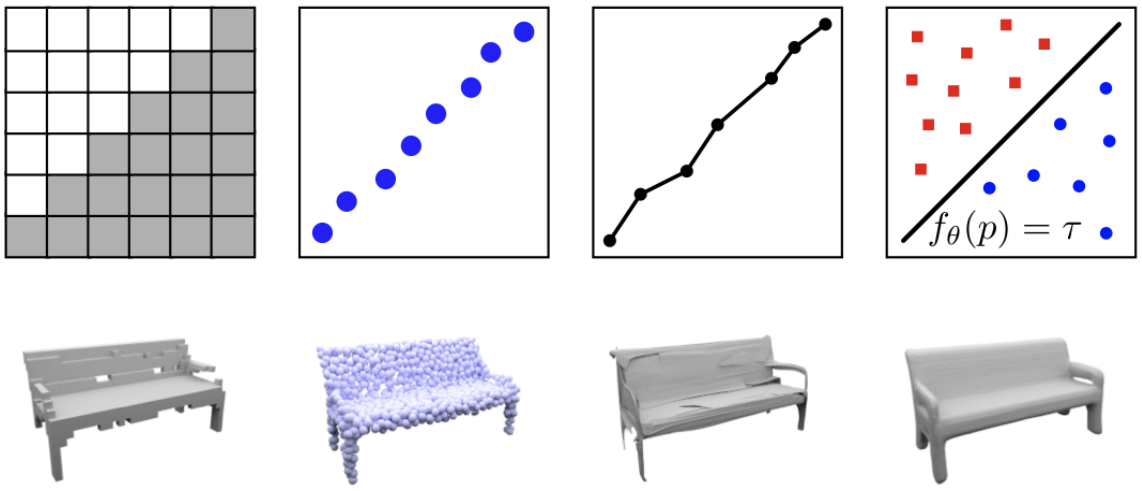
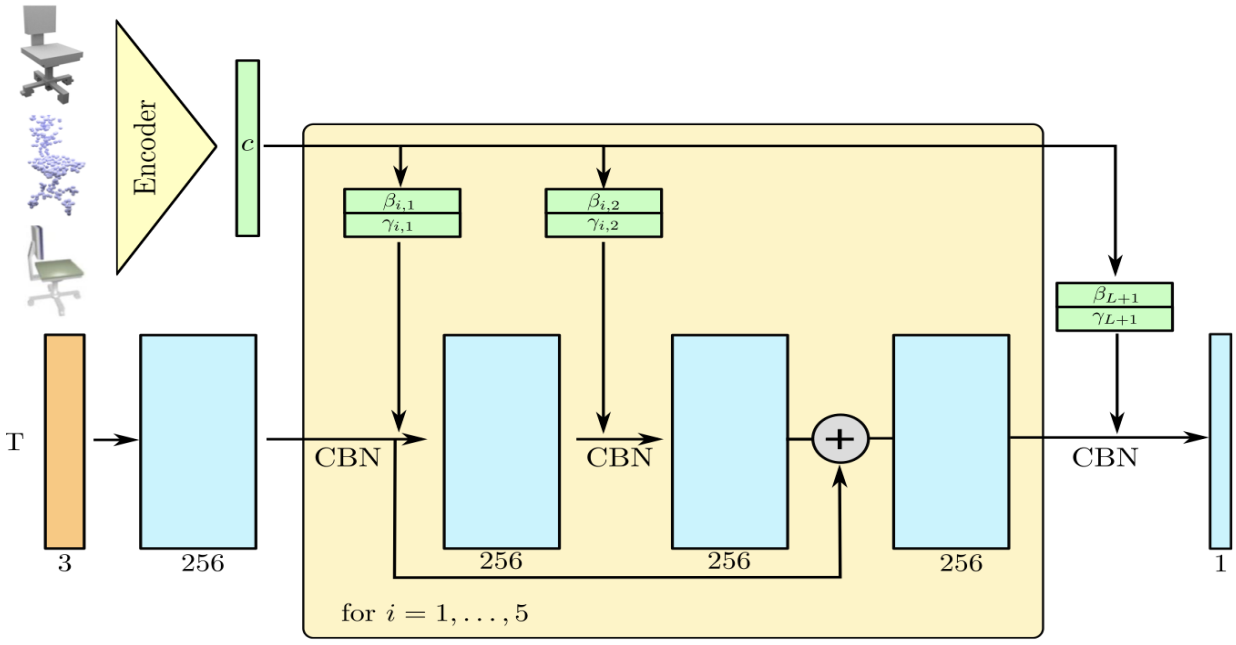
Occupancy Networks: Learning 3D Reconstruction in Function Space

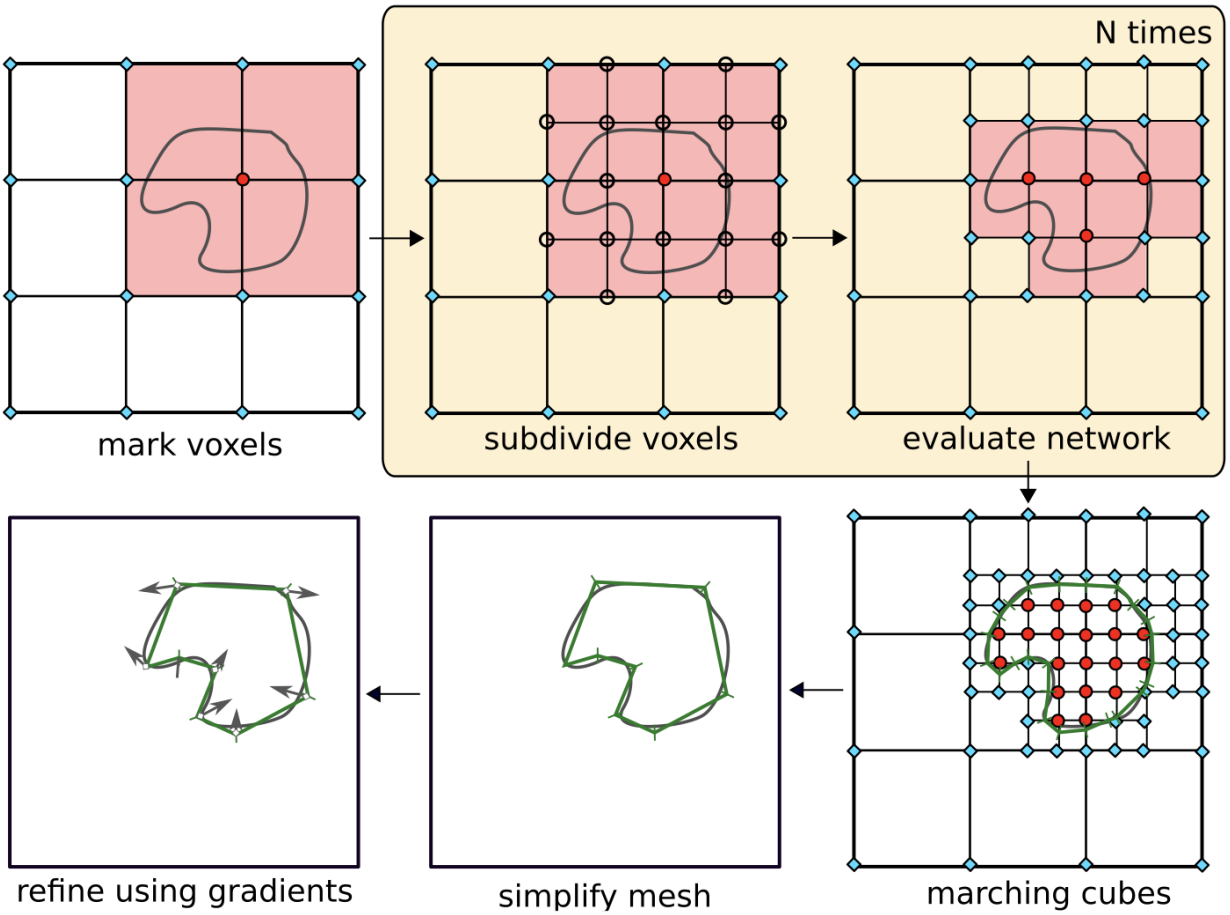


(a) Voxel (b) Point (c) Mesh (d) Ours

Dataset: ShapeNet, KITTI, Online Products dataset
Pytorch Code: [Code]
Paper: https://arxiv.org/pdf/1812.03828.pdf



Multiresolution Isosurface Extraction



- We first mark all points at a given resolution that have already been evaluated as either occupied (red circles) or unoccupied (cyan diamonds). We mark all grid points p as occupied for which $f_\theta(p,x)$ is bigger or equal to some threshold τ
- We then determine all voxels that have both occupied and unoccupied corners and mark them as active (light red) and subdivide them into 8 subvoxels each.
- Next, we evaluate all new grid points (empty circles) that have been introduced by the subdivision. The previous two steps are repeated until the desired output resolution is reached.

- Finally we extract the mesh using the marching cubes algorithm, simplify and refine the output mesh using first and second-order gradient information.

Metrics

- IoU
- Chamfer - L1
- Normal Consistency Score