Geometry Processing Project Report

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Exercise 1: ICP (Part 1)

In this part I implemented the calculation of the normal vectors. It was all done in the file "NormalEstimator.cpp". The results look good when I enable the lightning option on the viewer, so I assume the calculations are correct.

Exercise 2: ICP (Part 2)

In this second part of the ICP I implemented all the functionalities in the IterativeClosestPoint class (both .h and .cpp), the details are documented in the code.

Apart from this, I also added a new function on the PointCloud files (ChangeSomeColors) which will just change the color of a subset of the vertices. This is used on Scene.cpp where I use it to color only the border vertices to red (on the loadScans method).

The ICP results look quite nice. In my opinion it's a bit slow but maybe that's because of my laptop's poor performance. The part that doesn't look as good are the border points, it looks like there's a lot of false positives, but I didn't want to lower the *angle_threshold* too much because it would miss a lot of border points. But, in general it looks good.

Exercise 3: Reconstruction

In this reconstruction lab I filled in the functions that we were asked to in both SimpleDistance and RBFFunction classes. Once again, the details are commented on the code.

The results look visually good, but in my opinion it takes too much time, especially the RBF. I even used the sphere model to test instead of the bunny. Even though my laptop is slow, I think the implementation could be improved in this sense. Other than that, the results look visually ok.

Exercise 4: Curvatures

In this lab I implemented the MongePatch class. As before, the implementation details can be found on the files themselves.

This time, however, the results don't look ok to me. Compared to the results that we saw during class, they look quite different with the Moai model, which is the one I used to test. You can build and run the application with no errors, but something is off and I didn't manage to get it right.

Exercise 5: Smoothing

This lab exercise is incomplete as I only implemented the 3 first functions that were required (the ones about iterative smoothing). There are more detailed comments in the code.

The functionalities were tested on the Moai model. The first 3, displayed some good results and adapted to the parameters given.