CS 532: Homework Assignment 5

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1   Voxel-based reconstruction from silhouettes

The 3D model below was reconstructed using a initial voxel grid with x range equals to -2.5m to 2.5m, y from -3m to 3m and z from 0 to 2.5m. With resolution 0.01, this gives a number of 75576351 initial voxels. In the end, there were 98584 voxels left to represent the dancer.
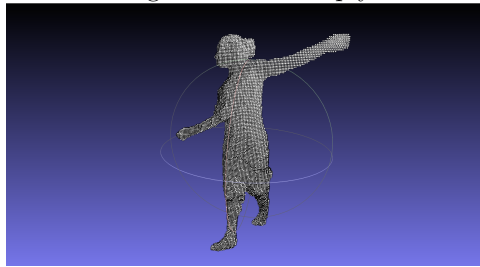
Figure 1: dancer0.ply
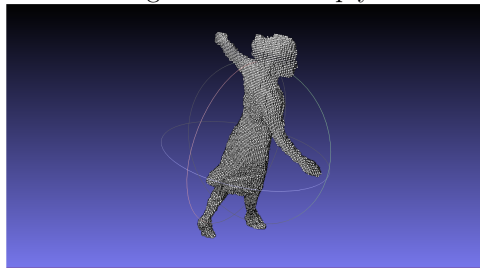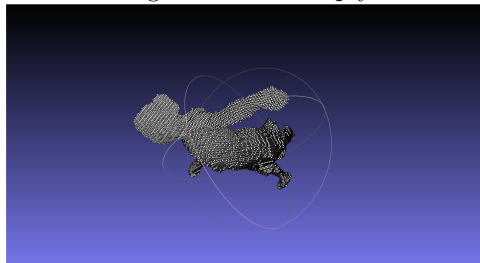

Figure 2: dancer0.ply

Figure 3: dancer0.ply

2 Coloring

First, I tried to color all the points with color information from the first image. As expected, the up-front part of the model was perfect, but rest was bad. Then I tried to color with a blend of all the cameras, just getting the mean off all colors. The results are below:

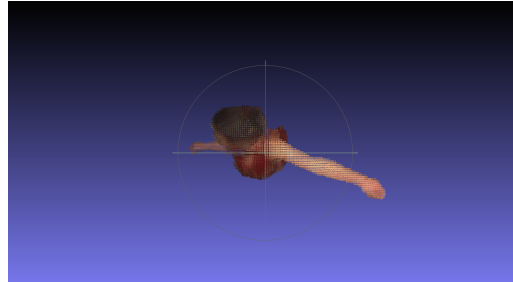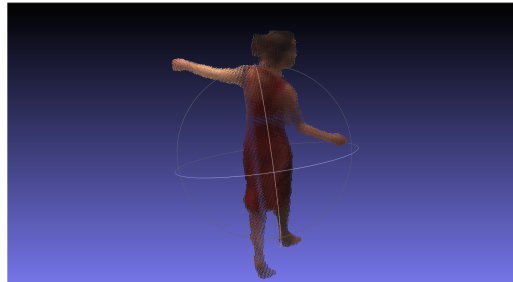Figure 4: dancer1.ply

Figure 5: dancer1.ply

Figure 6: dancer1.ply

The results are not too bad, but also aren't good. Then I tried to find the best camera view for each point, and I saw somewhere online that I could do

that by comparing the normal vector of the point with the camera view vector. So, I used a Matlab code by Zachary Taylor to find the normals of the points. Then, I compared them with the cameras $z - axis$ and kept the index of the camera that provided minimum angle between these vectors. The result didn't came out as good as I expected. But I imagine that if I could estimate the normals only at the surface points, I would get better results.
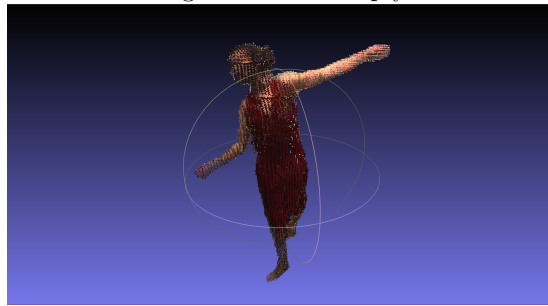
Figure 7: dancer3.ply

Figure 8: dancer3.ply

Figure 9: dancer3.ply