Video-based compression for plenoptic point clouds

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1   Algorithm

In this paper, we first extend the video-based point cloud compression (V-PCC) to support the plenoptic point cloud compression by generating multiple attribute videos. Then based on the observation that these videos from multiple views have very high correlations, we propose encoding them using multiview high efficiency video coding. We further propose a block-based padding method that unifies the unoccupied attribute pixels from different views to reduce their bit cost.

2   Experimental results

The proposed algorithms are implemented in the V-PCC reference software TMC-7.0 to compare with the state-of-the-art method RAHT-KLT [1]. Table 1 gives a performance comparison between our multiview solution with the proposed padding method and the state-of-the-art method RAHT-KLT. We can see that the proposed multiview solution can lead to 37.0% performance improvements on average compared with RAHT-KLT through better utilizing the correlations among various views.

Table 1: Performance comparison between the proposed method and RAHT-KLT

Name	Points	Cameras	Geometry depth	Attribute depth	performance
Boxer	3496011	13	12	8	−17.9%
Loot	3021497	13	12	8	−42.4%
Soldier	4007891	13	12	8	−33.9%
Thaidancer	3130215	13	12	8	−50.4%
Longdress	3100469	12	12	8	−40.6%
Redandblack	2776067	12	12	8	−28.3%
Average	−	−	−	−	−37.0%

3   References

[1] G. Sandri, R. L. de Queiroz, and P. A. Chou, "Compression of plenoptic point clouds," *IEEE Transactions on Image Processing*, vol. 28, no. 3, pp. 1419–1427, March 2019.