

SDFDiff: Differentiable Rendering of Signed Distance Fields for 3D Shape Optimization (Supplementary Materials)

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Abstract

This document includes additional visual results of multi-view 3D reconstruction for single objects (corresponding to Section 5 "Multi-view 3D Reconstruction") and learning-based single-view 3D reconstruction from the ShapeNet benchmark (corresponding to Section 6 "Learning-based Single-view Reconstruction").

1. Multi-view 3D Reconstruction

We show some additional results of multi-view 3D reconstruction using our differentiable renderer.



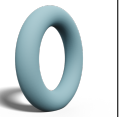
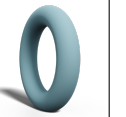






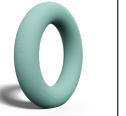







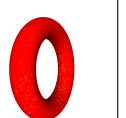
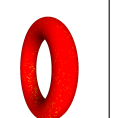
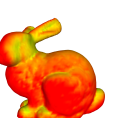
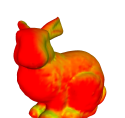

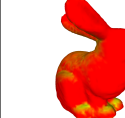








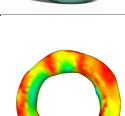
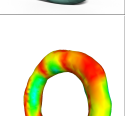
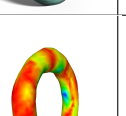
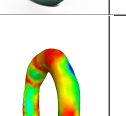
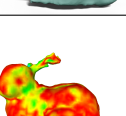
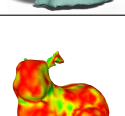
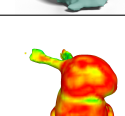
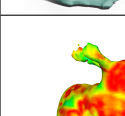
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DSS [2]								
Error								

Figure 1. Multi-view reconstruction results comparing with the state-of-the-art point-based differentiable rendering approach DSS [2] and the corresponding color-coded error visualizations based on Hausdorff distance (red-green-blue map where red means zero error and blue high error).



































































































































2. Learning-based Single-view Reconstruction

We compare our single-view reconstruction results with the state-of-the-art approach SoftRasterizer [1]. Our method can reconstruct detailed objects and accurately recover complicated topologies. In contrast, SoftRasterizer [1] relies on a template mesh with spherical topology and it cannot capture the complex topology of chairs or benches with holes. In this document, we mainly want to demonstrate that our methods can recover complicated topologies by showing those cases with complex topologies (e.g., benches). We also include objects in other categories to show that we can reconstruct different categories well.

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























































































































References

- [1] Shichen Liu, Tianye Li, Weikai Chen, and Hao Li. Soft rasterizer: A differentiable renderer for image-based 3d reasoning. *The IEEE International Conference on Computer Vision*, 2019.
- [2] Wang Yifan, Felice Serena, Shihao Wu, Cengiz Öztireli, and Olga Sorkine-Hornung. Differentiable surface splatting for point-based geometry processing. *ACM Transactions on Graphics (proceedings of ACM SIGGRAPH ASIA)*, 38(6), 2019.

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