SegDF: Segment Based Dynamic Filter in 3D Point Cloud

Abstract

Dynamic objects in lidar data often leave traces with low interpretability in 3D point clouds, affecting the quality of maps and localization performance. We propose a novel static and semantic reconstruction method, called SegDF, for focusing on filtering the dynamic objects on the ground with high mobility in urban environment. Given pairs of registered scans, we build a curved-voxel map assisted by sensor intensity to cluster them into instances and obtain semantics through geometric verification. Meanwhile, we represent the occupancy state of the volume of space by curved-voxels to remove dynamic points in object level. Furthermore, our approach tightly couples the instance segmentation and dynamic detection, which can improve the removal accuracy and compensate the imperfect clustering in the process of building a static object map. We validate SegDF on the KITTI dataset using SemanticKITTI as ground truth and prove that it works well in real urban streets.