

CS 148 Final Project Writeup

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In CS 148, I learned a lot and was also given a lot of freedom to be *imagiNETive*. Inspired by this, the scene is an artistic depiction of deep learning in the context of us students starting to “learn” to create cool images with graphics. The task performed by our imagiNET is style transfer. The background is a picture of Stanford’s Main Quad I took that was stylized by a texture network. The foreground contains groups of neurons in various stages of learning, grouped into bunches loosely inspired by convolutional filters. In particular, the filter in front seems to have learned so many cool things that its neurons have started to morph into the shape of a young Stanford bunny, since we bright-eyed students are still budding folks in graphics. Reflected in the bunny is the original Main Quad image (see how many times you can spot Hoover Tower!) and the reference style image of an owl, since we’ve been learning under the wise and experienced eyes of our CS 148 instructors.

I used Blender to create the object geometry and prototype the scene layout. No external online models were downloaded, and all geometry besides the sphere already included in the ray tracer is original. The reference style image and texture network are from Algorithmia, and the metal texture is a high-resolution picture of aluminum from TextureX. I implemented depth-of-field, shadow rays through transmissive objects, and point light attenuation to draw attention to the bunny. Finally, the ray tracer was parallelized to allow simultaneous rendering of several strips of the final image and speed up total rendering time.

Resources

- Style transfer: <http://demos.algorithmia.com/deep-style/>
- Reference style image: http://demos.algorithmia.com/deep-style/public/images/thumb/oily_mcoilface.jpg
- Aluminum texture: <http://www.texture.com/albums/Metal-Textures/aluminum%20brushed%20metal%20texture%20polished%20wall%20surface%20stock%20photo.jpg>