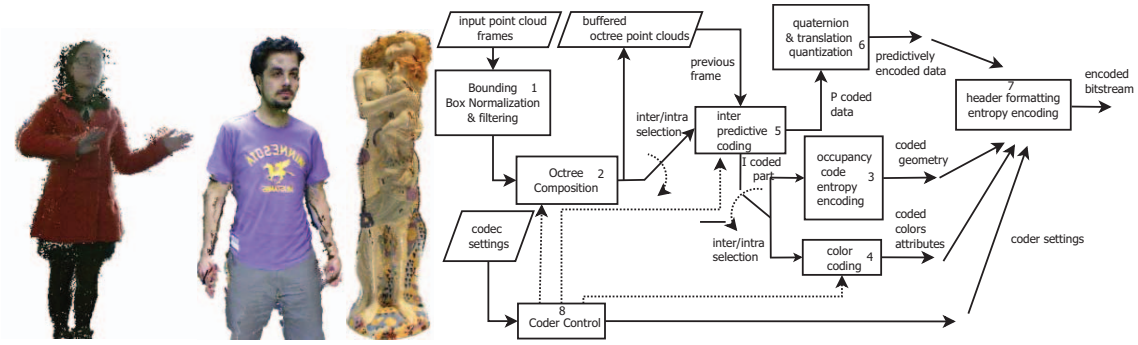

Figure 1: Test data and PCC test model software Architecture

On the left side of Figure 1 we show the PCC test data from MPEG media repository. It includes time-varying clouds for tele-immersive mixed reality and cultural heritage scans. The right of Figure 1 shows the currently defined architecture implemented in reference software test model in MPEG svn [1]. It is based on octree and includes novel techniques for lossy inter frame prediction and colors coding. For a more details we refer to [2].

[1]MPEG-4Part 16 AFX reference software. [Online]. http://wg11.sc29.org/svn/repos/MPEG-04/Part16-Animation_Framework_eXtension_(AFX)/trunk/3Dgraphics/3DG-PCC/

[2] R.N. Mekuria, K. Blom, P. Cesar., "Design, Implementation and Evaluation of a Point Cloud Codec for 3D Tele-immersive Video," IEEE Transactions on Circuits and Systems for Video Technology, 2016

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