

## Investigation on view sampling strategies for effective construction of canonical regions

We made an investigation on view sampling strategies to effectively and efficiently construct canonical regions. In this investigation, we evenly sampled views on the box surface with the views added gradually, and checked how the obtained clusters by the sampled views cover the viewing sphere surface. The three tested sampling strategies are in the below:

- **Manner1:** only 8 canonical views of the bounding box are adopted.
- **Manner2:** 8 canonical views of the bounding box, 6 face views from the face centers of the box, and 24 interpolation views from the middle points of the lines connecting face centers and corners of the box, whose directions are interpolated between those of the related canonical views and face views.
- **Manner3:** 8 canonical views of the bounding box, 6 face views from the face centers of the box, 24 interpolation views, and 12 edge views from the middle points of the box edges, whose directions are interpolated by those of its nearby canonical views.

The sampled views are illustrated on a box face in Figure 1, where canonical views, face views, interpolation views and edge views are in black, red, blue and green respectively.

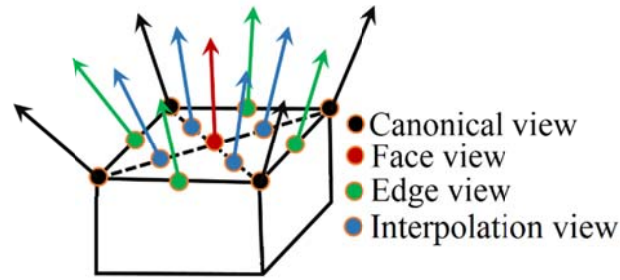


Figure 1. Four types of views sampled on a box face.

In Table A, it is given the coverage ratios of the obtained clusters vs. the viewing sphere surface when the three view sampling manners were used respectively. From the statistics in Table A, it is known that with the second and third view sampling manners, the obtained clusters can almost cover the viewing sphere surface. This means that the viewing sphere surface is almost checked for the observability of the box, and so the obtained canonical regions are surely the regions that are very likely to contain best views. Considering the computation efficiency, we adopt **Manner2** for view sampling in our implementation.

**Table A.** Coverage ratios of the obtained clusters vs. the viewing sphere surface

Models	View Sampling Manners		
	Manner1	Manner2	Manner3
Humans	48.45%	92.99%	97.34%
Animals	47.62%	93.86%	97.40%
Artificial models	43.08%	91.31%	92.96%