Photogrammetrics & Robot Vision
## Exercises

Contents

1   Context

Photogrammetrics and LiDAR permit to obtain a sampling of the surfaces of interest. The result of this sampling process is a Point Cloud (PC) for both methods.

There is a need to perform the absolute orientation of such PCs to have a **registered** complete 3D model of the surfaces sampled from several points of view in the case of LiDAR, or to make real world measurements on the data in the case of Photogrametry.

2   Objectives

The objective of this practice is to obtain the coarse-to-fine registration of two point clouds using the results of the Assigment 3, the Open3D library and validate the results using Cloud Compare software.
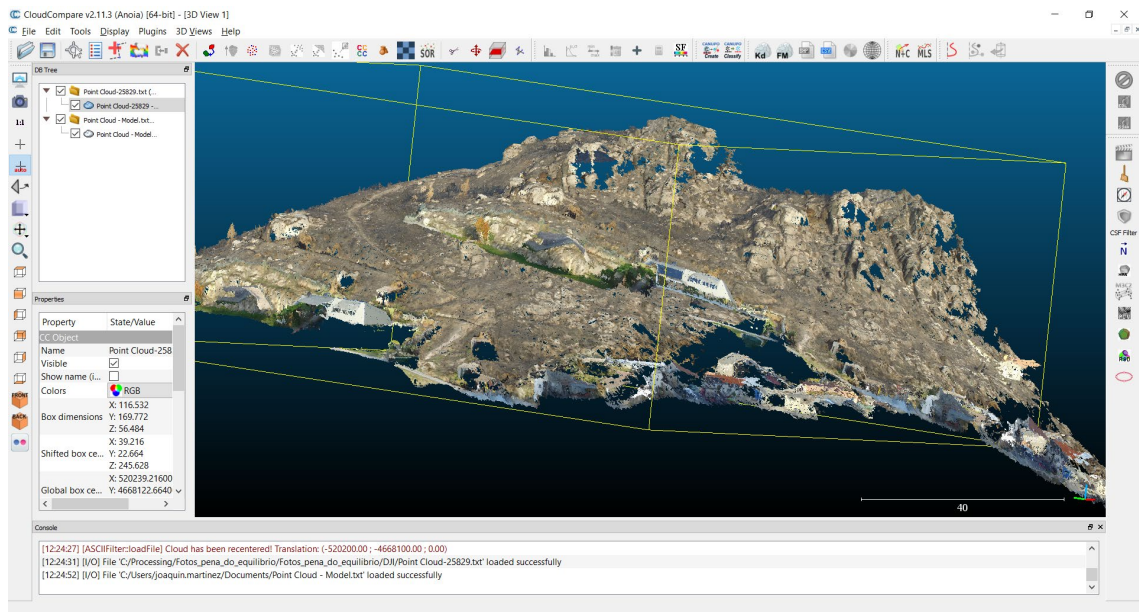
3 Methodology

3.1 Obtain correspondence points

Use geometric features to guess salient points and correspondences to apply the scripts implemented in Assigment 3 to obtain the coarse registration of the point clouds.

This is a challenging task, please describe your approaches and discuss on the validity of the outcomes.

3.2 Point cloud registration

Test different flavours and parameters of the ICP function and document the better solution to the registration problem.

4 Resources

- Use the dataset for the Exercise 1 in Week 3 and create your own dataset with Agisoft Metashape or Meshroom
- Install and use Open3D library, a complete library for point cloud processing and analysis.
- Cloud Compare software for dealing with Point Clouds and obtain the ground truth of the alignment.

5 Deliverables

The deliverables of the exercise consist of

- the python functions and scripts developed.
- A discussion of the results and conclusions.

The preferred format for the deliverable is a Jupyter Notebook.