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CMSC 838M

Progress Report: Final Project

Digital Holography Simulation

For my final project, I proposed implementing an accurate simulation of a digital holography system in which an airborne imaging system captures the hologram of a moving object under atmospheric turbulence and speckle.

Thus far, I have successfully implemented a Blender simulation in which a **motionless camera and motionless object** are imaged through **Kolmogorov turbulence** with **speckle added**. I have additionally **phase wrapped the images by an amount proportional to the wavelength of the light**. I can capture both RGB and depth images of the object in Blender.

By the end of the semester, I hope to have a simulation in which both the camera and the object move during image capture, with this being reflected in the hologram. A dynamic system is, after all, the main driver of topics in this class. As a demonstration of principle, I additionally hope to learn how to accurately collect camera pose information that can be, along with the depth images themselves, simulated using neural radiance fields (NeRFs).