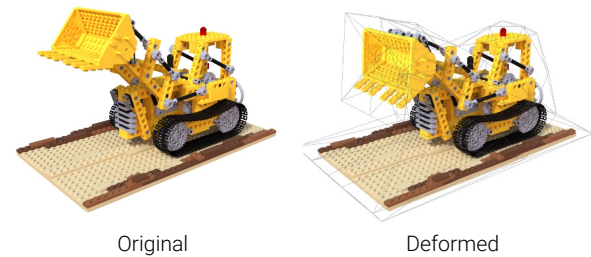




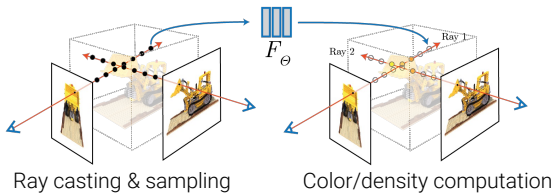
Goal: deforming optimized radiance fields for novel scene/animation generation



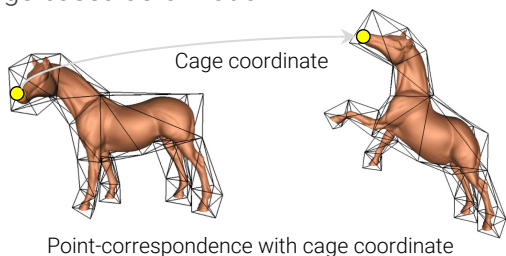
Approach: extend **cage-based deformation** used for mesh to the radiance field with:
 (1) a novel formulation which supports the position and view-dependent properties of the radiance field
 (2) a discretization approach for high-speed deformation computation.

Preliminaries

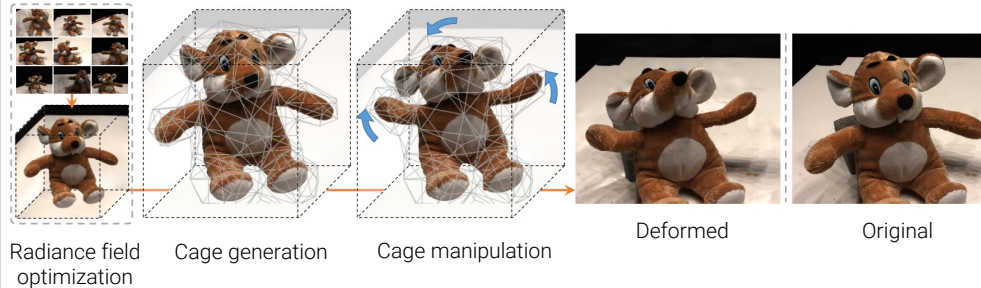
Neural radiance field (NeRF) [1]



Cage-based deformation [2]

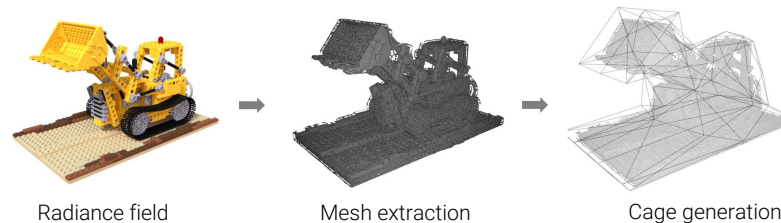


Method overview

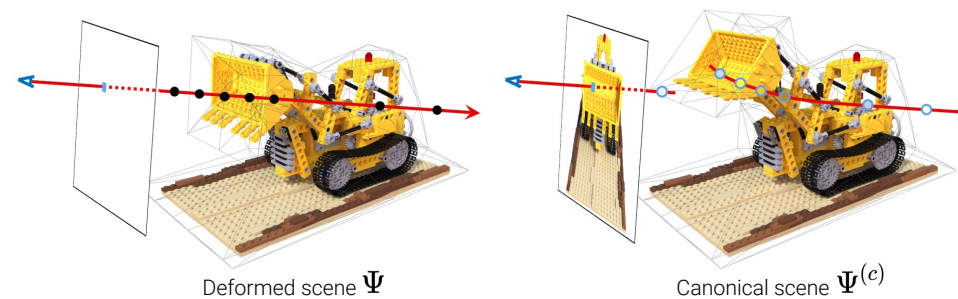


Method details

Cage generation from radiance field



Cage-based deformation (CBD) for radiance field



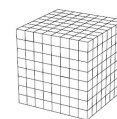
(1) novel CBD formulation for radiance field

$$\phi_{\mathbf{x}} : \mathbf{x} \rightarrow \mathbf{x}^{(c)}$$

$$\phi_{\mathbf{d}} : (\mathbf{x}, \mathbf{d}) \rightarrow \mathbf{d}^{(c)}$$

Deformed-to-canonical mapping for position and view direction

(2) discretization for high-speed cage coordinate computation



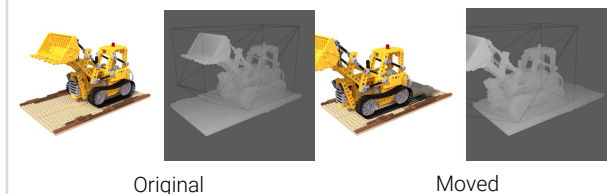
Pre-compute cage coordinates for each grid point, then perform trilinear interpolation

Qualitative results

Deformation



Object movement w/ a simple cage



[1] "NeRF: Representing Scenes as Neural Radiance Fields for View Synthesis", Mildenhall et al. ECCV'20
 [2] "Mean Value Coordinates for Closed Triangular Meshes", Ju et al. SIGGRAPH'05