Thesis Defense

Computer Science Master's Program

"3D Pano Inpainting: Scene Construction Using a Single Input Panorama"

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Abstract:

Creating 360-degree 3D content has gained traction in the past few years, being used for Virtual Reality environments. However, creating such content is challenging because it requires a multi-camera setup or a collection of images from different perspectives. This paper proposes 3D Pano Inpainting, a pipeline capable of transforming a single equirectangular panoramic RGBD image into a complete 360° 3D virtual reality scene represented as a textured mesh. Our methodology is as follows: we estimate a consistent depth map for the input panorama; we use a pre-built framework to convert the image and its depth map into a textured mesh with inpainted background edges; we account for wrapping the resulting mesh around the viewer's perspective for better immersion in VR headsets. Additionally, we evaluate our method's effectiveness in producing consistent novel views through the peak signal-to-noise ratio (PSNR), structural similarity index (SSIM), and learned perceptual image patch similarity (LPIPS) between a rendering produced from the ground truth image and depth map to that produced from our model. Furthermore, we compare our model's scores with that of a non-inpainted textured mesh.

Date: Tuesday, March 5th, 2024
Time: 1:00 PM – 3:00 PM
Location: 14-238b
Zoom: https://calpoly.zoom.us/j/2409949667?omn=81109134755
Committee: Dr. Ventura, Dr. Mukhopadhyay, and Dr. Seng