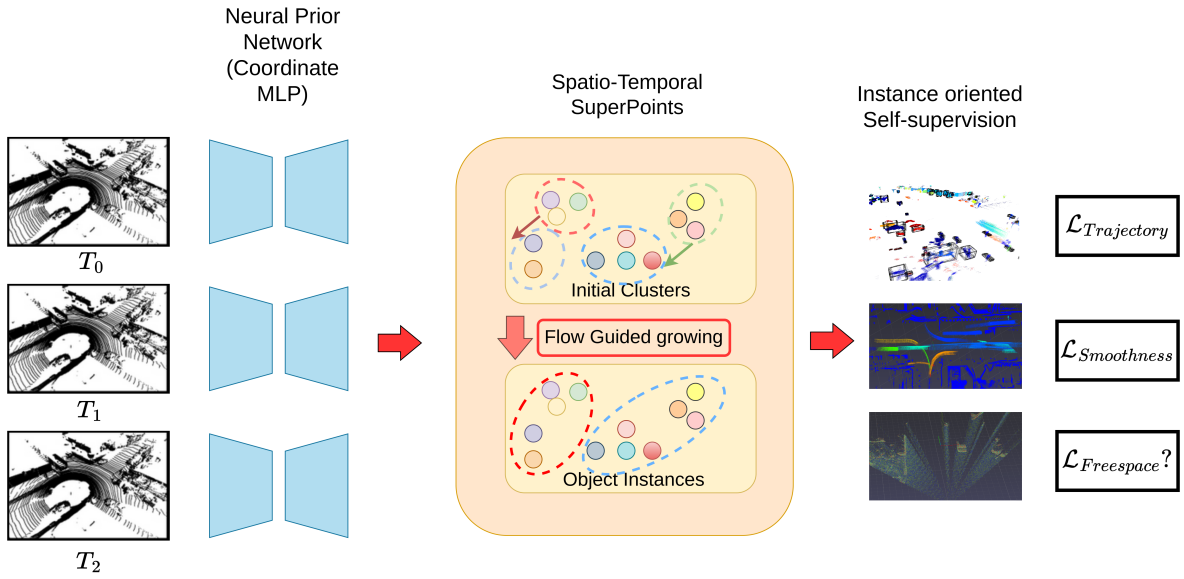
”short name” - Unsupervised Multi-Rigid Body Scene Flow For 3D Point Clouds



Anonymous CVPR submission

Paper ID *****

Abstract

We study the problem of 3D scene flow from real large-scale raw point cloud sequences, the growing research topic useful for other computer vision tasks as it provides per-point motion features. Despite the current approaches using coordinate or complex neural networks are able to capture high-level motions by implicitly smoothing the scene flow predictions, they are prone to fail at detection multi-object rigid motions in real data, resulting in deformed scene flows. Unlike the other methods that relies on cumbersome and time-consuming fitting of SE3 transformation for multi-body rigidity, we propose to use progressive spatio-temporal clustering with time-efficient rigidity regularization along the time sequence, that does not require human labels or pretrained models, and that generilize to out-of-the-distribution data. Our method consists of three major components: 1) rigid instance-level proposals based on progressive spatio-temporal clustering along the sequence, 2) the per-point efficient rigidity regularization term and 3) instance trajectory optimization representing fluent motion of rigid bodies. We evaluate our method on multiple datasets with LiDAR point clouds, demonstrating the superior performance over unsupervised baselines and showing the benefits of joint instance and flow estimation, as well as our proposed regularization terms. We hope our work will shift the research attention from the synthetic bi-jective dataset benchmarks to the real large-scale generalizable scene flow estimation. The code is anonymously available at ...

1. Introduction

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References