Abstract:

Neural volumetric representations have become a widely adopted model for radiance fields in 3D scenes. These representations are fully implicit or hybrid function approximators of the instantaneous volumetric radiance in a scene, which are typically learned from multi-view captures of the scene. We investigate the new task of neural volume super-resolution - rendering high-resolution views corresponding to a scene captured at low resolution. To this end, we propose a neural super-resolution network that operates directly on the volumetric representation of the scene. This approach allows us to exploit an advantage of operating in the volumetric domain, namely the ability to guarantee consistent super-resolution across different viewing directions. To realize our method, we devise a novel 3D representation that hinges on multiple 2D feature planes. This allows us to super-resolve the 3D scene representation by applying 2D convolutional networks on the 2D feature planes. We validate the proposed method's capability of super-resolving multi-view consistent views both quantitatively and qualitatively on a diverse set of unseen 3D scenes, demonstrating a significant advantage over existing approaches.

Bio: Yuval holds a joint postdoctoral researcher position at the computational imaging lab in Princeton and the ZESS center at the university of Siegen. His research interests lie at the intersection of computer vision and computational photography with Machine learning. He was previously a postdoctoral researcher at Prof. Tomer Michaeli's lab at the Technion, after completing his PhD at the Weizmann Institute of Science, advised by Prof. Michal Irani. Prior to that he completed his M.Sc. at the Technion with Prof. Yoav Y. Schechner.