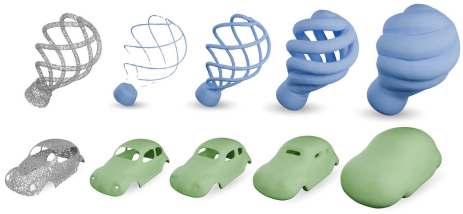
Neural Implicit Signed Distance Fields for Surface Reconstruction from Point Clouds

A list of academic papers on neural implicit Signed Distance Fields (SDFs) for surface reconstruction from point clouds. Note: Each neural SDF here corresponds to only a shape.

I will update this list systematically.

Preview	Title	Publication	Links
	1-Lipschitz Neural Distance Fields	Computer Graphics Forum 2024	Paper Project Code

2024

- Linus Härenstam-Nielsen, Lu Sang, Abhishek Saroha, Nikita Araslanov, Daniel Cremers. *DiffCD: A Symmetric Differentiable Chamfer Distance for Neural Implicit Surface Fitting*.
    - ECCV 2024
    - [Paper][Code]
- Qiujie Dong, Rui Xu, Pengfei Wang, Shuangmin Chen, Shiqing Xin, Xiaohong Jia, Wenping Wang, Changhe Tu. *NeurCADRecon: Neural Representation for Reconstructing CAD Surfaces by Enforcing Zero Gaussian Curvature*.
    - SIGGRAPH 2024
    - [Paper][Project Page][Code]
- Shengtao Li, Ge Gao, Yudong Liu, Ming Gu, Yu-Shen Liu. *Implicit Filtering for Learning Neural Signed Distance Functions from 3D Point Clouds*.
    - ECCV 2024
    - [Paper][Project Page][Code]

2023

- Huizong Yang, Yuxin Sun, Ganesh Sundaramoorthi, Anthony Yezzi. *StEik: Stabilizing the Optimization of Neural Signed Distance Functions and Finer Shape Representation*.
    - NeurIPS 2023
    - [Paper][Code]
- Yi-Fei Feng, Li-Yong Shen, Chun-Ming Yuan, Xin Li. *Deep Shape Representation with Sharp Feature Preservation*.

    - Computer-Aided Design 2023
    - [Paper]

- Zixiong Wang, Yunxiao Zhang, Rui Xu, Fan Zhang, Pengshuai Wang, Shuangmin Chen, Shiqing Xin, Wenping Wang, Changhe Tu *Neural-Singular-Hessian: Implicit Neural Representation of Unoriented Point Clouds by Enforcing Singular Hessian*.

    - SIGGRAPH Asia 2023
    - [Paper][Project Page][Code]

2022

- Alexandre Boulch, Renaud Marlet. *POCO: Point Convolution for Surface Reconstruction*.

    - CVPR 2022
    - [Paper][Code]

- Hao-Xiang Guo, Yang Liu, Hao Pan, Baining Guo. *Implicit Conversion of Manifold B-Rep Solids by Neural Halfspace Representation*.

    - SIGGRAPH Asia 2022
    - [Paper][Project Page][Code]

- Jingyang Zhang, Yao Yao, Shiwei Li, Tian Fang, David McKinnon, Yanghai Tsin, Long Quan. *Critical Regularizations for Neural Surface Reconstruction in the Wild*.

    - CVPR 2022
    - [Paper]

- Yizhak Ben-Shabat, Chamin Hewa Koneputugodage, Stephen Gould. *DiGS: Divergence guided shape implicit neural representation for unoriented point clouds*.

    - CVPR 2022
    - [Paper][Project Page][Code]

2021

- Baorui Ma, Zhizhong Han, Yu-Shen Liu, Matthias Zwicker. *Neural-Pull: Learning Signed Distance Functions from Point Clouds by Learning to Pull Space onto Surfaces*.

    - ICML 2021
    - [Paper][Code]

- Peng-Shuai Wang, Yang Liu, Yu-Qi Yang, Xin Tong. *Spline Positional Encoding for Learning 3D Implicit Signed Distance Fields*.

    - IJCAI 2021
    - [Paper][Project Page][Code]

2020

- Amos Gropp, Lior Yariv, Niv Haim, Matan Atzmon, Yaron Lipman. *Implicit Geometric Regularization for Learning Shapes*.
    - ICML 2020
    - [Paper][Code]
- Matan Atzmon, Yaron Lipman. *SAL: Sign Agnostic Learning of Shapes from Raw Data*.
    - CVPR 2020
    - [Paper][Code]
- Vincent Sitzmann, Julien N. P. Martel, Alexander W. Bergman, David B. Lindell, Gordon Wetzstein. *Implicit Neural Representations with Periodic Activation Functions*.
    - NeurIPS 2020
    - [Paper][Project Page][Code]

2019

- Jeong Joon Park, Peter Florence, Julian Straub, Richard Newcombe, Steven Lovegrove3. *DeepSDF: Learning Continuous Signed Distance Functions for Shape Representation*.
    - CVPR 2019
    - [Paper][Code]