

## **Evaluation of projection model for random point cloud**

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**ABSTRACT:** Recently, point cloud data are acquired by some platforms, such as a terrestrial laser scanner, land-based mobile mapping system (MMS), and airborne LiDAR. These systems can achieve a rapid and massive point cloud data acquisition for road surveying, mapping, structure maintenance, and environment monitoring. However, massive point cloud data require huge processing time in data sharing, visualization and 3D modeling. Therefore, we have proposed a performance improvement of point cloud processing based on point-based rendering approach. Our point-based rendering can select several projection models, such as a spherical, cylindrical, and orthogonal model. Each model has different advantages and disadvantages.

We propose a methodology to select a suitable projection model in some point cloud editing works in a road monitoring, structure monitoring, surveying, and indoor mapping. First, we projected point cloud into multi-layered panoramic range images as 2D models. Second, we defined the most suitable projection model for some applications using point cloud. Then, we defined evaluation indices for the most suitable projection to represent measured space using acquired point cloud. The indices include environment parameters, such as a sky factor and existence of artificial objects.

In our experiment, we prepared two types of point cloud data acquired with MMS and terrestrial LiDAR. Through our experiment, we clarified that a projection model selection can be described with our evaluation model in a road monitoring, structure monitoring and surveying.

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Suggested Topics: LiDAR, Data processing