



浙江大学
ZHEJIANG UNIVERSITY



腾讯优图



APRIL 机器人智能感知与学习实验室
Advanced Perception on Robotics and Intelligent Learning Lab

Learning to Measure the Point Cloud Reconstruction Loss in a Representation Space

IEEE Conference on Computer Vision and Pattern Recognition 2023 (CVPR'23)

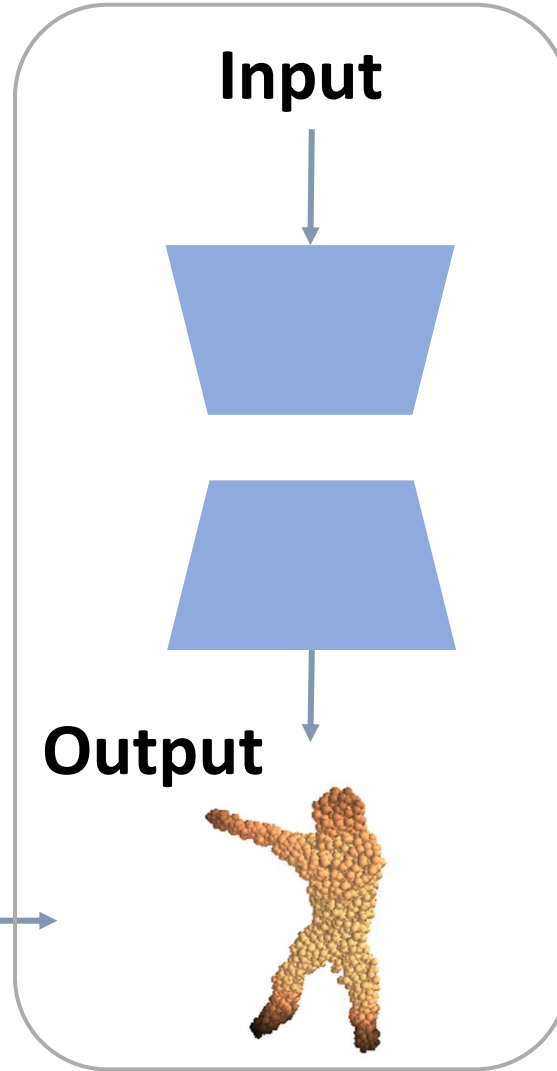
Tianxin Huang, Zhonggan Ding, Jiangning Zhang, Ying Tai, Zhenyu Zhang,
Mingang Chen, Chengjie Wang and Yong Liu*

WED-AM-380

Overview

Problem Definition

Ground Truth



Reconstruction-related task

Reconstruction?

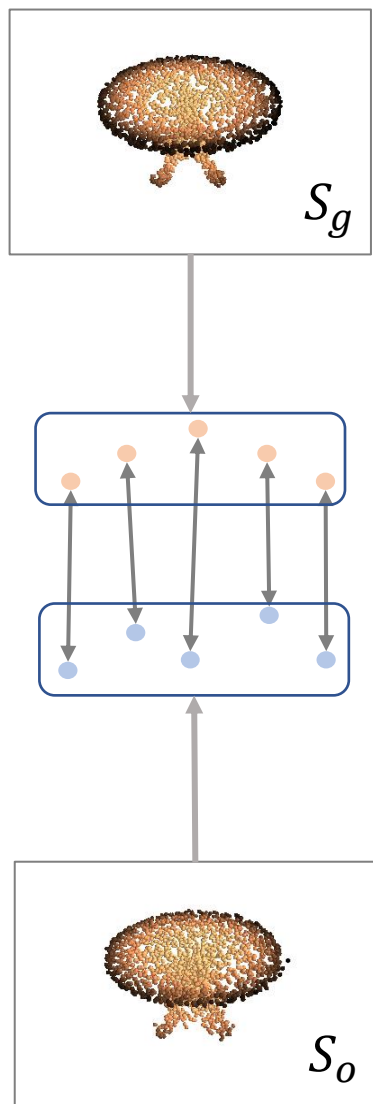
Unsupervised
Classification?

Completion?

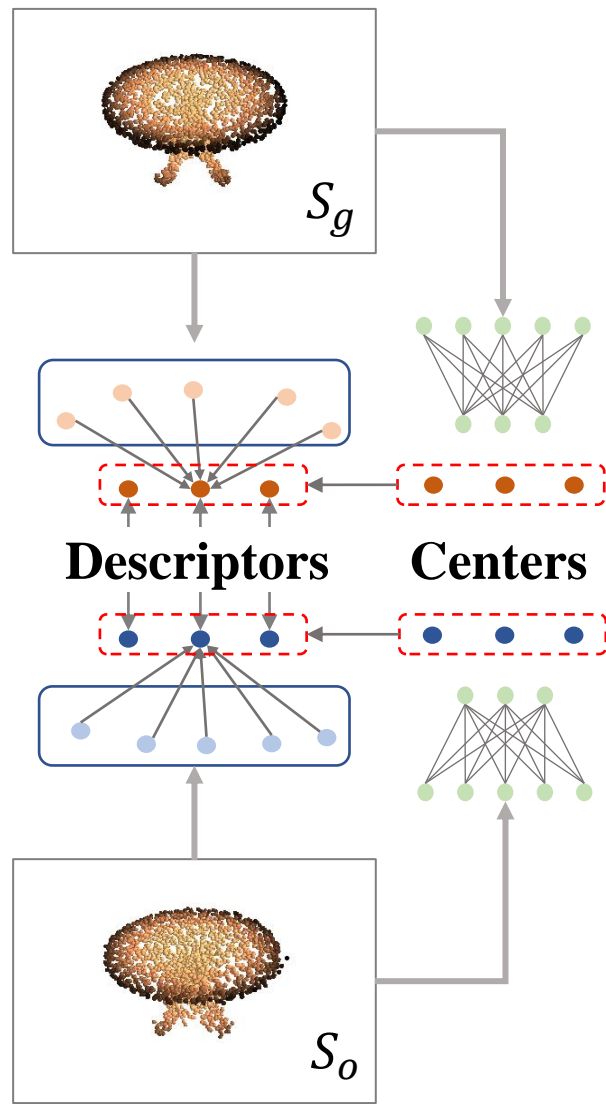
...

Evaluate the distance between reconstructed results and GT

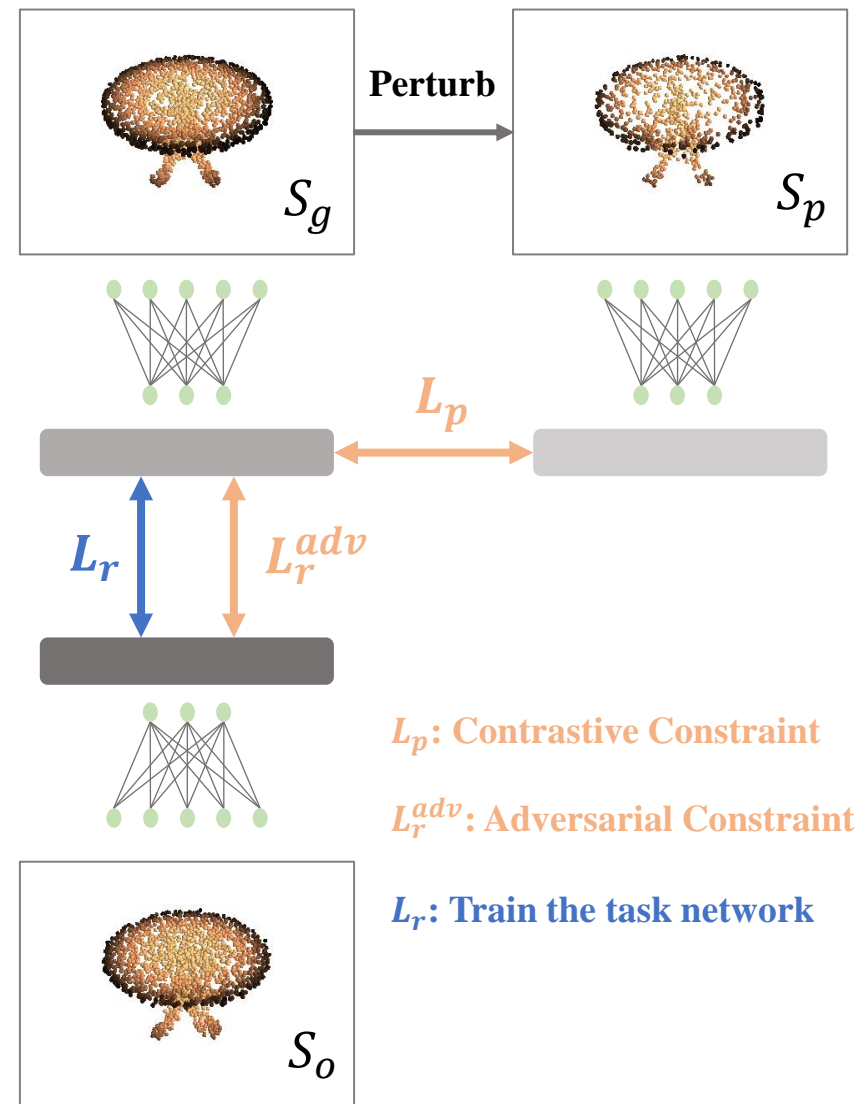
Matching-based Loss




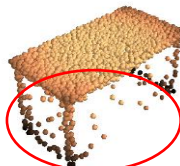
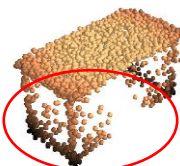


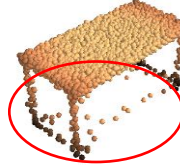

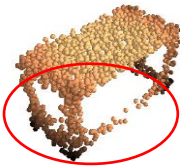
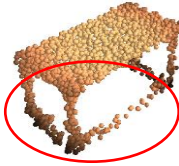






















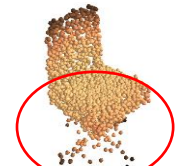




PCLoss



Ours

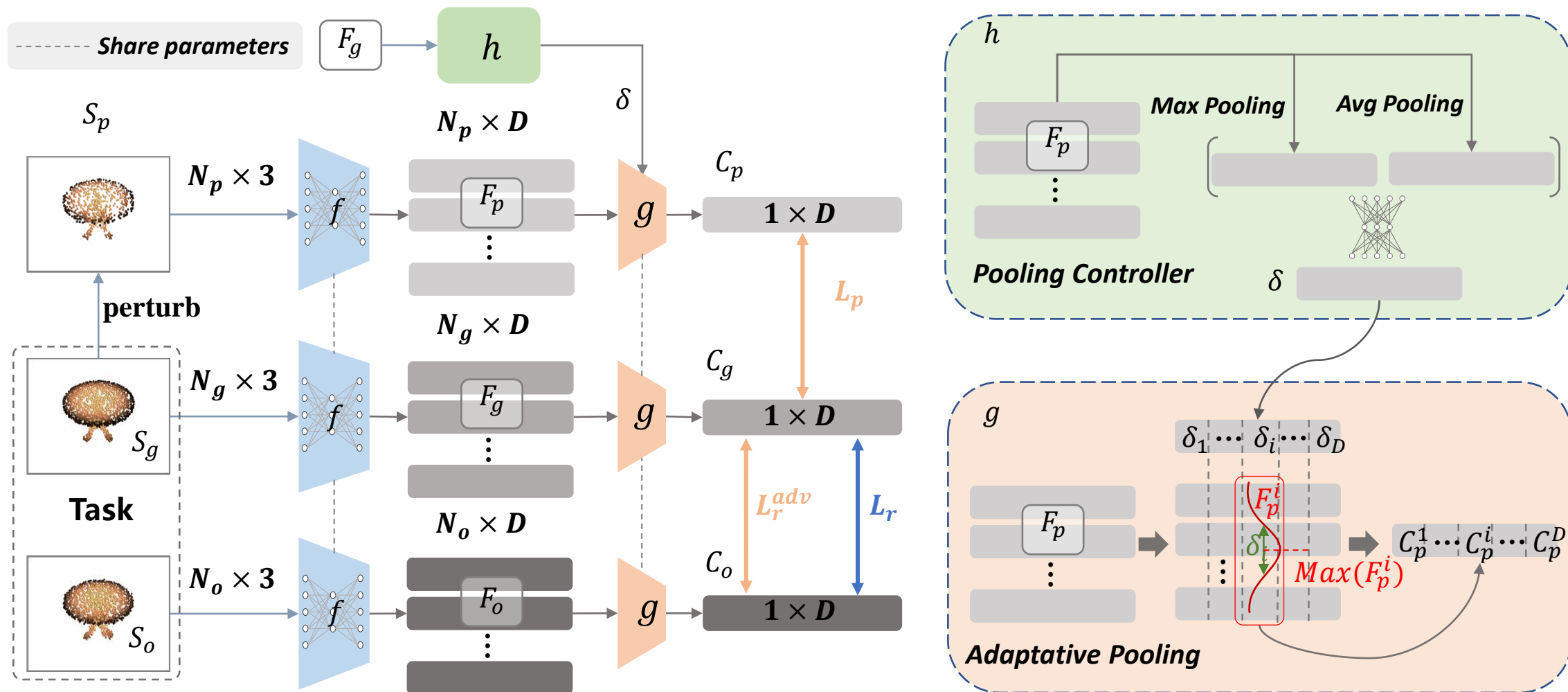


Performance evaluation

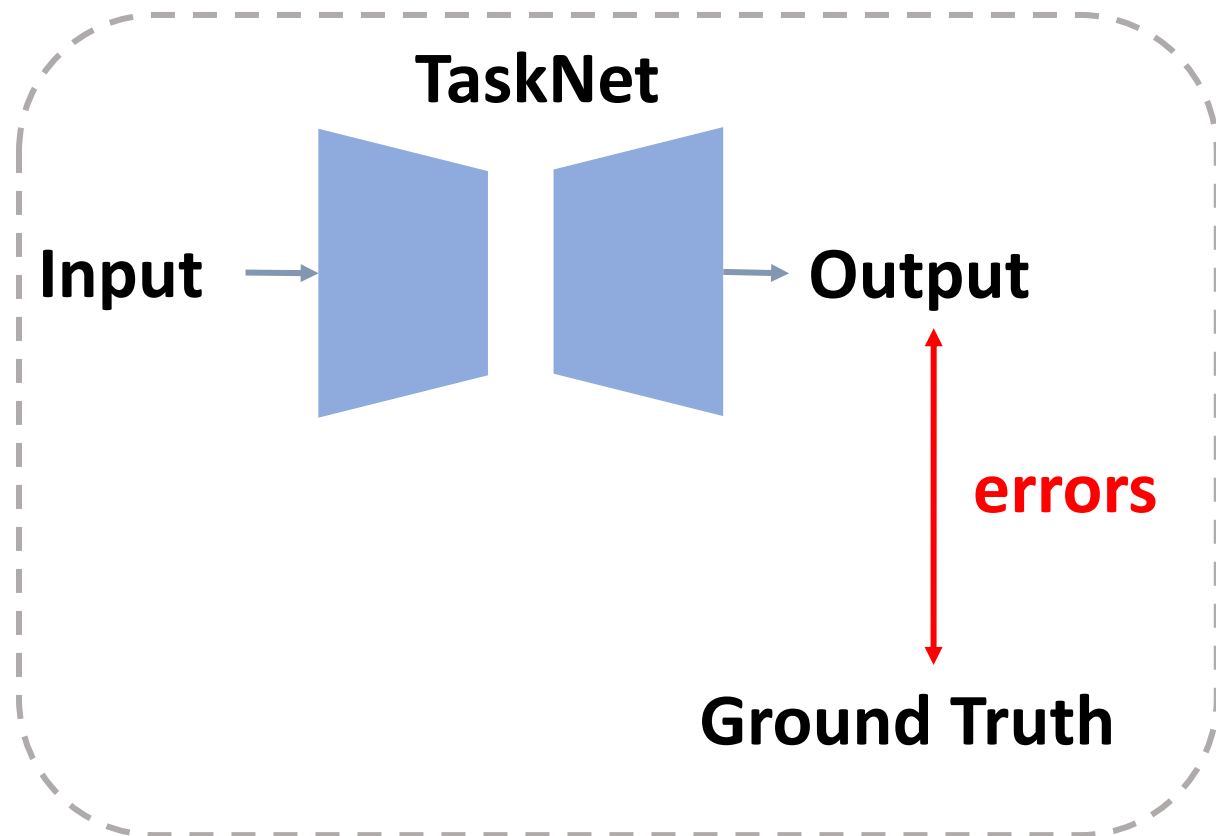
GT	CD	EMD	PUD	CRND	PFD	DCD	PCLoss	Ours
								
								
								
								

More details

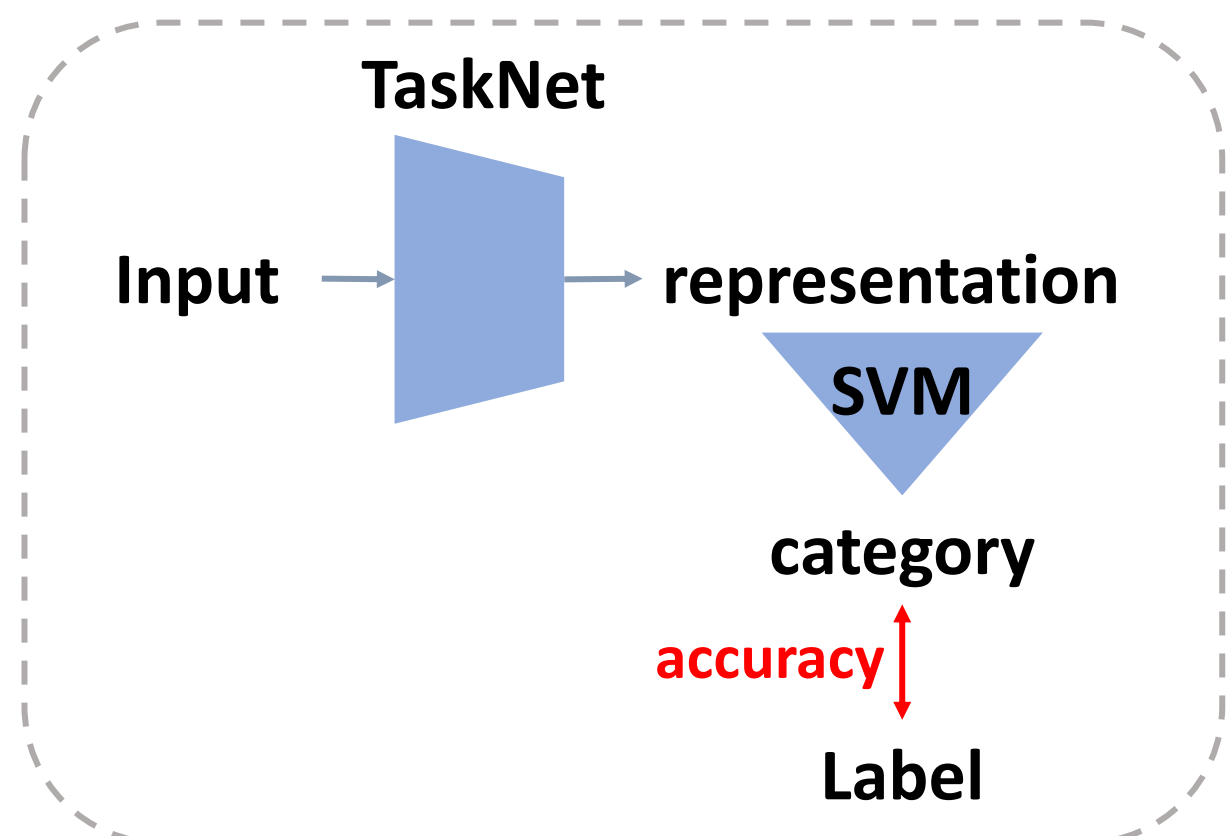
Proposed Methodology



How to compare?



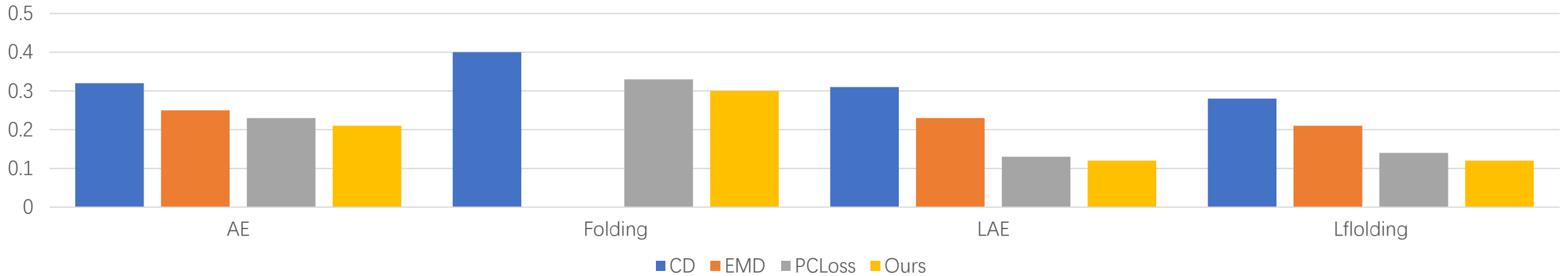
Reconstruction/Completion



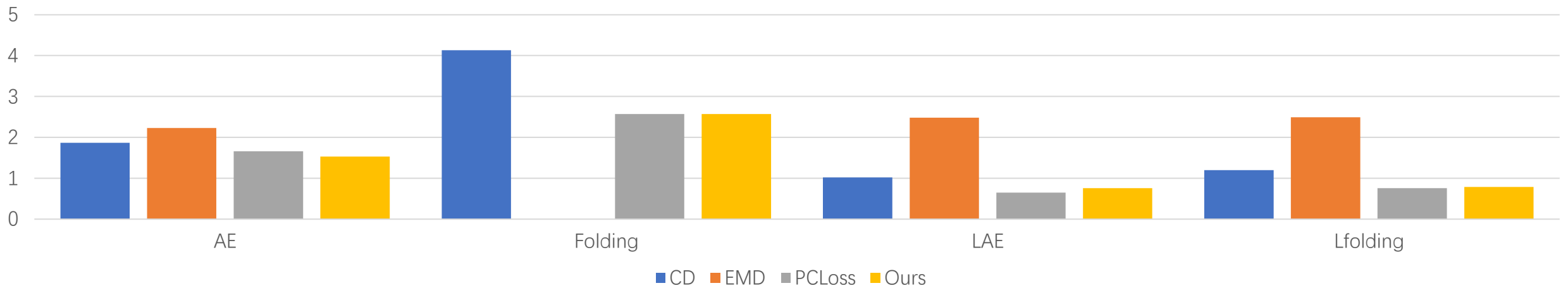
Unsupervised classification

Comparison with Reconstruction Losses

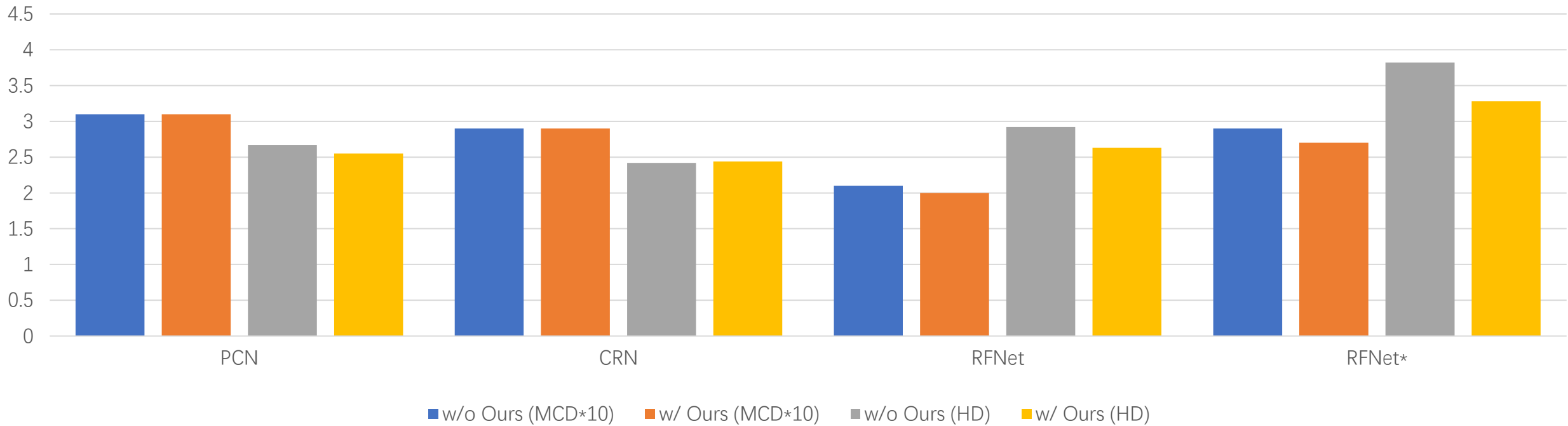
Comparison on ShapeNet Part (MCD metric)



Comparison on ShapeNet Part (HD metric)



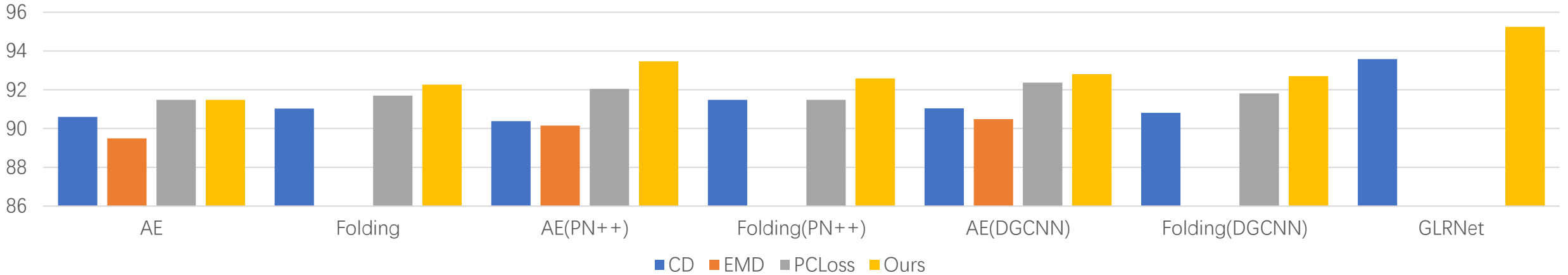
Comparison on Point Cloud Completion



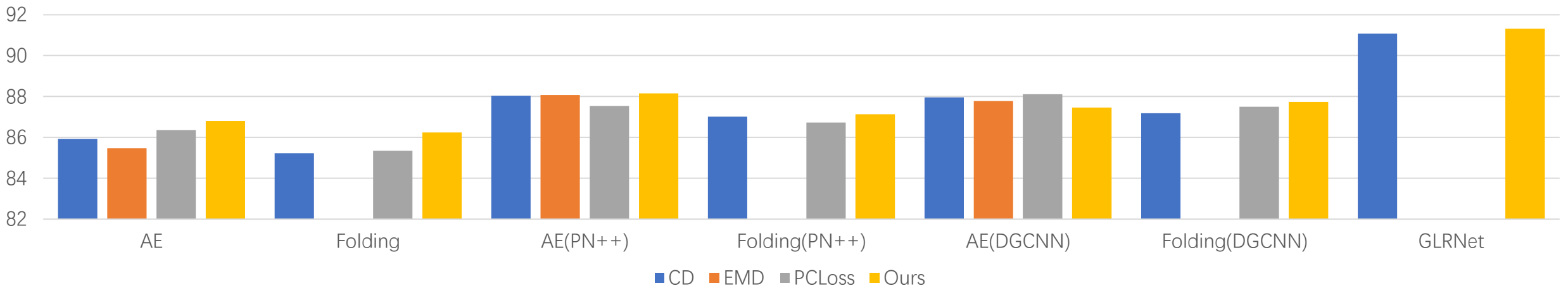
RFNet and RFNet* denote results evaluated on known and novel categories, respectively.

Comparison on unsupervised classification

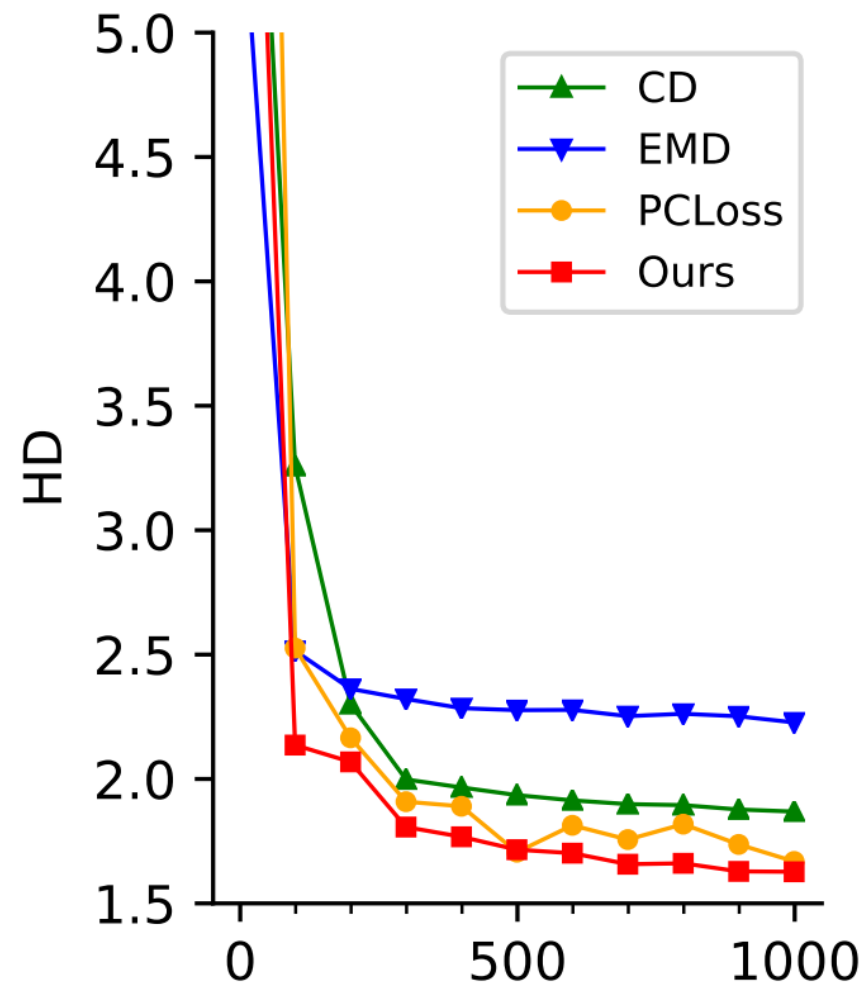
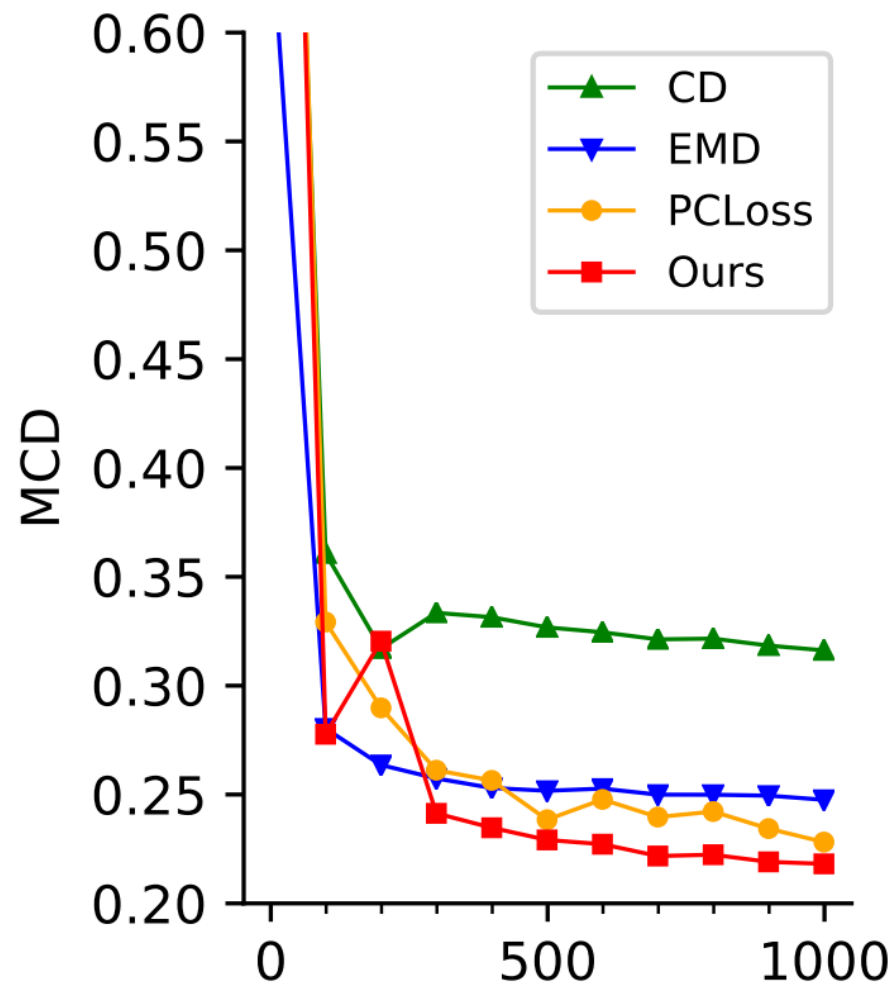
Comparison on MN10



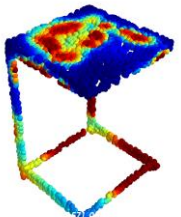
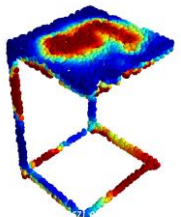
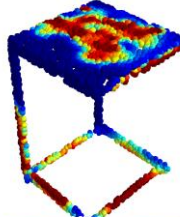
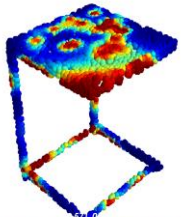
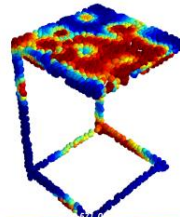
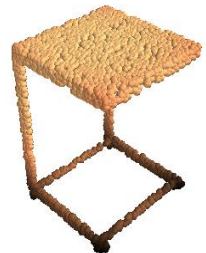





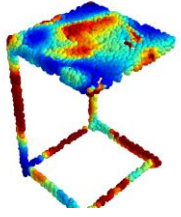
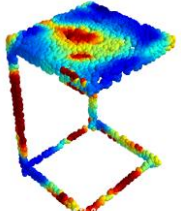
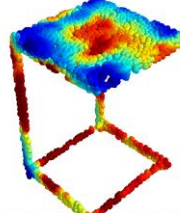
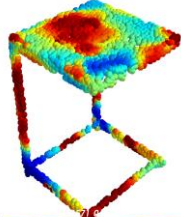
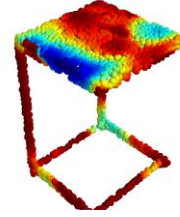
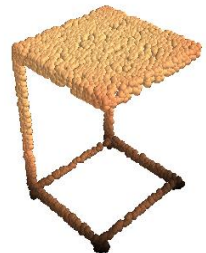


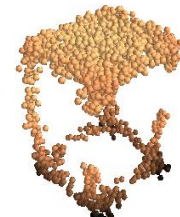
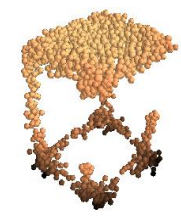

Comparison on MN40



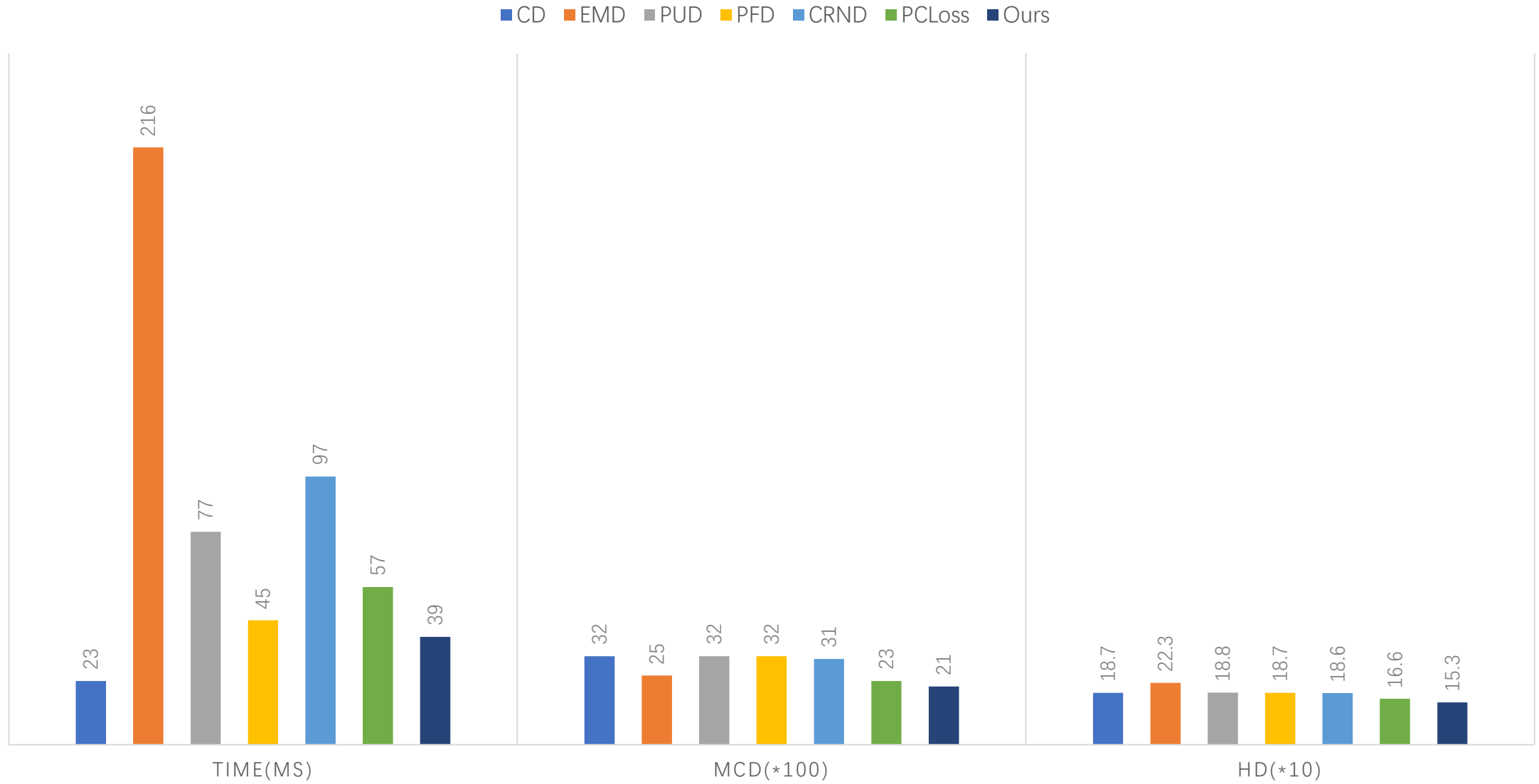
Training Process



Training Process Analysis

	Iteration	100	200	300	400	500	GT
PCLoss	Map						
	Output						
Ours	Map						
	Output						

Training efficiency Comparison



Thank you for your attention!

➤ Code page: <https://github.com/Tianxinhuang/CALoss>