

NeRF: Representing Scenes as Neural Radiance Fields for View Synthesis

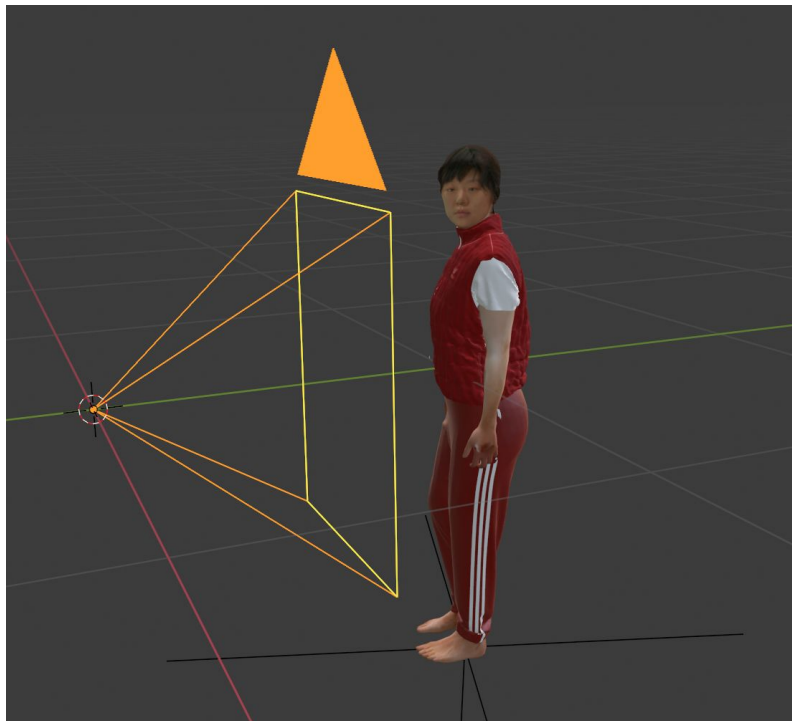
Andrey Gusev

2020 / Google Research, UC Berkeley, UC San Diego

Plan

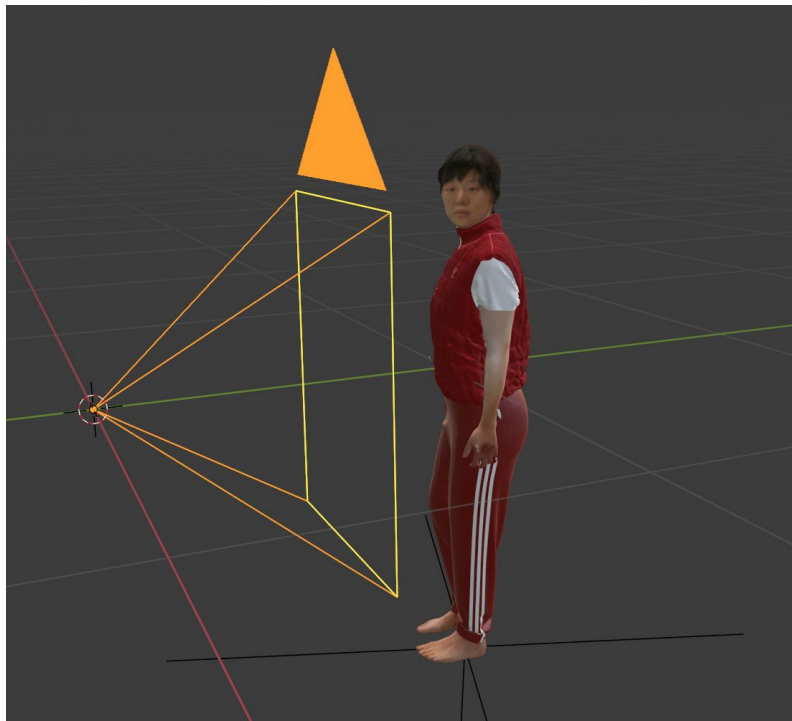
1. 3D Intro
2. Problem statement
3. Solution
4. Extensions
5. Results

3D Intro: Rendering

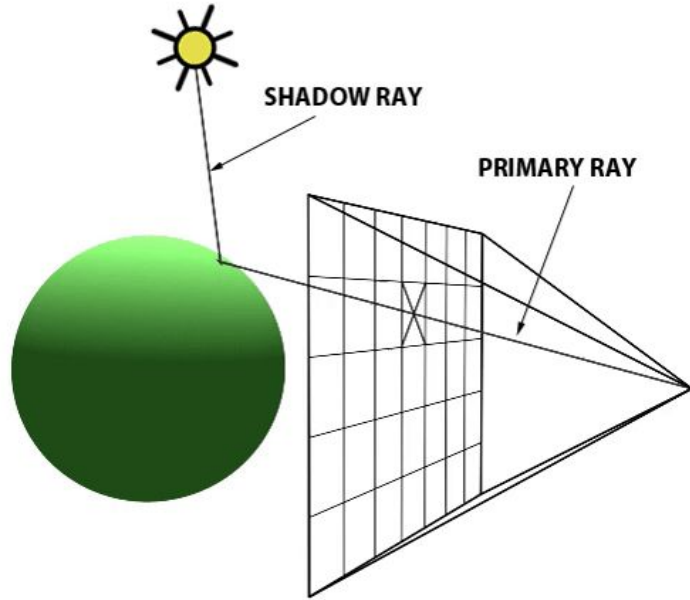


3D scene

3D Intro: Rendering

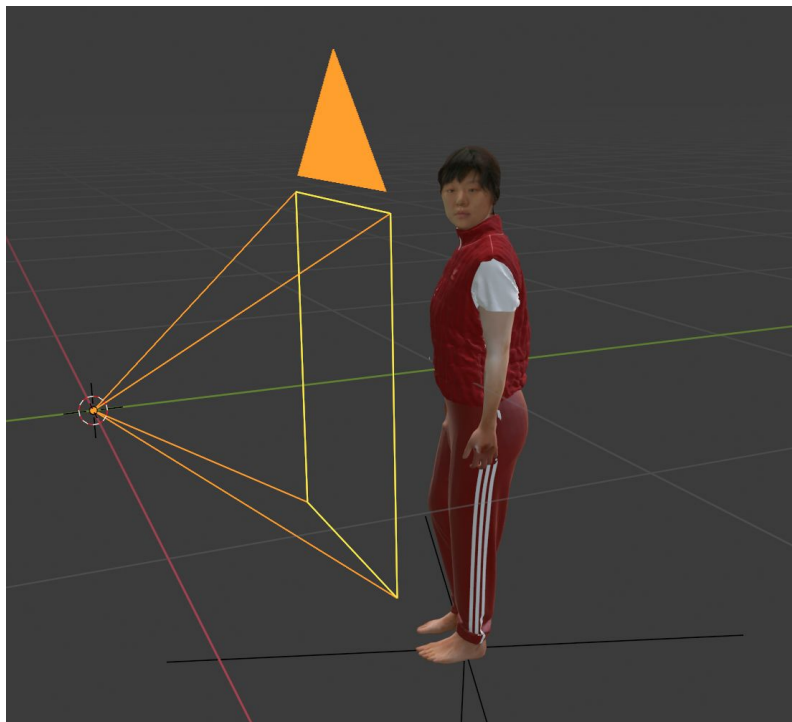


3D Intro: Rendering

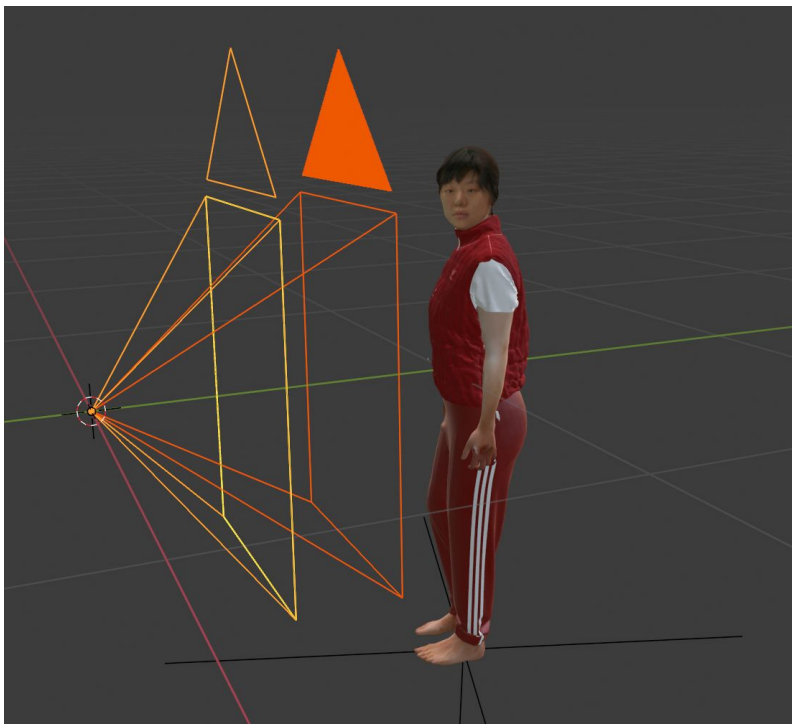


Ray-tracing

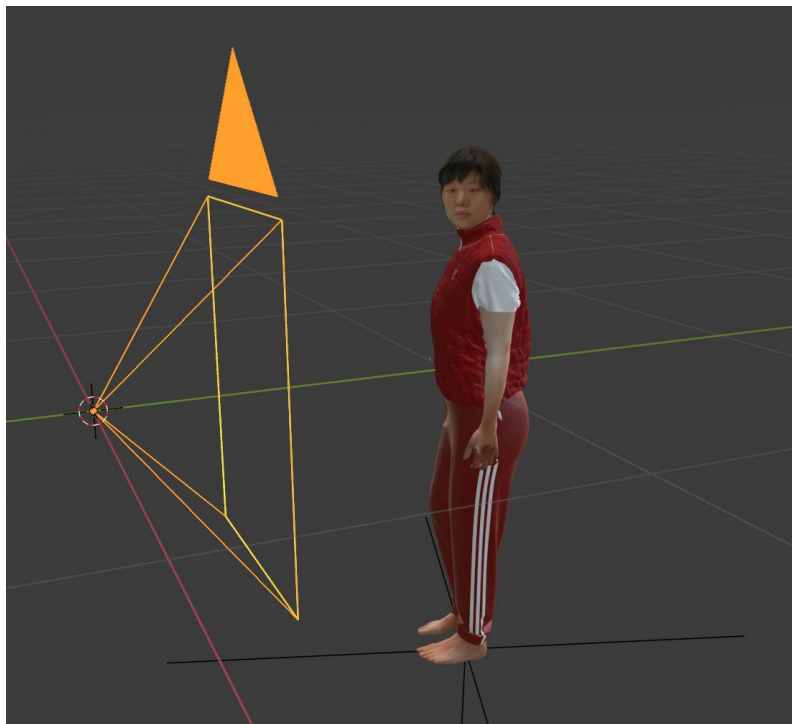
3D Intro: Rendering



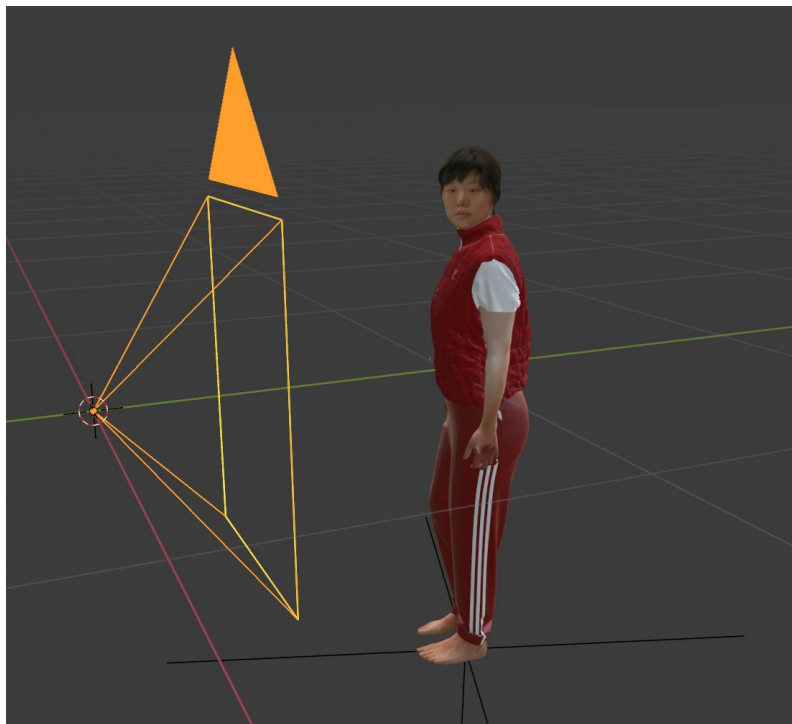
3D Intro: Rendering



3D Intro: Rendering



3D Intro: Rendering



Problem

Input Images



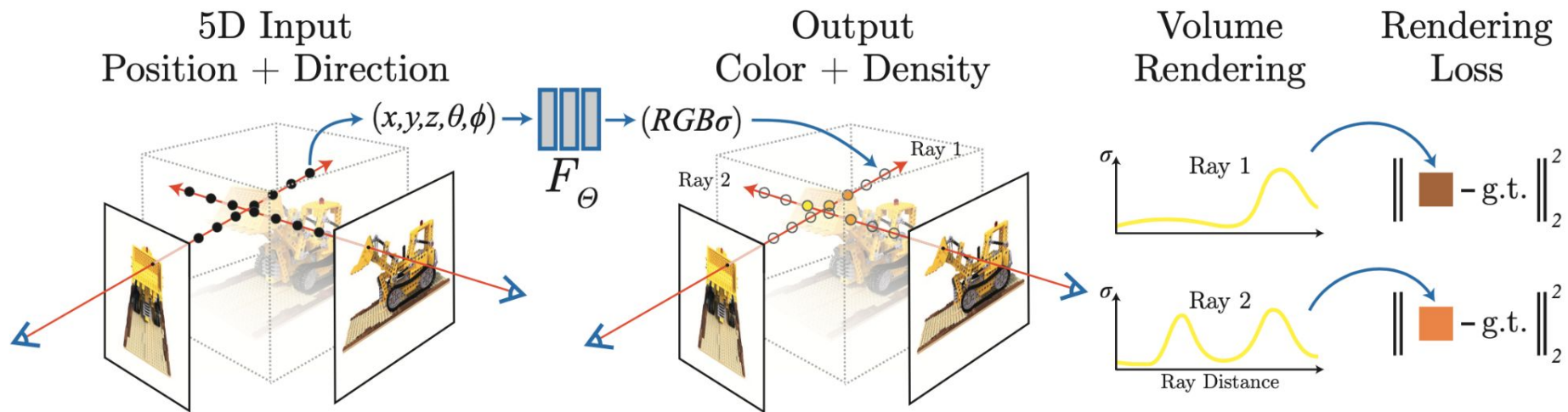
Optimize NeRF



Render new views



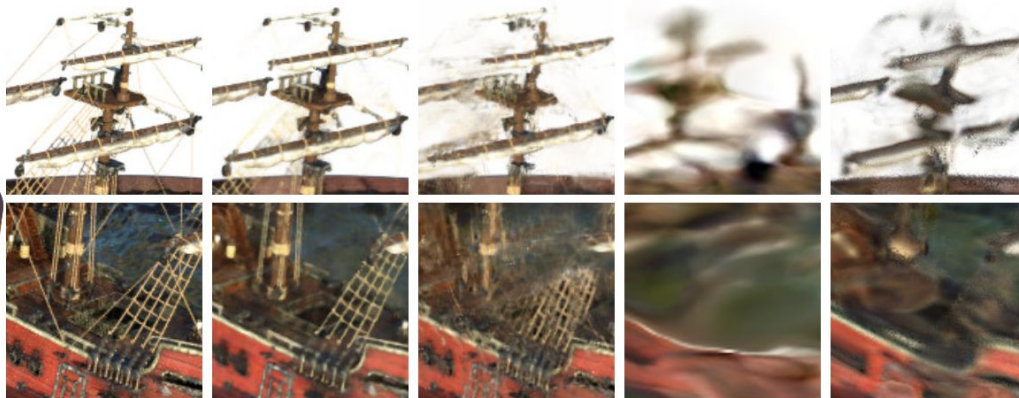
Solution



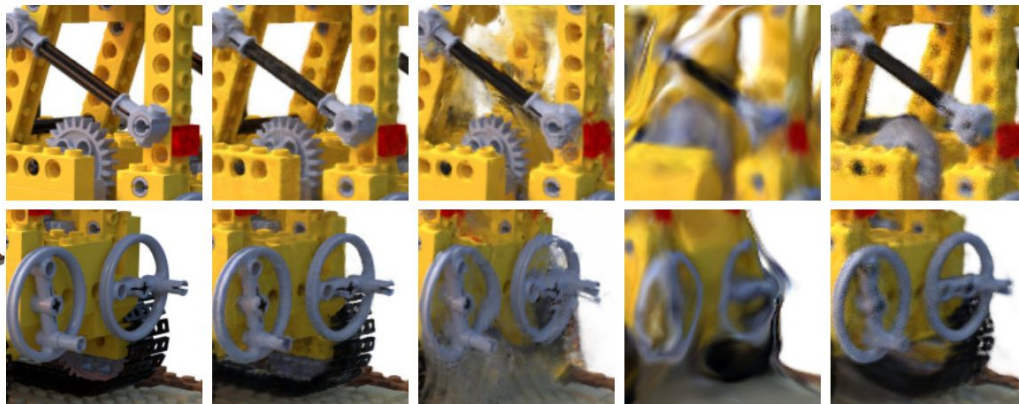
Results: synthetic



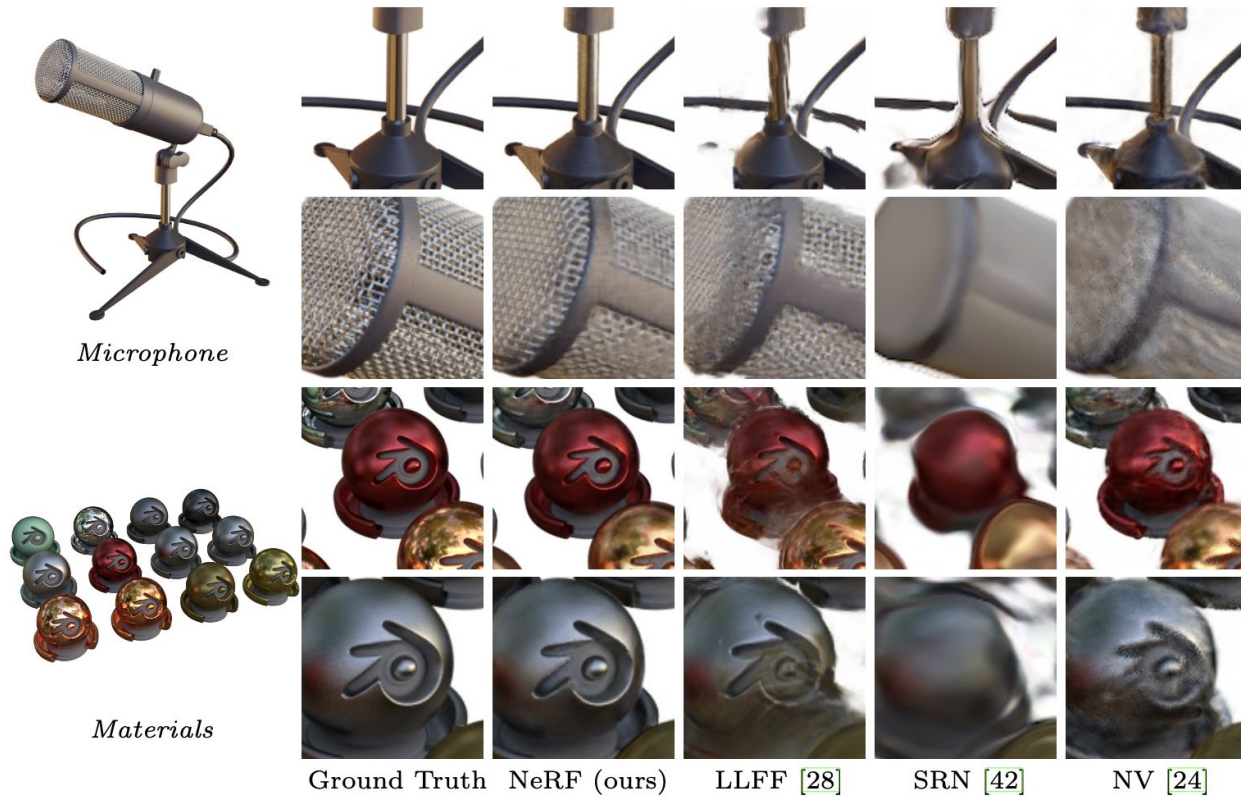
Ship



Lego



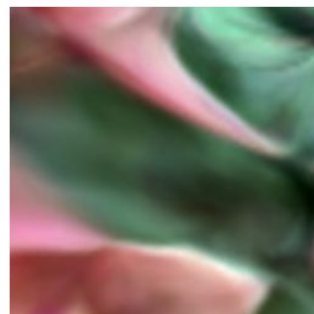
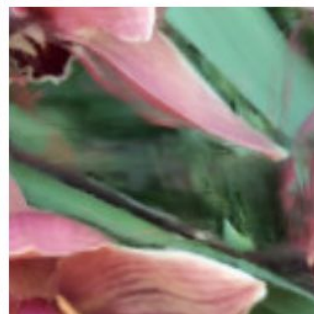
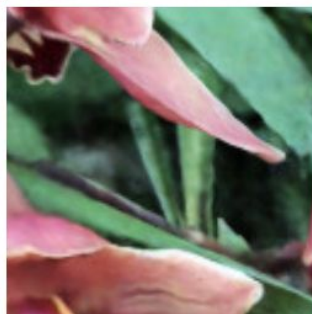
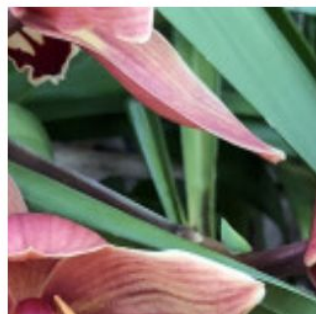
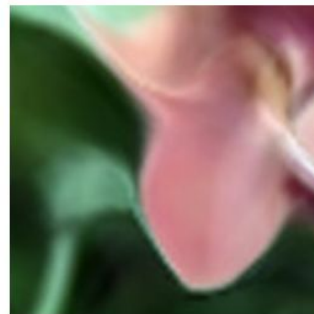
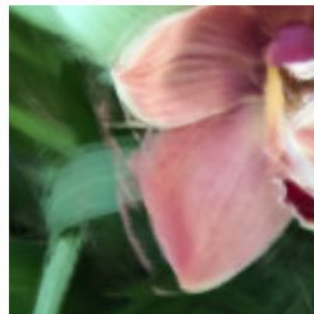
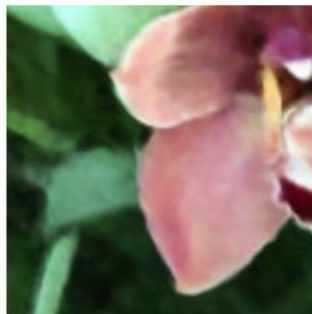
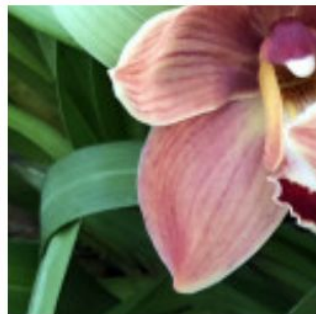
Results: synthetic



Results: real world



Orchid



Ground Truth

NeRF (ours)

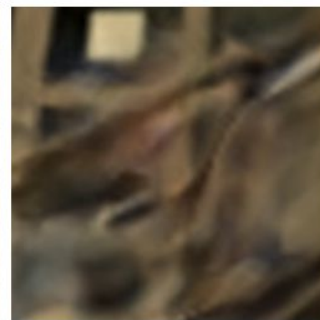
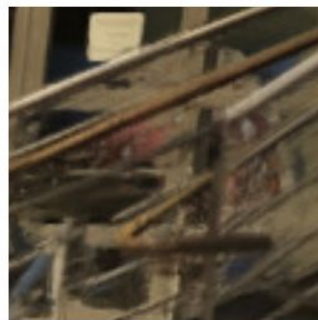
LLFF [28]

SRN [42]

Results: real world



T-Rex



Results: real world



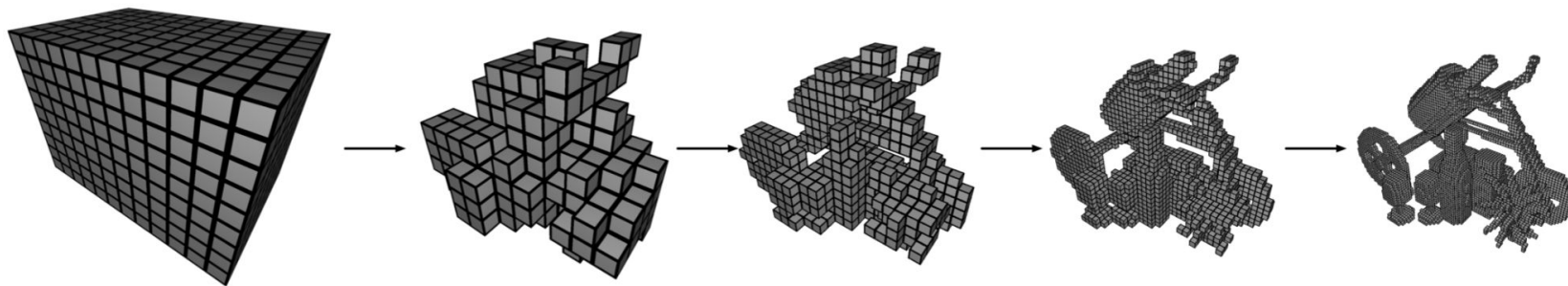
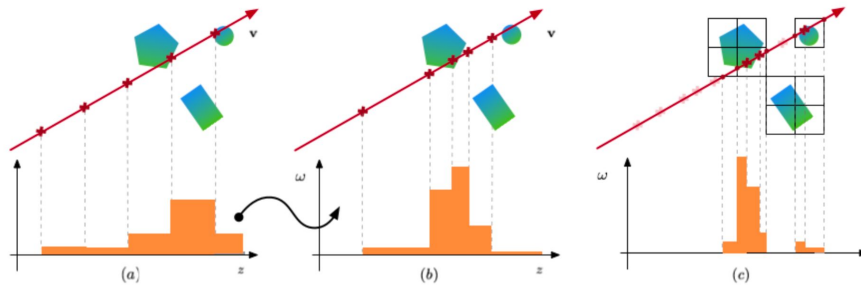
Fern



Problems

1. Slow training
2. Inefficient points sampling
3. Needs lots of frames

Neural Sparse Voxel Fields (2021)



Questions

1. Рендеринг. Что такое трассировка лучей и как она работает?
2. Какой вид нейронных сетей используется в NeRF? Что сеть принимает на вход и что выдает в качестве результата? Как собирается рендер из выхода сети?
3. Как обучается NeRF? На каких данных?