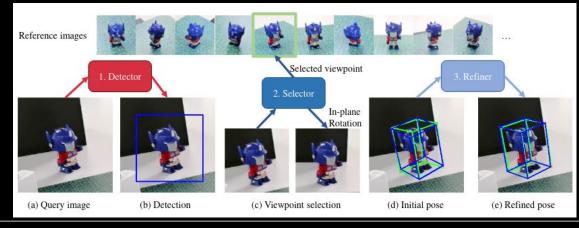
MCVM 2022/23

Seed Paper Introduction

Gen6D [Pengyuan]

- Few shot 6D pose estimation based on RGB images
- Detector and selector to pick the most similar image in the reference images
- 3D Volume CNN for pose refinement



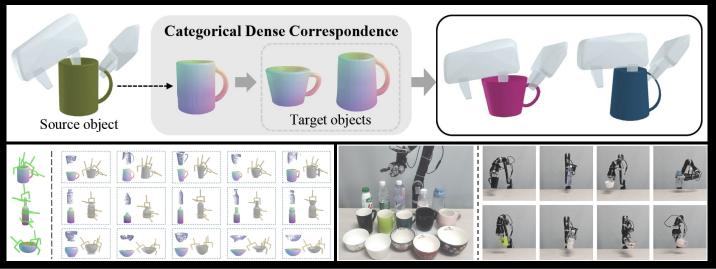


Yuan Liu, Yilin Wen, Sida Peng, Cheng Lin, Xiaoxiao Long, Taku Komura, Wenping Wang. Gen6D: Generalizable Model-Free 6-DoF Object Pose Estimation from RGB Images. ECCV 2022

TransGrasp [Guangyao]

https://github.com/yanjh97/TransGrasp

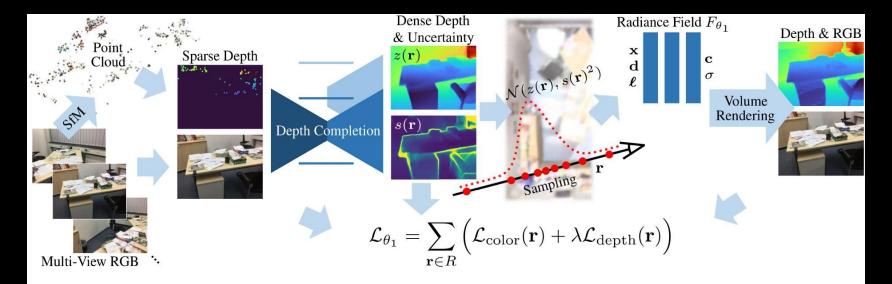
- A model predicts grasp poses of a category of objects by only labeling one instance.
- Transfer and correct grasp pose across a category of objects.
- Both simulation and real robot system achieve high quality grasps.





Hongtao Wen, Jianhang Yan, Wanli Peng, Yi Sun. TransGrasp: Grasp Pose Estimation of a Category of Objects by Transferring Grasps from Only One Labeled Instance. ECCV 2022

Dense Depth Priors [Patrick]





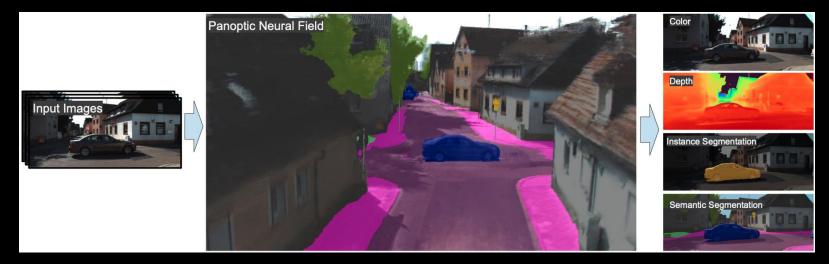
Barbara Roessle, Jonathan T. Barron, Ben Mildenhall, Pratul P. Srinivasan, Matthias Nießner. Dense Depth Priors for Neural Radiance Fields from Sparse Input Views. CVPR 2022

Panoptic Neural Fields (NeRF) [Stefano]

- object-aware neural scene representation
- scene into objects (things) and amorphous stuff background

multiple scene understanding tasks

individual MLPs for objects and stuff

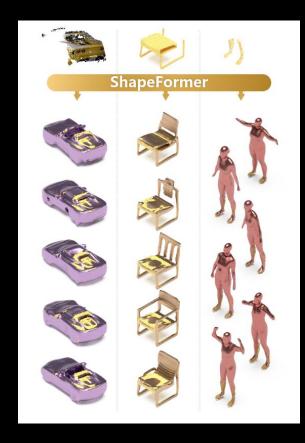




Abhijit Kundu, Kyle Genova, Xiaoqi Yin, Alireza Fathi, Caroline Pantofaru, Leonidas Guibas, Andrea Tagliasacchi, Frank Dellaert, Thomas Funkhouser. Panoptic Neural Fields: A Semantic Object-Aware Neural Scene Representation. CVPR 2022

ShapeFormer [Lennart]

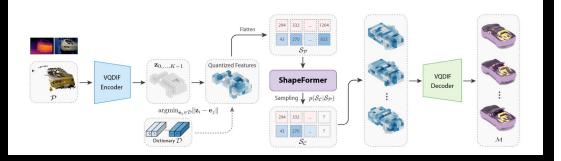
- Inferring missing information from noisy or partial scans has numerous real world applications
- Explore a novel approach using transformers and deep implicit functions
- Evaluate its performance and applications on several datasets including PartNet and Faust

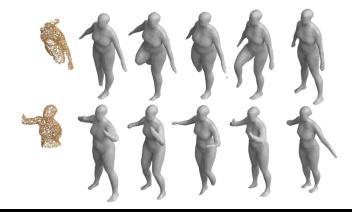




Xingguang Yan, Liqiang Lin, Niloy Mitra, Dani Lischinski, Daniel Cohen, Hui Huang. ShapeFormer: Transformer-based Shape Completion via Sparse Representation. CVPR 2022

ShapeFormer [Lennart]





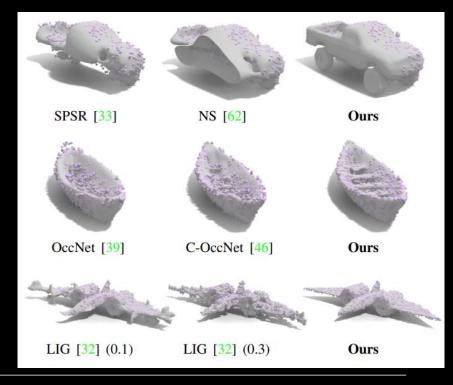


Xingguang Yan, Liqiang Lin, Niloy Mitra, Dani Lischinski, Daniel Cohen, Hui Huang. ShapeFormer: Transformer-based Shape Completion via Sparse Representation. CVPR 2022

Neural Fields & 3D Reconstr. [Shun-Cheng]

Encoder-decoder network tends to overfit training shapes and cannot generalize to unknown shapes.

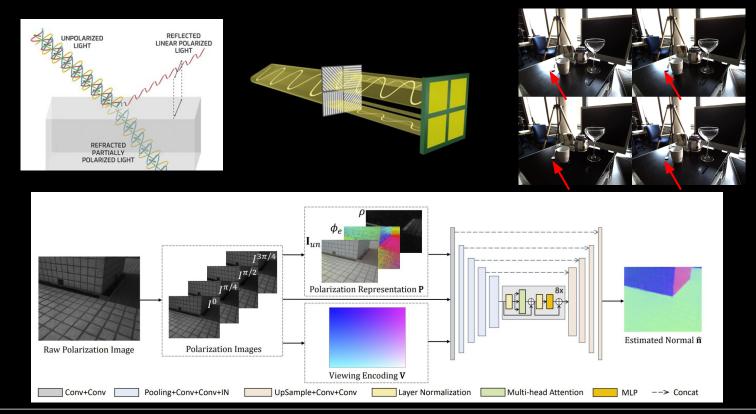
This paper enables inference-time optimization using partially known inputs to estimate accurate shapes.





Francis Williams, Zan Gojcic, Sameh Khamis, Denis Zorin, Joan Bruna, Sanja Fidlerl Or Litany. Neural Fields as Learnable Kernels for 3D Reconstruction. CVPR 2022

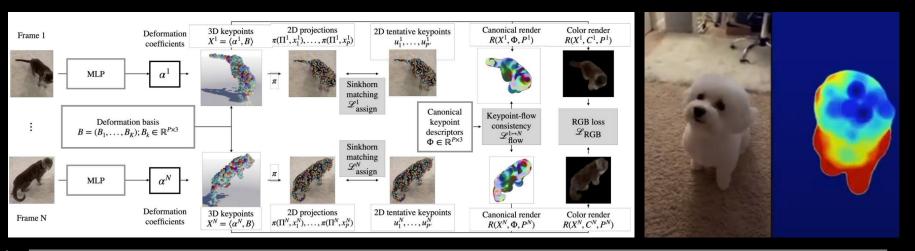
Shape From Polarization in the Wild [Hyun]



Chenyang Lei, Chenyang Qi, Jiaxin Xie, Na Fan, Vladlen Koltun, Qifeng Chen. Shape From Polarization for Complex Scenes in the Wild. CVPR 2022

KeyTr: Keypoint Transporter [Mahdi]

- Reconstructs 3d deformable objects from casual RGB frames
- Predicts and track keypoints
- Uses optical flow and optimal transport for consistency



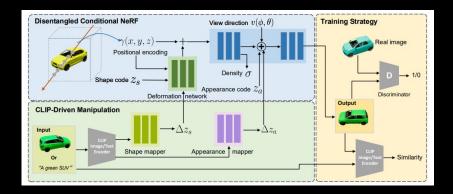


David Novotny, Ignacio Rocco, Samarth Sinha, Alexandre Carlier, Gael Kerchenbaum, Roman Shapovalov, Nikita Smetanin, Natalia Neverova, Benjamin Graham, Andrea Vedaldi. KeyTr: Keypoint Transporter for 3D Reconstruction of Deformable Objects in Videos. CVPR 2022

CLIP-NeRF [Hannah]

https://github.com/cassiePython/CLIPNeRF

- utilizes CLIP
- manipulating NeRFs leveraging joint language-image embedding (text-image driven manipulation)
- disentangled conditional NeRF which allows disentangling shape and appearance
- allow editing of existing data

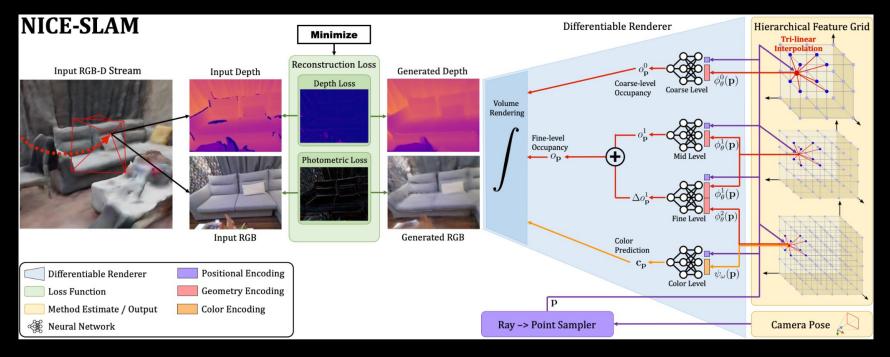






Can Wang, Menglei Chai, Mingming He, Dongdong Chen, Jing Liao. CLIP-NeRF: Text-and-Image Driven Manipulation of Neural Radiance Fields. CVPR 2022

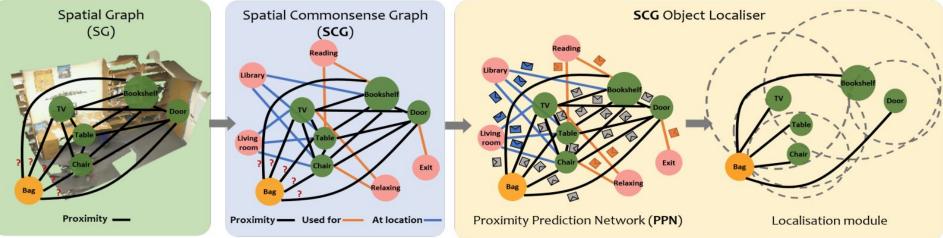
NICE-SLAM [Patrick]





Zihan Zhu, Songyou Peng, Viktor Larsson, Weiwei Xu, Hujun Bao, Zhaopeng Cui, Martin R Oswald, Marc Pollefeys. NICE-SLAM: Neural Implicit Scalable Encoding for SLAM. CVPR 2022

Commonsense Localization [Shun-Cheng]



"A method for estimating the unknown position of an object given a partial 3D scan of a scene. "

Spatial Commonsense Graph (SCG).

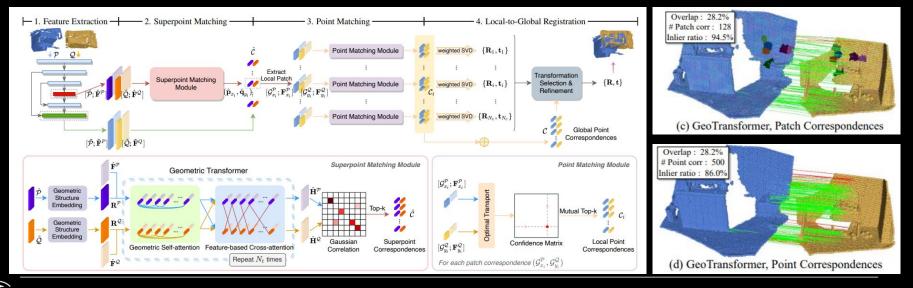
"... by injecting **commonsense knowledge** with in a scene graph representation, so that a machine can also reasonably localize an object in the unseen part of the scene, without the use of any visual/depth information."



Francesco Giuliari, Geri Skenderi, Marco Cristani, Yiming Wang and Alessio Del Bue. Spatial Commonsense Graph for Object Localisation in Partial Scenes. CVPR 2022

Geometric Transformer [Hao]

- Coarse-to-fine point matching in both rigid and deformable cases.
- Pairwise geometry-based self-attention module.
- Ransac-free point cloud registration.

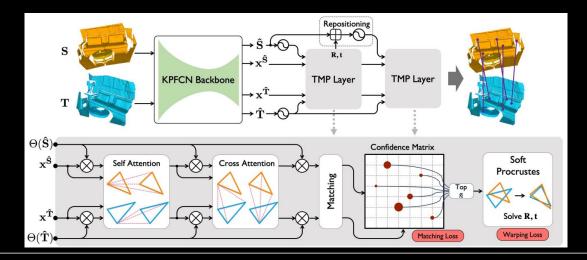


Zheng Qin, Hao Yu, Changjian Wang, Yulan Guo, Yuxing Peng, and Kai Xu. Geometric Transformer for Fast and Robust Point Cloud Registration. CVPR 2022

Lepard [Mert]

- Rigid and deformable point cloud registration.
- An architecture that disentangles the feature and position space.

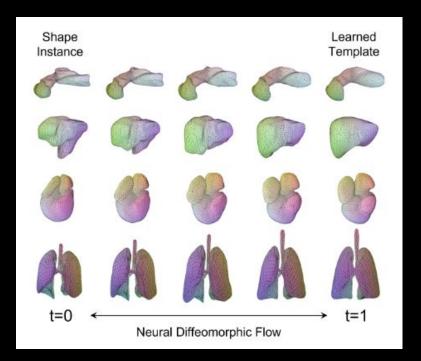
- Positional encoding on relative distance.
- A repositioning layer for improved matching.





Diffeomorphic Flow Registration [Lennart]

- Deep implicit templates for organ reconstruction
- Traditional shape correspondence works select a single template, which introduces bias
- Here a template is represented as a deep implicit function, and we learn a flow field to each shape while considering the topology of the shape





Shanlin Sun, Kun Han, Deying Kong, Hao Tang, Xiangyi Yan, Xiaohui Xie. Topology-Preserving Shape Reconstruction and Registration via Neural Diffeomorphic Flow. CVPR 2022