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SSII30周年技術マップ：点群事前学習と3Dデータセット

3D Dataset

Outdoor Scene

- KITTI [Geiger+, CVPR2012]
- Oxford RobotCar [Madden+, IJRR2017]
- ApolloScape [Wang+, TPAMI2019]
- Argoverse [Changl+, CVPR2019]
- Lyft lv5 [Kesten+, arXiv2019]
- OTOH [Housten+, CoRL2020]
- nuScenes [Caesar+, CVPR2020]
- A2D2 [Geyer+, arXivS2020]
- A*3D [Sun+, ICRA2020]
- AutoMine [Yuchen+, CVPR2022]
- ONCE [Mao+, NeurIPS2021]
- Zenseact [Alibeigi+, ICCV2023]
- Waymo Open [Mei+, ECCV2022]
- MUSES [Brödermann+, arXiv2024]

Indoor Scene

- SUN RGBD [Song+, CVPR2015]
- NYU Depth [Silbermanr+, ECCV2012]
- SUN 3D [Xiao+, ICCV2013]
- SYNTHIA [Ros+, CVPR2016]
- SceneNN [Hua+, 3DV]
- SUNCG [Shuran+, CVPR2017]
- SUNCG [Handa+, CVPR2016]
- 2D-3D Semntics [Shuran+, CVPR2017]
- MatterPort3D [Angel+, 3DV2017]
- InteriorNet [Li+, BMVC2017]
- ScanNet [Dai+, CVPR2017]
- Replica [Strab+, CoRR2017]
- 3D Scene Graph [Armei+, ICCV2019]
- OASIS [Chen+, CVPR2020]
- Structured3D [Zheng+, ECCV2020]
- ZInD [Cruz+, CVPR2021]
- OpenRoom [Li+, CVPR2021]
- OpenRoom [Li+, CVPR2021]
- OpenRoom [Li+, CVPR2021]
- OpenRoom [Li+, CVPR2021]
- SceneVerse [Jia+, CVPR2024]

3D Representation Learning (Self-Supervised Learning)

Contrastive Learning:

Contrastive Learningは、類似点と非類似点のデータを比較する自己教師あり学習手法です。特徴空間にて類似データペアを近づけ、異なるペアを遠ざけるように学習します。
特に、画像認識におけるSimCLRやMoCoに触発され、3Dシーン理解のための事前学習手法では数多く提案されています。

Reconstruction:

Reconstructionは、意図的に欠損させた点群を生成モデル等を用いて再作成する自己教師あり学習手法です。特に近年では、Transformerの台頭と同時にMasked Modelingが数多く提案されています。Masked Modelingでは、データの一部を意図的に隠蔽（マスキング）し、その隠蔽部分を予測します。

Alignment:

Alignmentは、複数視点やモダリティの一貫性を活用してPre-text taskによる自己教師あり学習手法です。点群に幾何拡張を施すことでPre-text taskを生成し学習する手法が提案されています。
例えば、Multi-Task PCでは複数のPre-text taskを同時に最適化することで、様々なタスクに対応する特徴表現を学習します。

Indoor Scene Understanding

- PointContrast [Xie+, ECCV2020]
- CSC [Hou+, CVPR2021]
- RandomRooms [Rao+, ICCV2021]
- DephtContrast [Zhang+, ICCV2021]
- STRL [Huang+, ICCV2021]
- PC-FractalDB [Yamada+, CVPR2022]
- SL3D [Julio+, ECCV2022]
- DPco [Li+, ECCV2022]
- 4D Contrast [Chen+, ECCV2022]
- SGRec3D [Koch+, WACV2024]
- MSP [Zetong+, CVPR2023]

Outdoor Scene Understanding

- GCC3D [Liang+, ICCV2021]
- ProposalContrast [Sautier+, ECCV2022]
- SegContrast [Nunes+, RA-L2022]
- AD-PT [Yuan+, NeurIPS2023]
- TARL [Nunes+, CVPR2023]
- O-MAE [Min+, TIV2023]
- MV-JAR [Xu+, CVPR2023]
- GeoMAE [Tian+, CVPR2023]
- ALSO [Boulch+, CVPR2023]
- GD-MAE [Yang+, CVPR2023]
- BEVContrast [Sautier+, 3DV2024]
- UniPAD [Yang+, CVPR2024]
- ViDAR [Yang+, CVPR2024]
- MAELi [Krispel+, WACV2024]
- BEV-MAE [Lin+, AAAI2024]

3D Object Classifation

- FoldingNet [Yang+, CVPR2018]
- LatentGAN [Achlioptas+, PMLR2018]
- Jigsaw3D [Saunder+,NeurIPS2019]
- ClusterNet [Zhang+, 3DV2019]
- Multi-Task PC [Hassani+,ICCV2019]
- Info3D [Sanghi+,ECCV2020]
- Orientation Estimation [Poursaeed+,3DV2020]
- OcCo [Pang+,ICCV2021]
- Self-Correction [Chen+,ICCV2021]
- PointBERT [Yu+,CVPR2022]
- MaskPoint [Liu+,ECCV2022]
- PointMAE [Pang+,ECCV2022]
- PointM2AE [Zhang+,NeurIPS2022]
- MD [Sun+, IEEE TM 2022]
- MaskSurf [Zhang+,arXiv2022]
- UAE [Zhang+,arXiv2022]
- PiMAE [Chen+,CVPR2023]
- IAE [Yan+,ICCV2023]
- PointGPT [Chen+,NeurIPS2023]
- RECON [Qi+,ICML2023]
- LCM [Zha+,arXiv2024]
- Mask Feat3D [Yan+,ICLR2024]
- Point-FEMAE [Zha+,AAAI2024]

Single Object

- IKEA [Lim+, ICCV2013]
- McGill Bechmark [Siddiqi+, MVA2008]
- BigBRID [Singh+, ICRA2014]
- Syndney Urban Objects [Deuge+, ACRA2013]
- Pascal3D [Xiang+, WACV2014]
- ShapeNet [Chang+, arXiv2015]
- ModelNet [Wu+, CVPR2015]
- Pix3D [Sun+, CVPR2018]
- ScanObjectNN [Uy+, ICCV2019]
- GSO [Downs+, ICRA2019]
- 3D-FUTURE [Fu+, IJCV2021]
- Objectron [Ahmadyan+, CVPR2021]
- CO3D [Reizenstein+, ICCV2021]
- DeepCAD [Wu+, ICCV2021]
- ABO [Collins+, CVPR2022]
- OmniObject3D [Wu+, CVPR2023]
- Objaverse-XL [Deitke+, NeurIPS2023]

3D Dataset

2012 — 2020 — 2024 Year