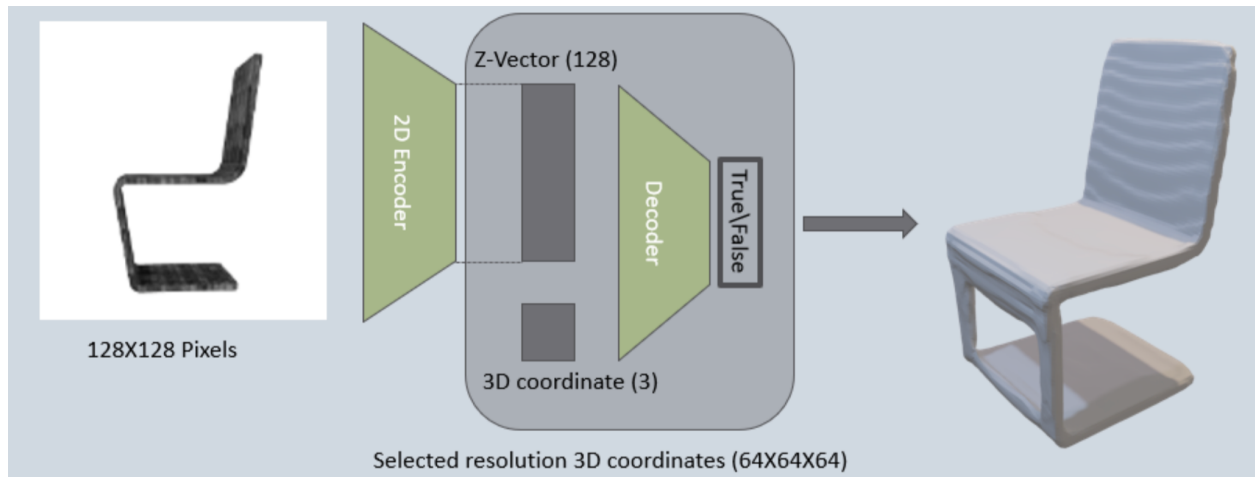


Learning Implicit Fields for Generative Shape Modeling

Report



Dataset: Shapenet

Pytorch Code: <https://github.com/czq142857/implicit-decoder>

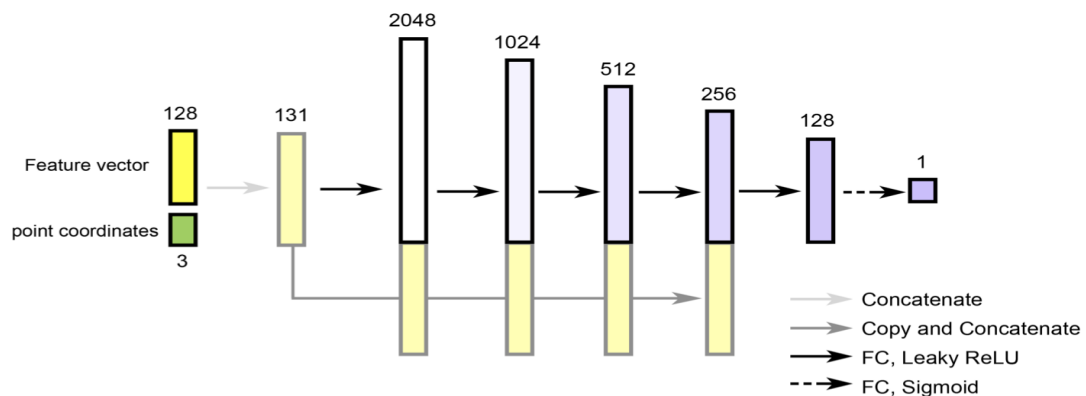
Paper: <https://arxiv.org/pdf/1812.02822.pdf>

Key Points to Note:

Encoder

- The encoder is made up of ResNet Architecture
- It basically converts the image to a 128D Feature Vector

Decoder



- The decoder takes in 2 inputs. One is the feature vector and another is the point coordinate (x, y, z).
- We sample out every point in the 3D space(64x64x64) and feed it into the network and we get a prediction of either 1 or 0 which tells whether the point coordinate lies inside or outside the 3D object
- We concatenate the fully connected layers so that we can optimise faster
- We obtain a voxel representation of the 3D object and we apply the Marching Cubes method to convert the voxels into a mesh representation of the 3D object

Loss Function

$$\mathcal{L}(\theta) = \frac{\sum_{p \in S} |f_{\theta}(p) - \mathcal{F}(p)|^2 \cdot w_p}{\sum_{p \in S} w_p}$$

- f is the predicted output and F is the ground truth
- We assign high weights to the points which are in a high-density area(i.e near the 3D object) and assign low weights to the points which are far away from the 3D object