Iterative Closest Point

Computer Vision 2 - Assignment 1

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1 Introduction

2 Results

3 Discussion

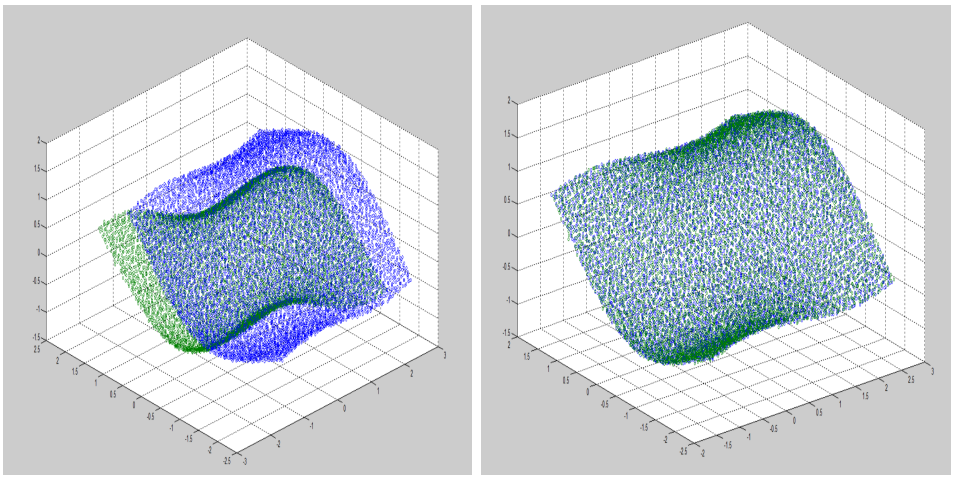


Figure 1: The point clouds of the sample data in 3D space (left) and the transformed pair with an error of 0.000947 after 30 iterations of the ICP algorithm (right).

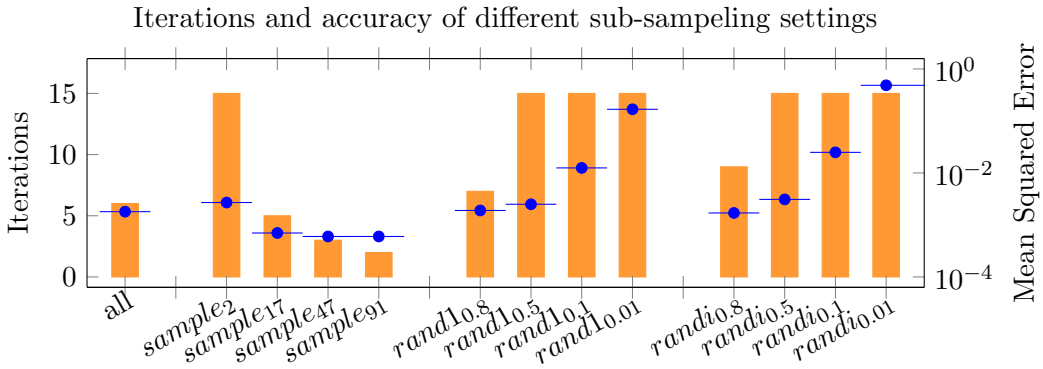


Figure 2: Accuracy and amount of iterations (with a maximum of 15) after ICP on the sample data, using: all points, uniform sampling with step-size 2,17,47 and 91, random sampling with $p = 0.8$,$p = 0.5$,$p = 0.1$ and $p = 0.01$, and random sampling with $p = 0.8$,$p = 0.5$,$p = 0.1$ and $p = 0.01$ after each iteration.

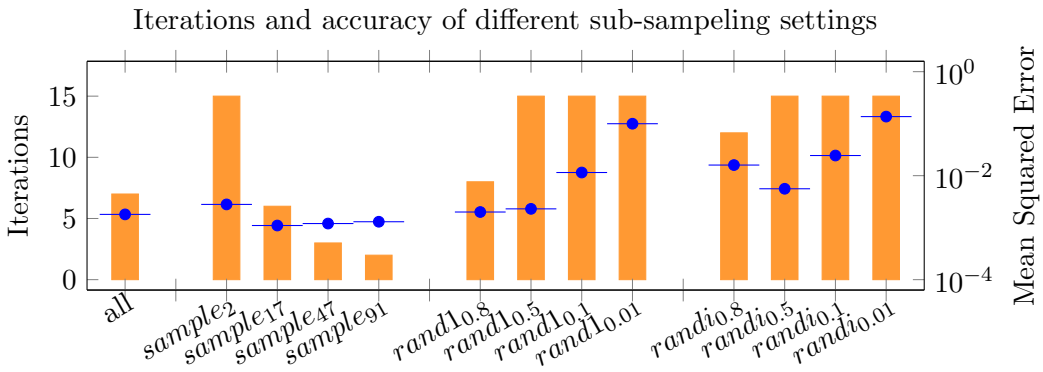


Figure 3: Accuracy and amount of iterations (with a maximum of 15) after ICP on the sample data with Gaussian noise of $\mu = 0.01$, using: all points, uniform sampling with step-size 2,17,47 and 91, random sampling with $p = 0.8$,$p = 0.5$,$p = 0.1$ and $p = 0.01$, and random sampling with $p = 0.8$,$p = 0.5$,$p = 0.1$ and $p = 0.01$ after each iteration.

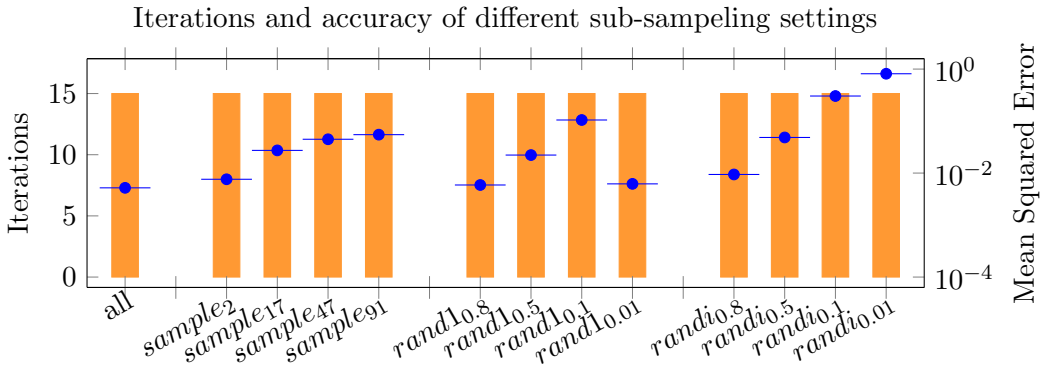
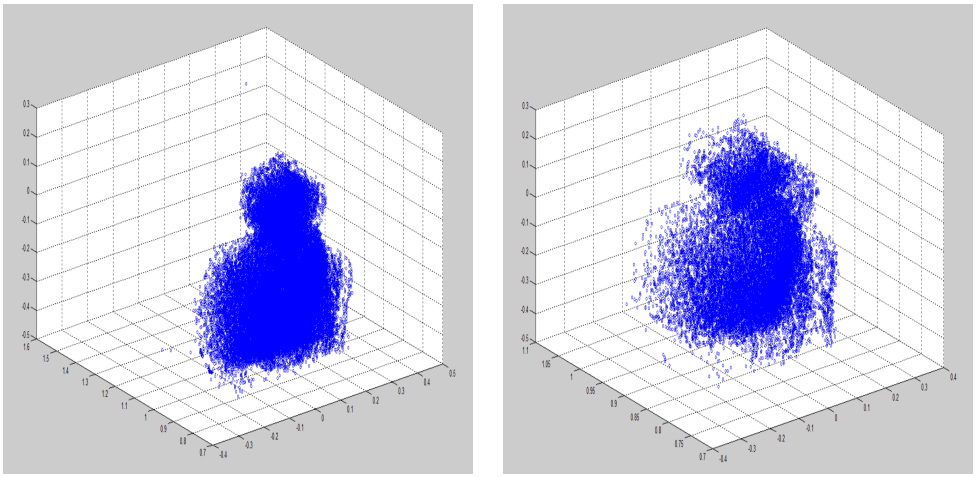
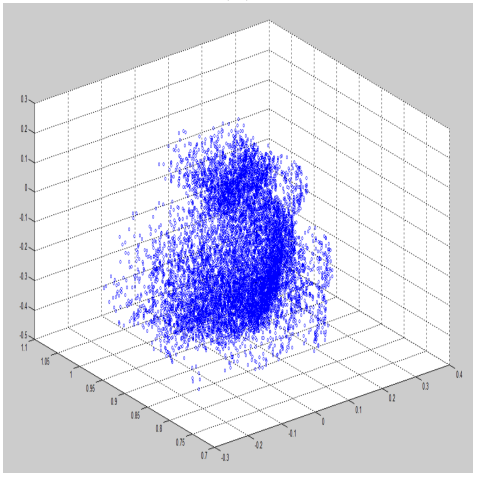


Figure 4: Accuracy and amount of iterations (with a maximum of 15) after ICP on the sample data with Gaussian noise of $\mu = 0.1$, using: all points, uniform sampling with step-size 2,17,47 and 91, random sampling with $p = 0.8$,$p = 0.5$,$p = 0.1$ and $p = 0.01$, and random sampling with $p = 0.8$,$p = 0.5$,$p = 0.1$ and $p = 0.01$ after each iteration.

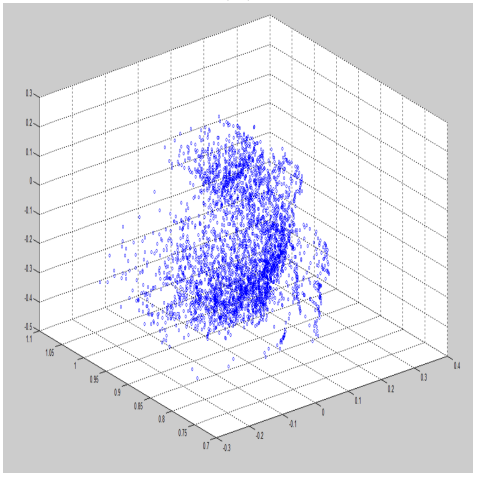


(a)

(b)



(c)



(d)

Figure 5: The point cloud of the model after ICP moddeling every frame (a), every second frame (b), every fourth frame (c) and every tenth frame (d) with the frame before.