

ML3D Project Ideas

Team members

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Proposals

Project 1: Controllable novel-view synthesis

Paper: [Decomposing NeRF for Editing via Feature Field Distillation](#)

Dataset: Scannet (just a few scenes if compute is limited)

Modifications:

- allow joint architecture with heads predicting both DINO and LSeg features
- add segmentation head to render segmentation masks and edit by them
- add DINOv2 foundational model features
- resolve the issue of positional embeddings in ViTs features (DINOv2) when lifted to 3D as in <https://arxiv.org/pdf/2311.02077.pdf>

Project 2: OpenMask3D: Open-Vocabulary 3D Instance Segmentation

Paper: <https://openmask3d.github.io/>

Dataset: STPLS3D

Modifications:

- replace the class agnostic mask generator by Mask3D trained on STPLS3D (pretrained weights available)
- replace SAM with Semantic-SAM to allow for masks of different granularities (<https://github.com/UX-Decoder/Semantic-SAM>)
- change best-view selection to prefer capturing the object from multiple angles to capture broader semantics (get more informative CLIP features)
- replace SAM input from sampled points to bbox

Project 3: Continuous 3D-Structure-Aware Neural Scene Representation

Paper: [Continuous 3D-Structure-Aware Neural Scene Representations](#)

Dataset: Scannet (just a few scenes if compute is limited)

Modifications:

- Replace Ray Marching LSTM by Attention
- Aggregate feature vectors from coordinates predicted by Ray Marching along the ray before finding an intersection with scene geometry
- Adjust feature vectors to encode semantic information by adding CLIP embeddings