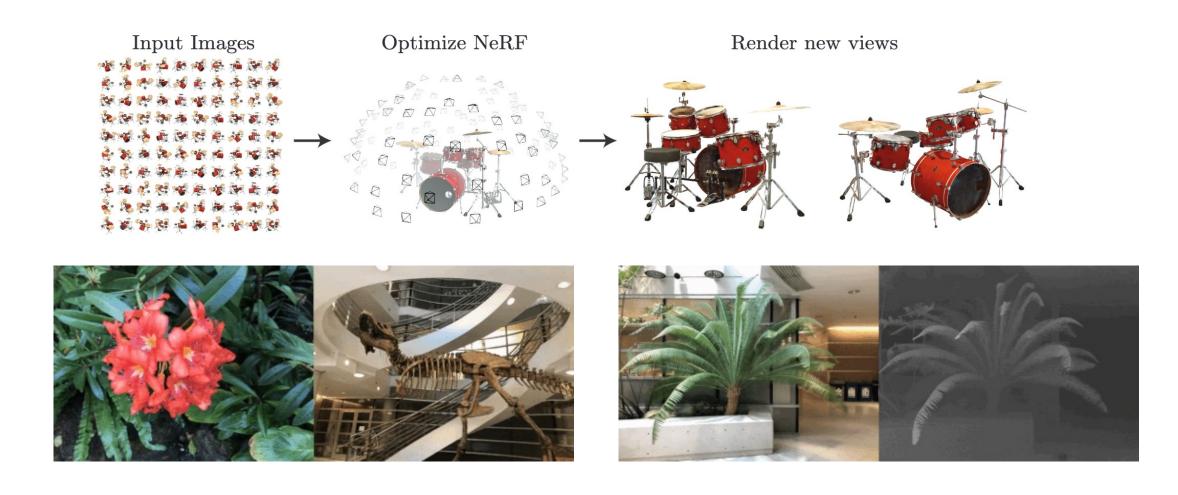
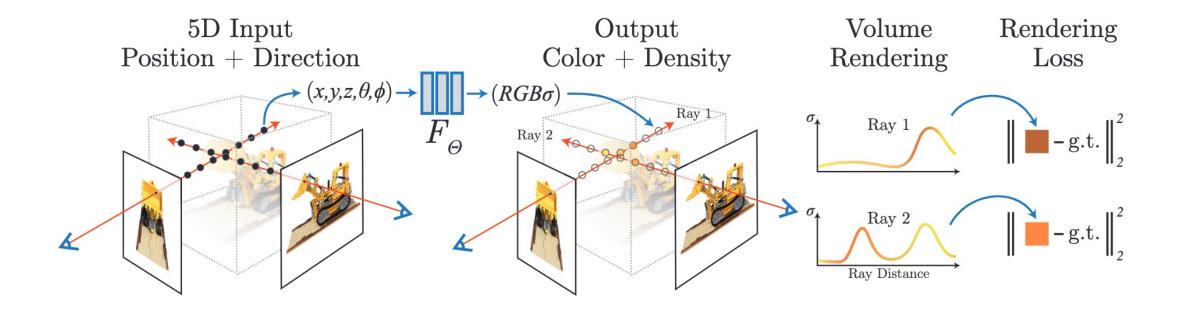


Introduction: What is NeRF?



Mildenhall, B. *et al.* (2021) 'Nerf', *Communications of the ACM*, 65(1), pp. 99–106. doi:10.1145/3503250.



Dive into NeRF

NeRF synthesizes images through a process that begins by sampling 5D coordinates along camera rays. These coordinates encapsulate both the spatial location and the viewing direction. Once sampled, these locations are fed into an MLP, to predict both the color and the volume density at each point.

Volume Rendering

$$C(\mathbf{r}) = \int_{t_n}^{t_f} T(t)\sigma(\mathbf{r}(t))\mathbf{c}(\mathbf{r}(t),\mathbf{d})dt, \text{ where } T(t) = \exp\left(-\int_{t_n}^{t} \sigma(\mathbf{r}(s))ds\right)$$

Hightlights

$$\gamma(p) = \left(\sin\left(2^0\pi p\right), \cos\left(2^0\pi p\right), \cdots, \sin\left(2^{L-1}\pi p\right), \cos\left(2^{L-1}\pi p\right)\right)$$





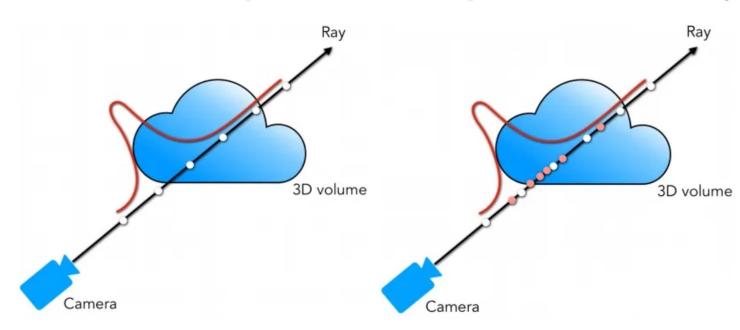




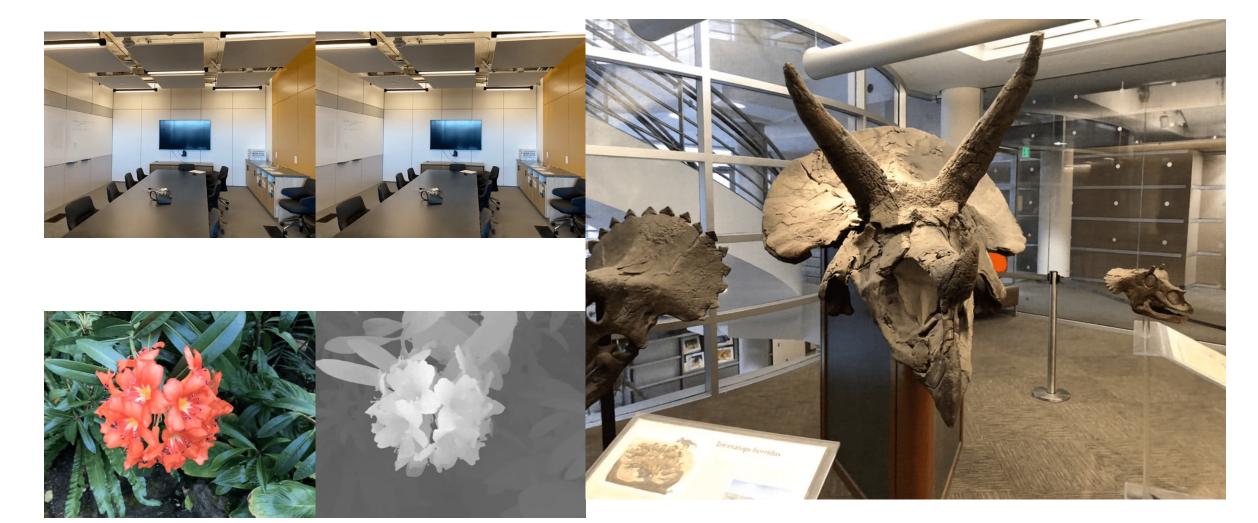
Ground Truth

Complete Model

No View Dependence No Positional Encoding

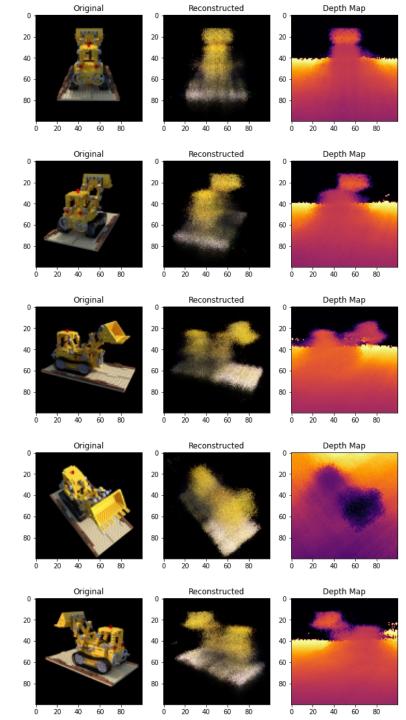


Examples



Experiments









Reference

• Mildenhall, B. *et al.* (2020) 'Nerf: Representing scenes as neural radiance fields for view synthesis', *Computer Vision – ECCV 2020*, pp. 405–421. doi:10.1007/978-3-030-58452-8_24.