3D Sensing Homework 3

ICP algorithm and Evaluation

The dataset was comprised of 3 object scans from which I took 2 pairs. The scans were taken at different angles with a maximum angle difference of 30 deg.

Only the ICP algorithm was run on the pairs. I tried different values for the rotation angle (performed on the Y axis) and gaussian noise. From the performed runs, I collected the following:

- MSE
- No. of iterations
- Runtime

Dragon Stand

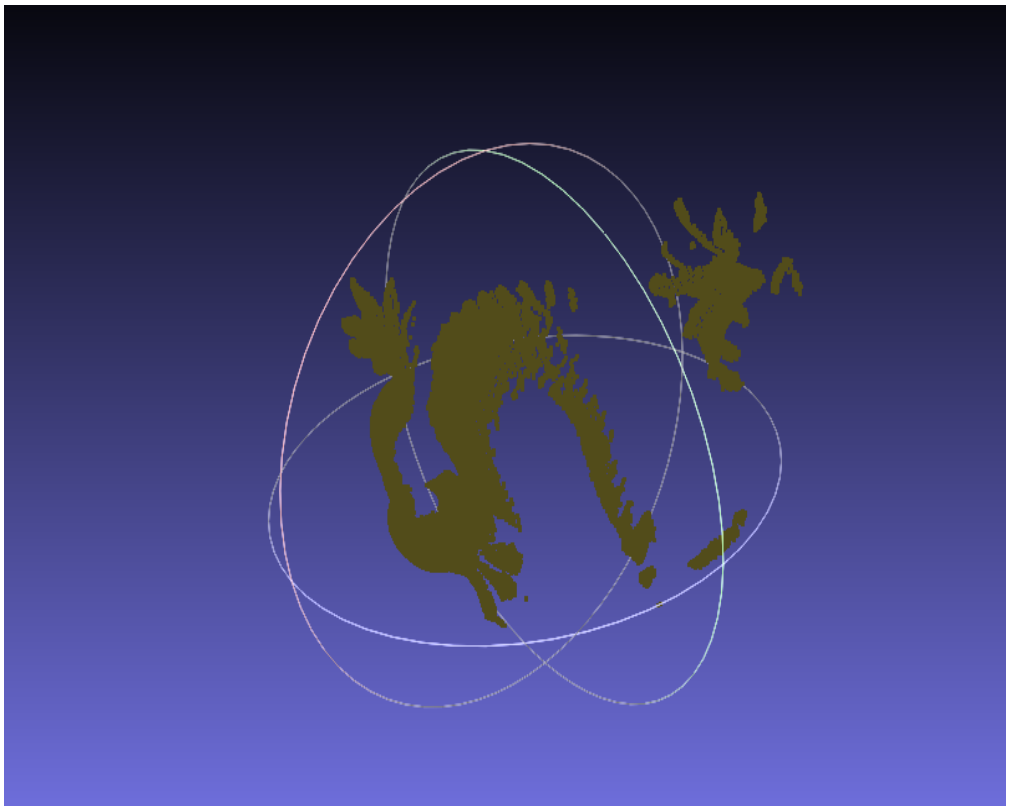
Variation of the rotation angle

Rotation angle (deg)	MSE	No. of iterations	Runtime (ms)
0	0.010136	10	1607
5	0.010923	9	1486
10	0.010792	9	1502
15	0.010639	9	1503
45	0.010568	10	1693

Variation of the gaussian noise level

Gaussian noise level	MSE	No. of iterations	Runtime (ms)
0	0.010136	10	1627
10%	0.086733	7	1490
20%	0.208361	8	1638

Result of the gausian noise level being 20%



Drill

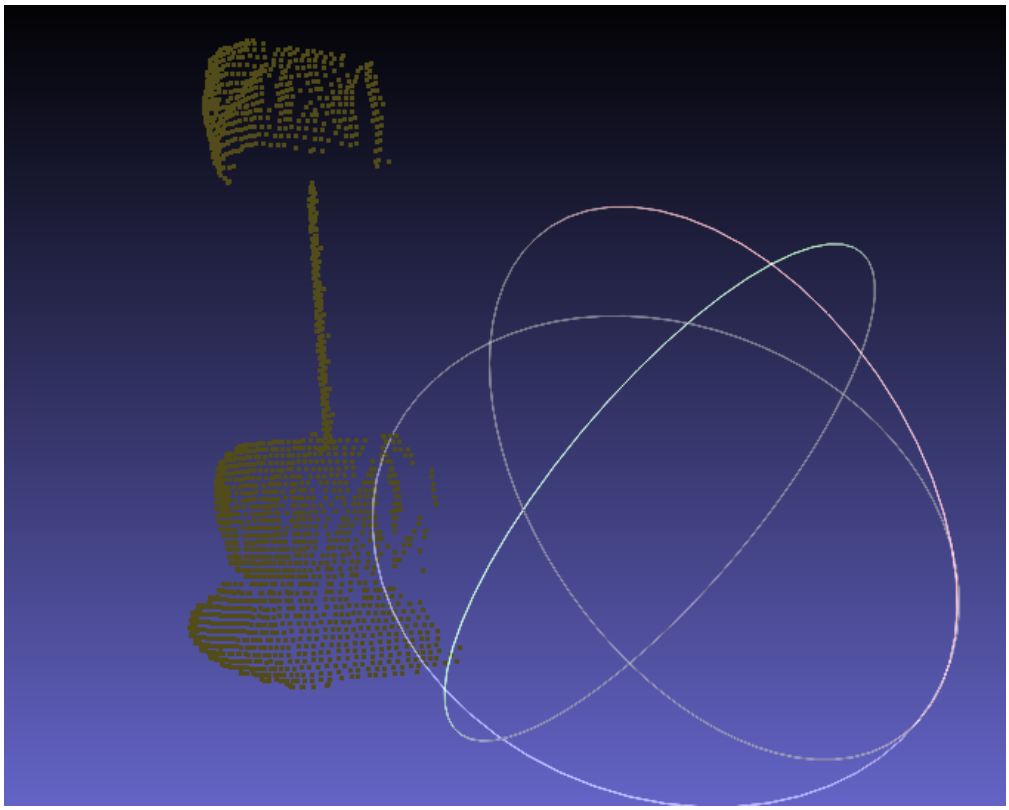
Variation of the rotation angle

Rotation angle (deg)	MSE	No. of iterations	Runtime (ms)
0	0.013844	1	44
5	0.013889	1	45
10	0.010922	5	104
20	0.013953	1	46

Variation of the gaussian noise level

Gaussian noise level	MSE	No. of iterations	Runtime (ms)
0	0.111535	7	146
10%	0.246570	7	148
20%	0.382520	6	126

Result of the gausian noise level being 20%



Armadillo

Variation of the rotation angle

Rotation angle (deg)	MSE	No. of iterations	Runtime (ms)
0	0.017344	10	1429
5	0.010090	17	2094
10	0.010476	14	1765
20	0.014013	16	2063

Variation of the gaussian noise level

Gaussian noise level	MSE	No. of iterations	Runtime (ms)
0	0.082568	9	1222
10%	0.200347	10	1319
20%	0.335996	4	698

Result of the gausian noise level being 20%