Object Oriented Programming Final Project Report

Alihan BOZKIR 151220182032

Uml Diagram:

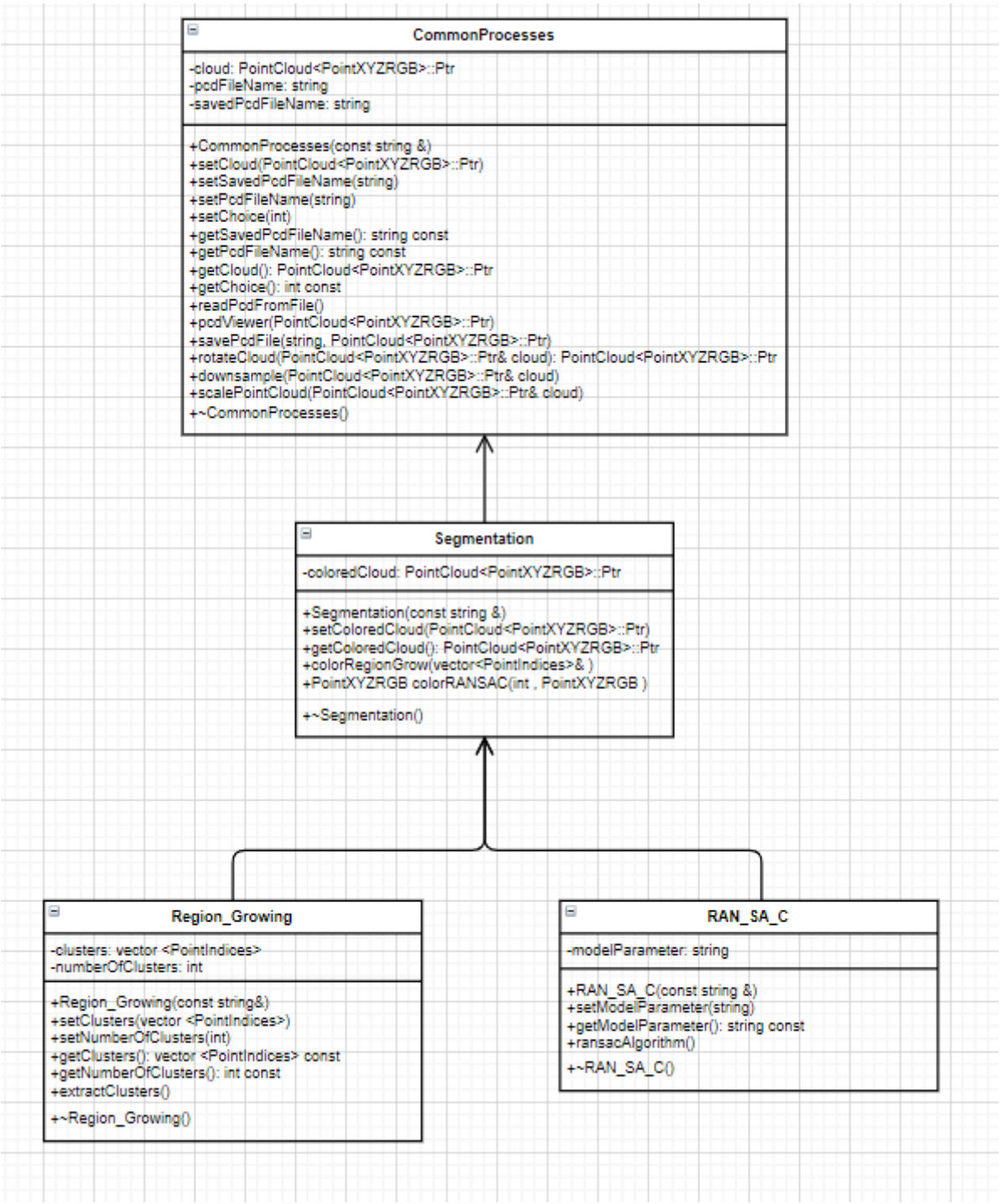


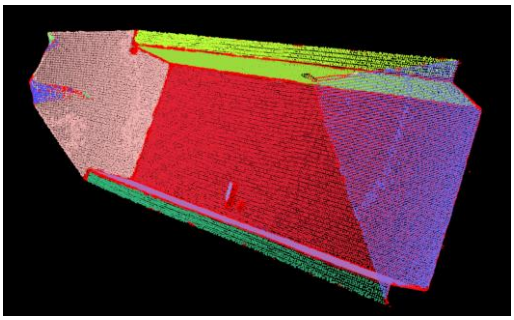
Figure 1

Main:

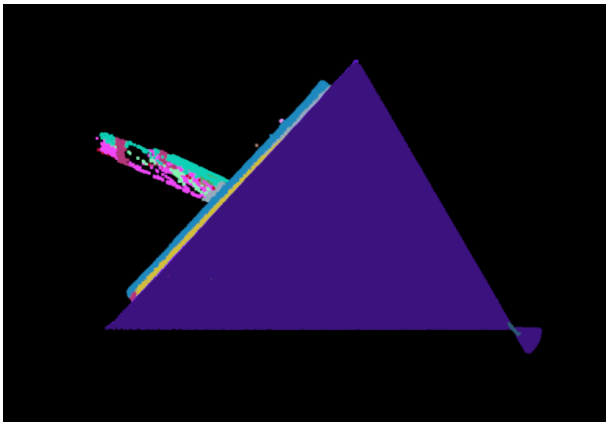
An interface has been created for the User in Main. First of all, which segmentation method to use is offered to the user as an option. In the next step, he is asked to choose one of the .pcd files that store ready-made raw point clouds. And an object is created from the Class of the selected segmentation method and sent to the selected file.

CommonProcesses Class:

This class is the base class of the Segmentation Class. The constructor initializes the file directory of the selected raw point cloud to the pcdFileName data member via the member initialier list. At the same time, an interface has been created in Constructor. The user is asked which operations to apply in this interface and this value to the choice data member is initialized after the validation process. There are cloud, pcdFileName and savedPcdFileName data members in this class, and set() and get() functions are defined for these datat members. The readPcdFromFile() function reads the point cloud from the file and initializes it to the cloud data member. The pcdViewer function prints the point cloud it takes as an argument to the screen. The savePcdFile function writes this point cloud to a .pcd file named file name by using the file name and point cloud arguments it includes. rotateCloud function rotates the given point cloud in accordance with the desired degree from the user.The downSample function reduces the number of points in a given point cloud without breaking its structure. The scalePointCloud function scales the given point cloud at a certain rate without breaking its structure.



Down Sampling



Rotated 180 degree

Segmentation Class: (is a CommonProcesses Class)

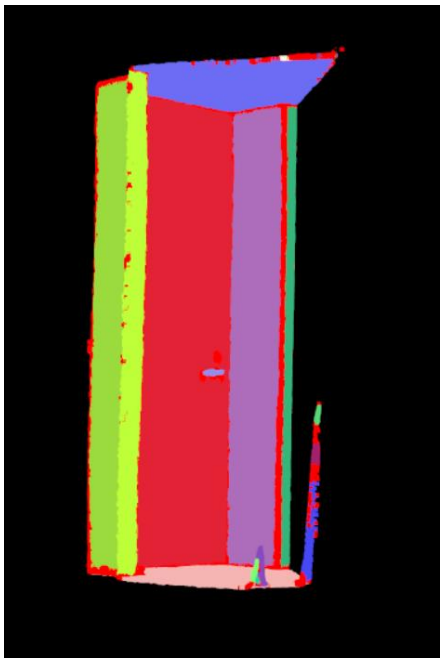
This Class is the base class of the Region_Growing and RAN_SA_C classes. Constructor sends the file directory of the selected raw point cloud to the CommonProcesses Class using the base-class initializer syntax. No action is taken in the Constructor scope of the Class. Class includes coloredCloud and choice data members and appropriate set() and get() functions. The main purpose of Class is to color the clusters or inliers that are separated meaningfully and store their segmented states in coloredCloud.

Region_Growing Class: (is a Segmentation Class)

This class divides the raw point cloud into clusters using the Region Growing algorithm. The constructor sends the file directory of the selected raw point cloud to the Segmentation Class using the base-class initializer syntax. On the colorCloud data segmented by applying the Regiongrowing algorithm in the Constructor, the Menu presented in the CommonProcesses interface is as follows:

```
**********************************************
1. Rotate and save
2. downsampling and save
3. scale and save
4. just save
**********************************************
```

Point cloud data is printed on the screen on the methods applied upon selection and saved in files with .pcd extension.



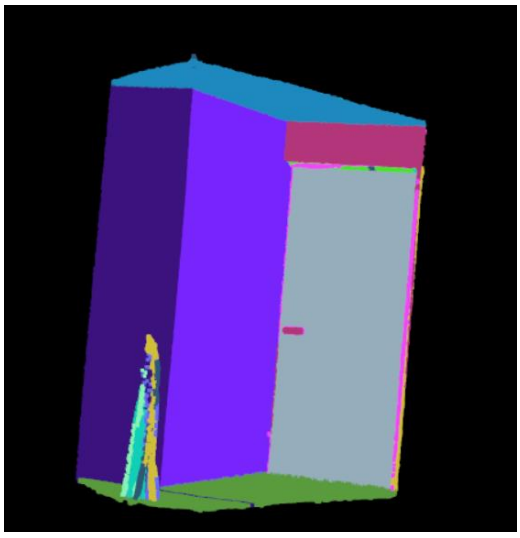
Region Growing

RAN_SA_C Class: (is a Segmentation Class)

This class splits the raw point cloud into inliers using the RANSAC algorithm. The constructor sends the file directory of the selected raw point cloud to the Segmentation Class using the base-class initializer syntax. On the colorCloud data segmented by applying the RANSAC algorithm in the Constructor, the Menu presented in the CommonProcesses interface is as follows:

```
**********************************************
1. Rotate and save
2. downsampling and save
3. scale and save
4. just save
**********************************************
```

Point cloud data is printed on the screen on the methods applied upon selection and saved in files with .pcd extension.



RANSAC

Changes:

The coloredCloud data member has been removed from the CommonProcesses class and defined in the Segmentation Class. Upon this change, necessary modifications were made in the functions again. Its interfaces were defined over and over in the Region_Growing and RAN_SA_C Classes. In order to avoid repetitive codes, we have gathered this interface in a single Class in the Base class at the top of the Hierarchy.