HiMo: High-Speed Objects Motion Compensation in Point Clouds (Abstract Reprint)

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Abstract

LiDAR point cloud is essential for autonomous vehicles, but motion distortions from dynamic objects degrade the data quality. While previous work has considered distortions caused by ego motion, distortions caused by other moving objects remain largely overlooked, leading to errors in object shape and position. This distortion is particularly pronounced in high-speed environments such as highways and in multi-LiDAR configurations, a common setup for heavy vehicles. To address this challenge, we introduce HiMo, a pipeline that repurposes scene flow estimation for non-ego motion compensation, correcting the representation of dynamic objects in point clouds. We further propose SeFlow++, a real-time scene flow estimator that achieves state-of-the-art performance on both scene flow and motion compensation. We validate HiMo through extensive experiments on Argoverse 2, ZOD and a newly collected real-world dataset featuring highway driving and multi-LiDAR-equipped heavy vehicles.

References

Zhang, Q.; Khoche, A.; Yang, Y.; Ling, L.; Mansouri, S. S.; Andersson, O.; and Jensfelt, P. 2025. HiMo: High-Speed Objects Motion Compensation in Point Clouds. *IEEE Transactions on Robotics*, 41: 5896–5911.