With the development of augmented reality, the delivery and storage of 3D content have become an important research area. Among the proposals for point cloud compression collected by MPEG, Apple's Test Model Category 2 (TM2C) achieves the highest quality for 3D sequences under a bitrate constraint. However, the TM2C framework is not spatially scalable. In this paper, we add interpolation components which make TM2C suitable for flexible resolution. We apply a patch-aware averaging filter to eliminate most outliers which result from the interpolation. Experimental results show that our method performs well both on objective evaluation and visual quality.

Evaluation

**Evaluation metric**
- 2D: PSNR
- 3D: MSE defined below

\[
\text{MSE} = \frac{1}{N} \sum_{i=1}^{N} (x_i - y_i)^2
\]

\[
\Delta_{\text{MSE}} = \text{MSE}_{\text{ours}} - \text{MSE}_{\text{baseline}}
\]

where \(\text{MSE}_{\text{ours}}\) and \(\text{MSE}_{\text{baseline}}\) are obtained from different algorithms.

**Evaluation**

- 2.5, 5, 1, 1.75, 2.0, 2.25, 2.5
- Quantization parameters: 0, 10, 20, 30, 40
- Scale factors:
- Filtering: A: Average filter, M: Median filter, W: Weighted filter

**Example for sequence**
- **dancer** with different S, Q, and C
- **Quantization**
- **Filter**
- **Scale Factors**

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**TMC2 Framework**

**Evaluation**

- Add scale-down module at encoder side and scale-up module at decoder side
- Simple scaling module will cause noise at edge of path

**Patch-aware Averaging Filter**

- Add scale-down module at encoder side and scale-up module at decoder side
- Simple scaling module will cause noise at edge of path

- **At encoder side:**
  - Decomposition into patches for each frame
  - Packing for each frame

- **Geometry Sequence**
  - Video Encoder
  - Texture Sequence
  - Video Encoder
  - Auxiliary Patch Information

- **Decomposition (Segmentation):**
  - Computing normal for each facet
  - Clustering based on normal direction
  - Assigning each facet's normal direction

- The averaging filter generates slightly lower MSE than the median filter and a weighted filter. The experimental results on 2D PSNR and 3D MSE as well as visual inspection of image pairs show that our method performs well both on objective evaluation and on subjective visual quality.