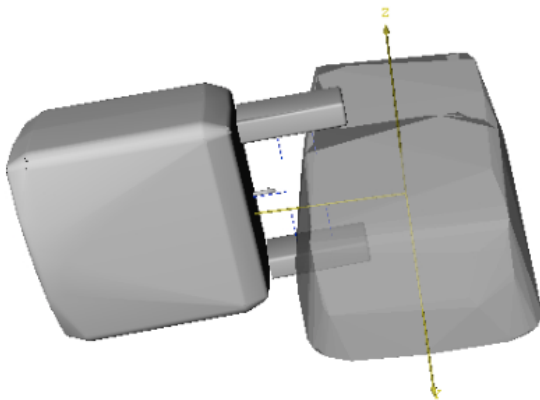


B3M33HRO HW5

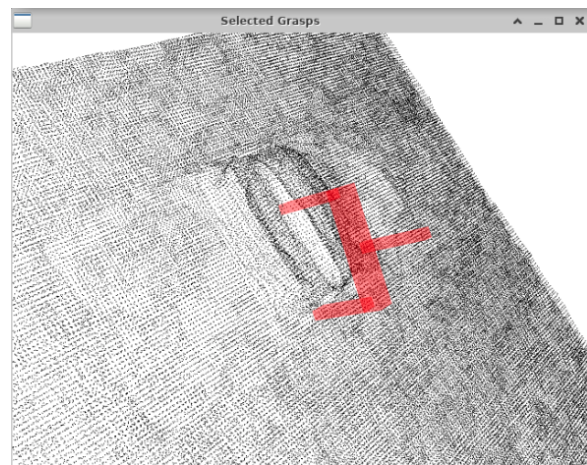
Grasping

1 Introduction

You are provided with point clouds from real depth cameras. Your task is to combine them to get a full view of a scene and use it to get grasp from two pipelines: [GraspIt!](#) and [GPD](#). Examples of grasps can be seen in [Figure 1](#).



(a) Example grasp from GraspIt!



(b) Example grasp from GPD.

Figure 1: Examples of grasps.

2 Assignment

- Download assignment from the course website.
- Get the pipelines working:
 - Use Docker images with tags *full* or *graspit*. The instructions can be found in the [Docker tutorial](#),
 - or install them manually.
- Open Jupyter notebook and the code template provided.
 - In the docker image, run *jupyter-notebook* in the terminal and open <http://localhost:8888> in browser (in Docker or in your machine).
- Set limits in *z-axis* for the bounding box of workspace.
 - Try something and update it based on visualizations.
 - Different minimal values may be needed for GraspIt! and for GPD.
- Combine the provided point clouds in one. You can process them as you want and as needed—downsample, outliers removal, bounding box crop.
 - Decide whether to use the processing on the final point cloud, or on individual samples.
 - See [Open3D Point Cloud Class](#) and [Open3D Point Cloud Tutorial](#).

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- Create a mesh from the point cloud, translate it to position (0,0,0), and save it to file.
 - Select the appropriate method that will work in GraspIt!
 - * **Note:** the mesh should be watertight, *i.e.*, it should be complete, without holes.
 - See [Surface Reconstruction Tutorial](#) and [Open3D Triangle Mesh Class](#).
 - Open the GraspIt interface and:
 - Clear the World;
 - Import *fetch_gripper* as a robot;
 - Import your mesh as a graspable body;
 - See [GraspIt! commander API](#).
 - **Note:** if you see only black/grey after you load the robot and the body, zoom-out in the GraspIt GUI.
 - Run the EigenGrasp planner and sort the grasp by ϵ -quality.
 - ϵ -quality: the closer to 1, the better. **Note:** if you close the GraspIt interface, you will probably need to restart the kernel in the notebook before you run it again.
 - Check if the grasp looks like you would assume and take a picture of it.
 - Prepare point cloud for GPD.
 - This point cloud should have “a table” under the object.
 - Run the GPD and take a picture of the output. Make it run as fast as possible.
 - Right processing of the point cloud can help you to reduce time, or you can play with the values in *eigen_params.cfg* (in Docker located in */gpd/cfg/eigen_params.cfg*).