Identifying Duplos of the Same Size

pointcloudlibrary

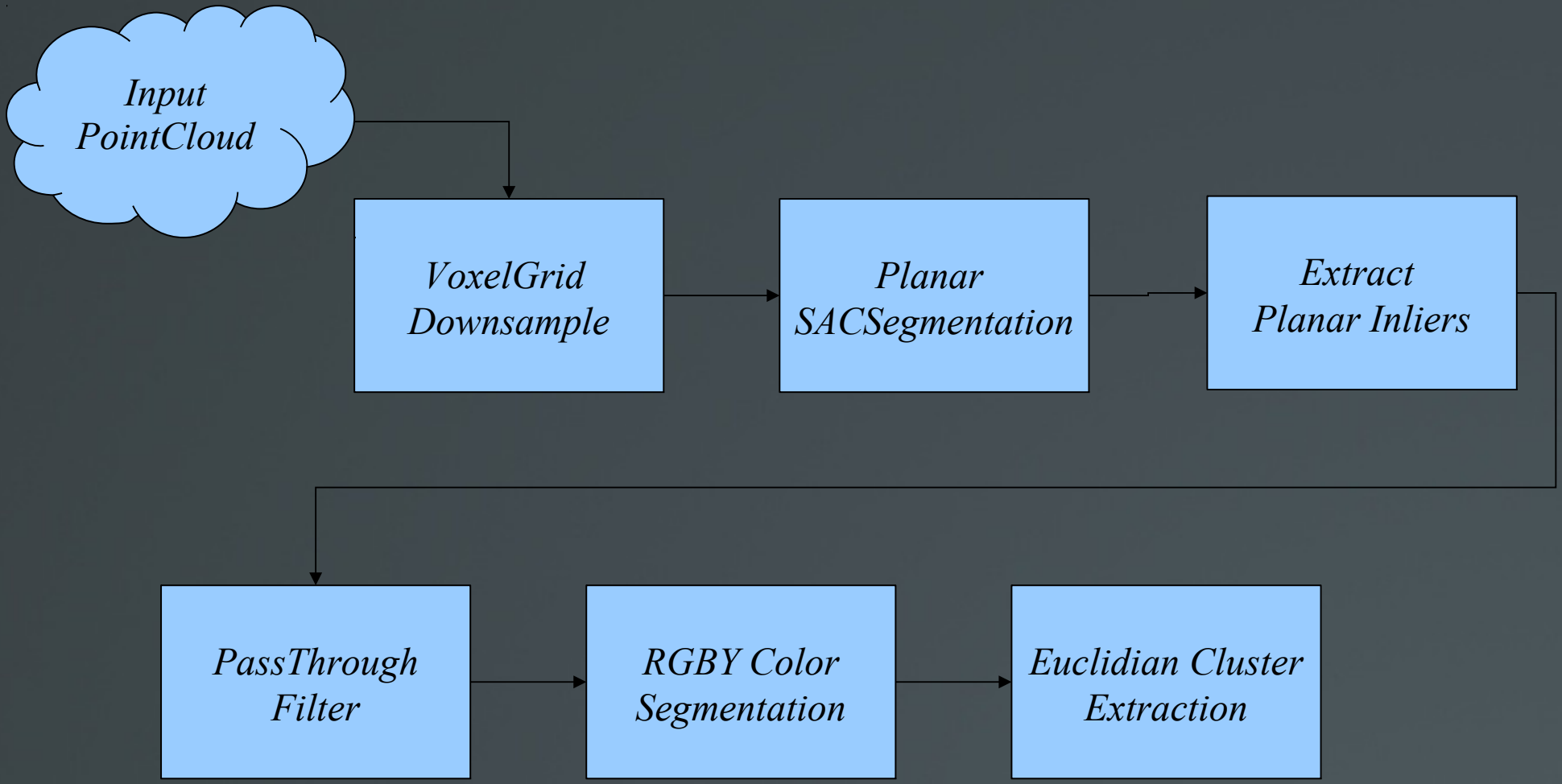
ROS KINECT

- Team Members: Hieu Nguyen
- CSCI-547 ”Sensing and Planning in Robotics” Final Project
- Project Task: *Identify Duplo bricks of the same size. (ROS)*

Approach

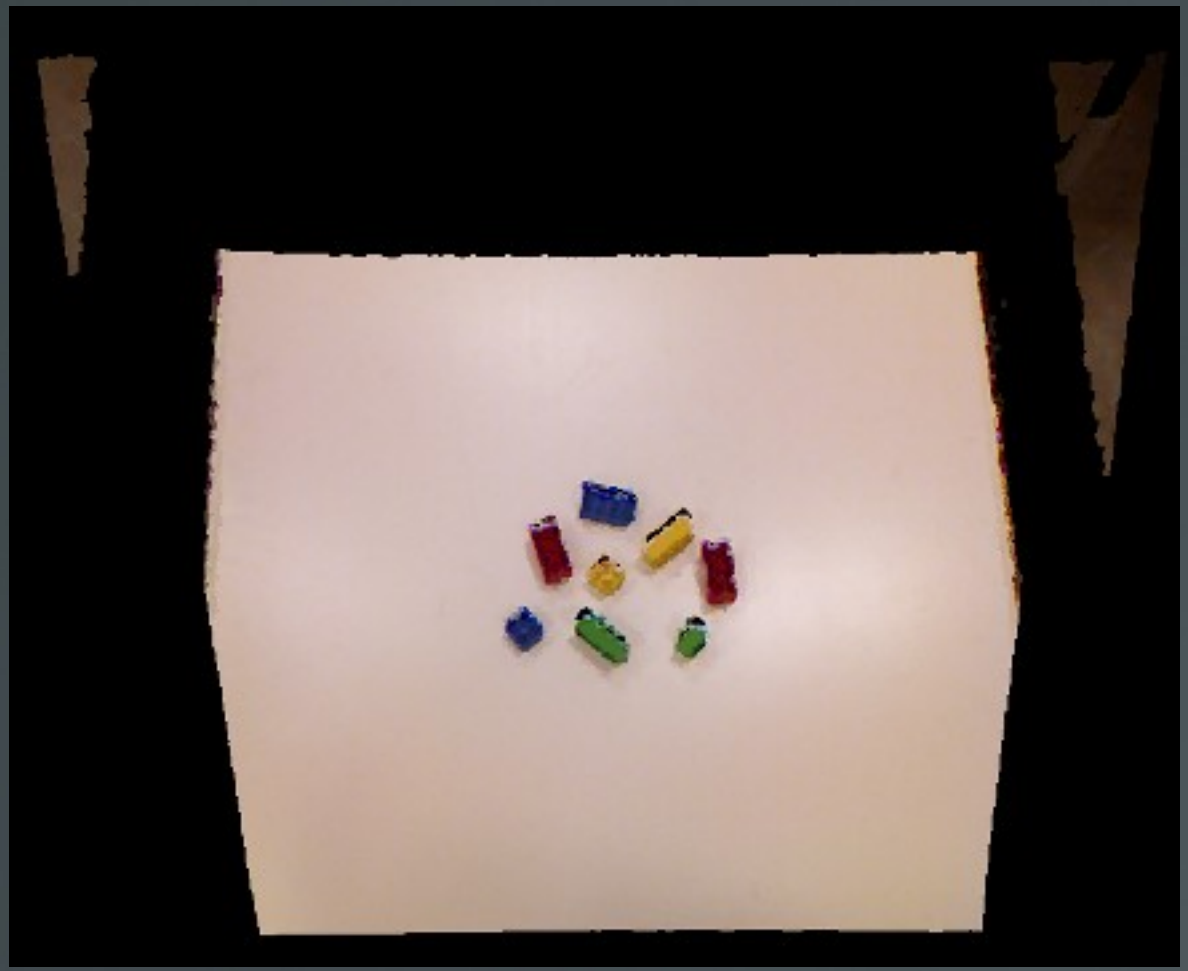
- Segment Duplo bricks from input PointCloud
- Determine size of each Duplo brick
- Search for bricks of similar size

Segmentation Algorithm



Segmentation Algorithm

Input → Downsample → Extract Planar Inliers → PassThrough Filter → Color Segmentation → Cluster Extraction



Segmentation Algorithm

Input → **Downsample** → Extract Planar Inliers → PassThrough Filter → Color Segmentation → Cluster Extraction

Segmentation Algorithm

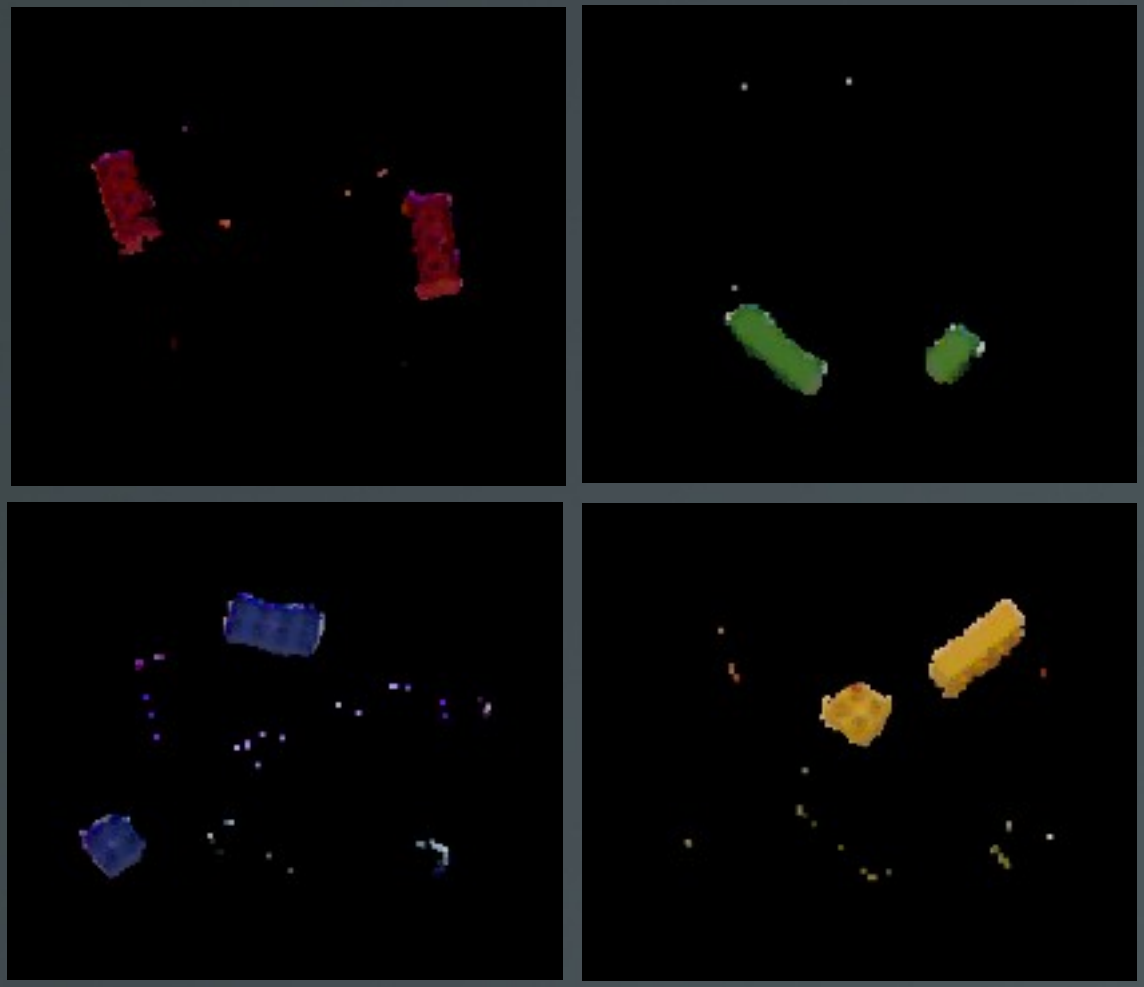
Input → Downsample → **Extract Planar Inliers** → PassThrough Filter → Color Segmentation → Cluster Extraction

Segmentation Algorithm

Input → Downsample → Extract Planar Inliers → **PassThrough Filter**
→ Color Segmentation → Cluster Extraction

Segmentation Algorithm

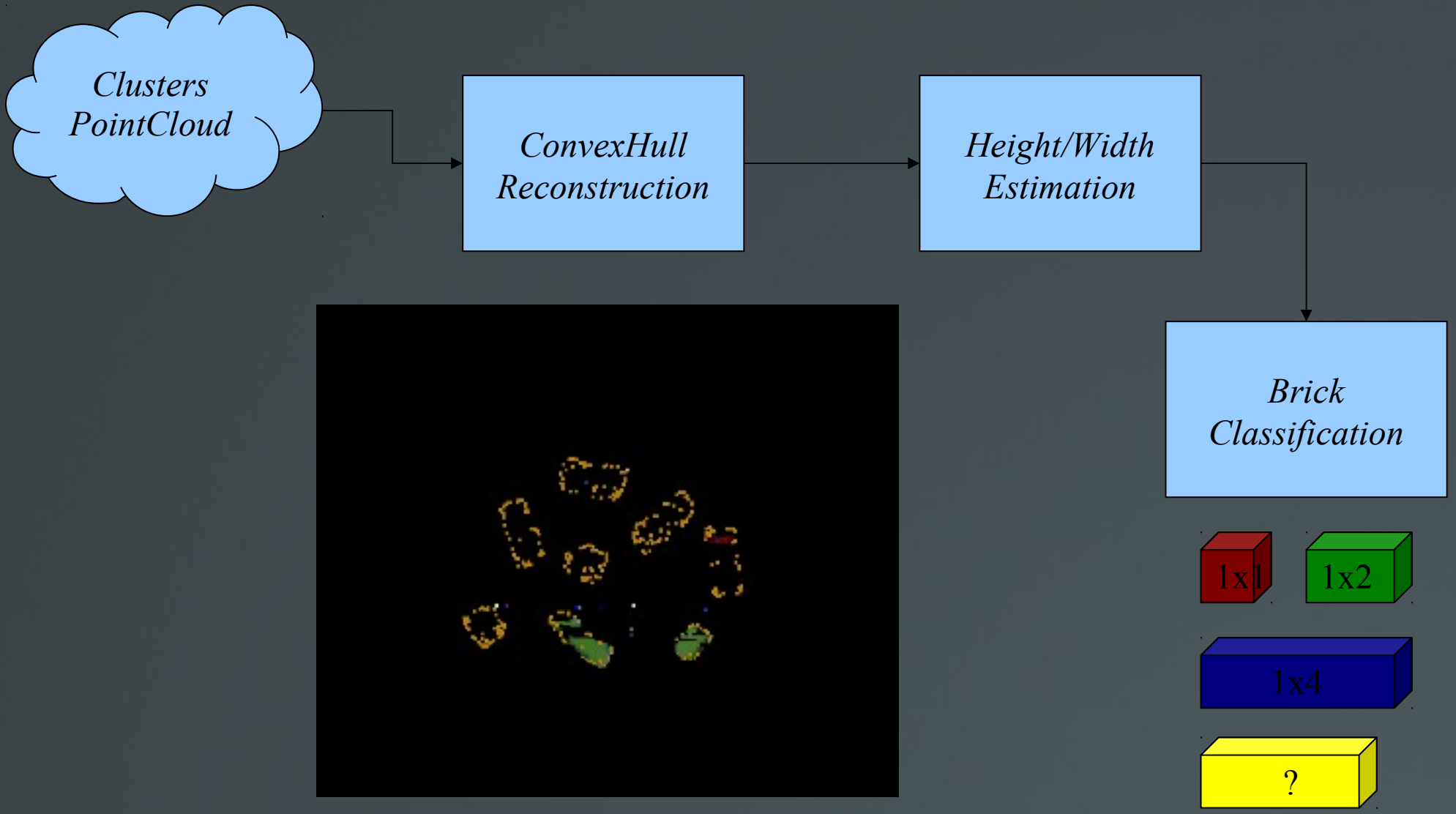
Input → Downsample → Extract Planar Inliers → PassThrough Filter → **Color Segmentation** → Cluster Extraction



Segmentation Algorithm

Input → Downsample → Extract Planar Inliers → PassThrough Filter → Color Segmentation → **Cluster Extraction**

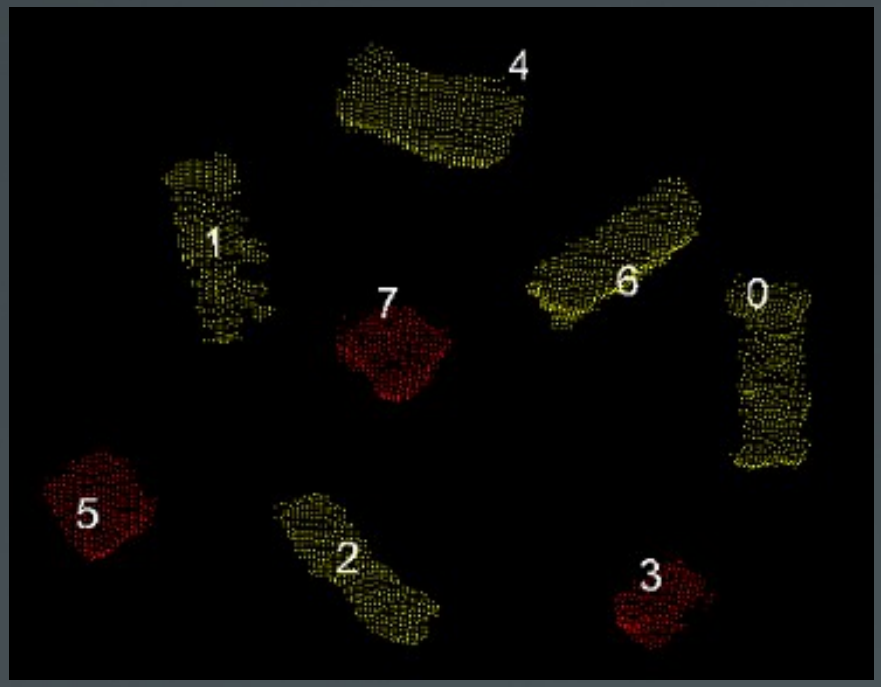
Size Classification Algorithm



Results

Input: "*group2_1.pcd*"

Size-classified Output

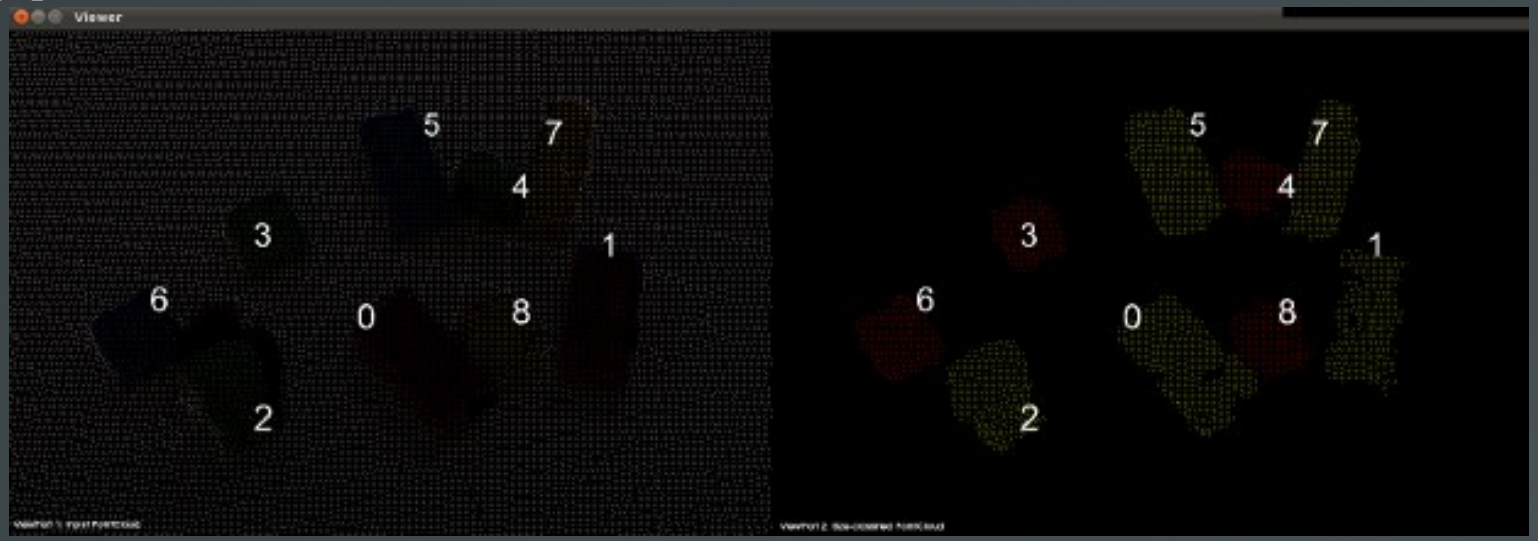


Terminal Output:

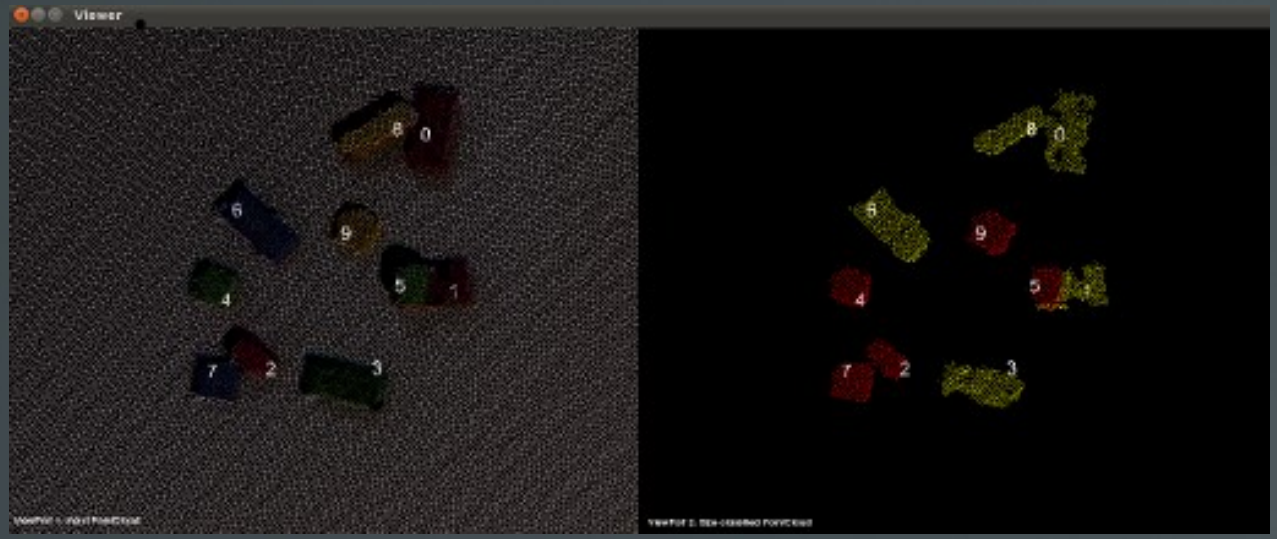
```
----------------Received point cloud!-----------------
Number of RED clusters: 2
Number of GREEN clusters: 2
Number of BLUE clusters: 2
Number of YELLOW clusters: 2
TOTAL number of clusters: 8

There are 3 blocks of size 1x1 (cluster index: 3, 5, 7, )
There are 5 blocks of size 1x2 (cluster index: 0, 1, 2, 4, 6, )
There are 0 blocks of size 1x4
There are 0 unclassified blocks
```

More Results

“*group2_2.pcd*”

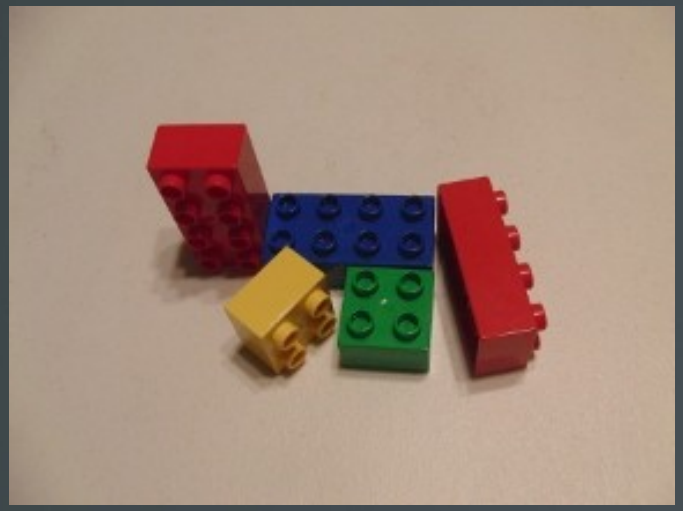


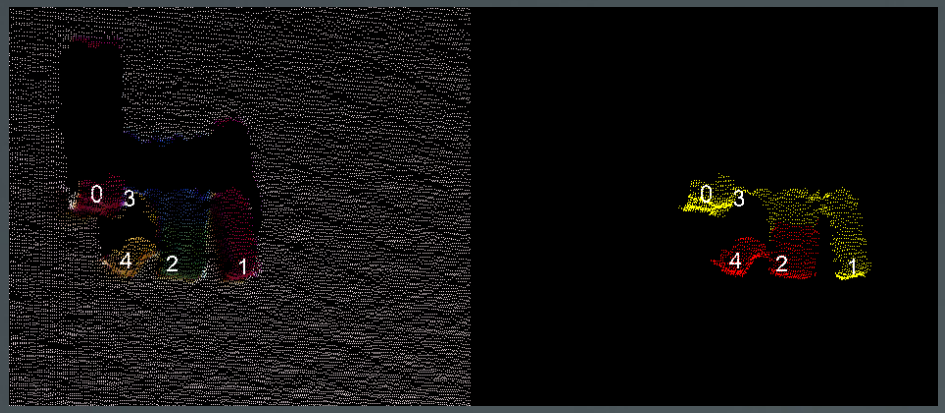
“*group2_3.pcd*”



Even More Results

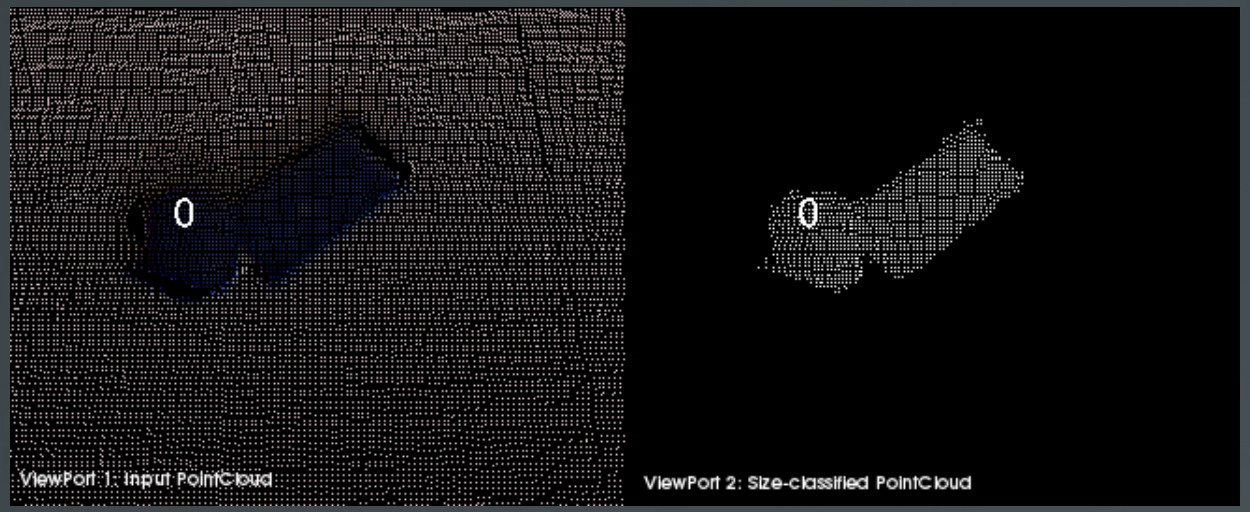
Testing with the Kinect sensor in "real-time"

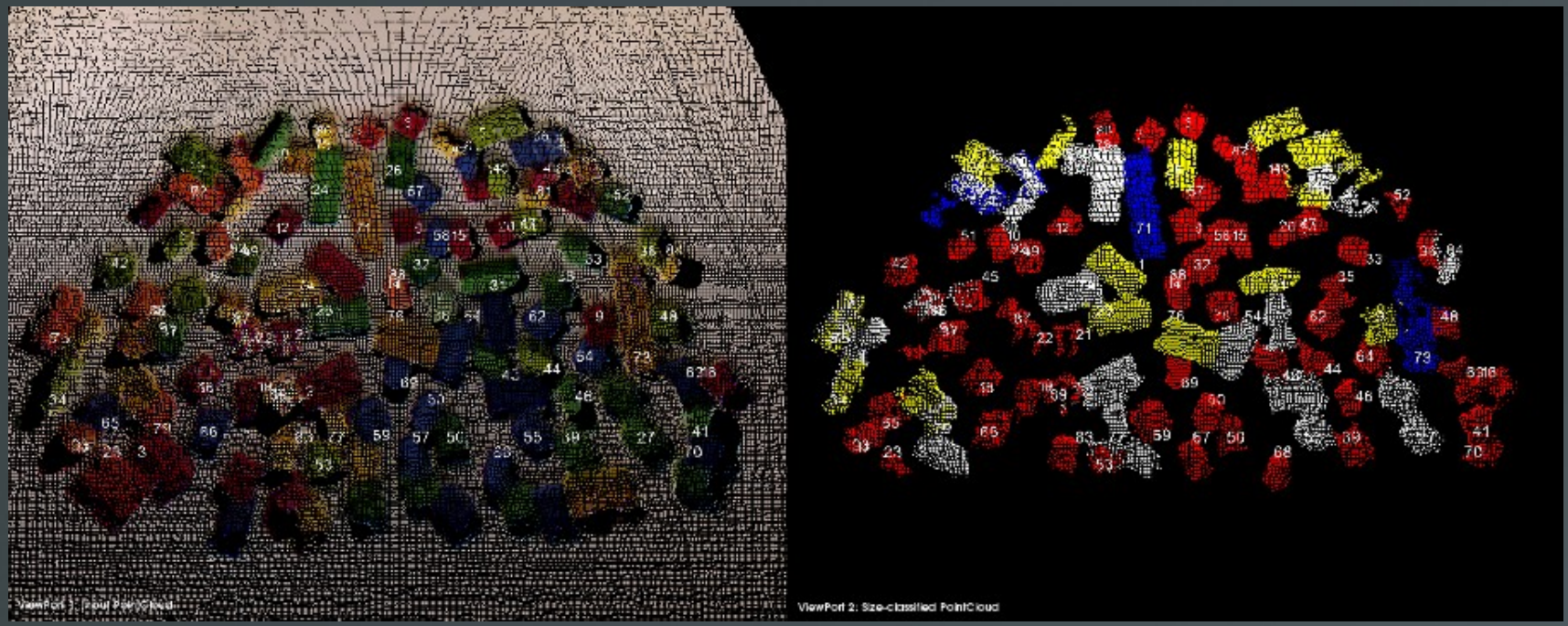




Even More Results

Limitations





Thank You!