

Nordic AI Meet 2026

P4: Machine Learning, Intelligent Systems & AI for Science and Engineering

1. Self-supervised Learning of 3D Representations from Lidar Images

Authors: Alexandre Justo Miro^{1,2}; Bogdan Timus¹; Thomas Gustafsson¹; Ajinkya Khoche¹; Mikael Sjödin²; Ludvig af Klinteberg²; Sina Sharif Mansouri¹; Masoud Daneshtalab²

Affiliations: 1. Traton Group R&D, Sweden; 2. Mälardalen University, Sweden

Abstract: Learning rich 3D representations is essential for real-world applications, such as autonomous driving, where robustness, accuracy, and efficiency are critical. Although large amounts of LiDAR data are already available, many remain unlabeled. Annotations are costly and time-consuming to obtain, which limits the scalability of supervised approaches. In this work, we explore techniques for self-supervised representation learning for LiDAR images. Specifically, we investigate knowledge distillation from a frozen visual foundation model into a LiDAR image encoder, and masked autoencoding of various LiDAR channels; all without requiring any labels. Using samples from several LiDAR brands, our work provides analyses of learned deep feature embeddings and their richness, providing insights into the potential of self-supervised representation learning from LiDAR images. We work on a path toward 3D representation learning that can scale up with range and resolution, and as such can benefit modern perception systems that rely on LiDAR sensors.