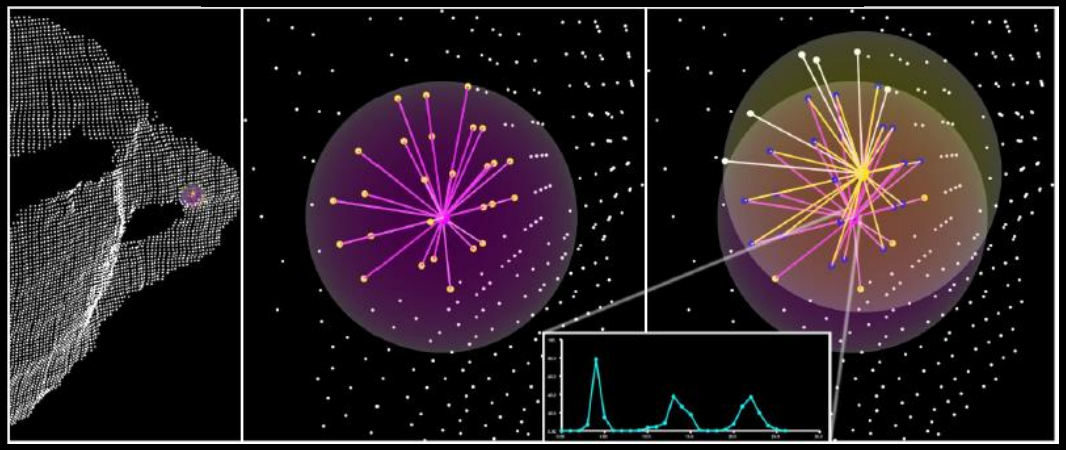
pointcloudlibrary



PCL
Homework

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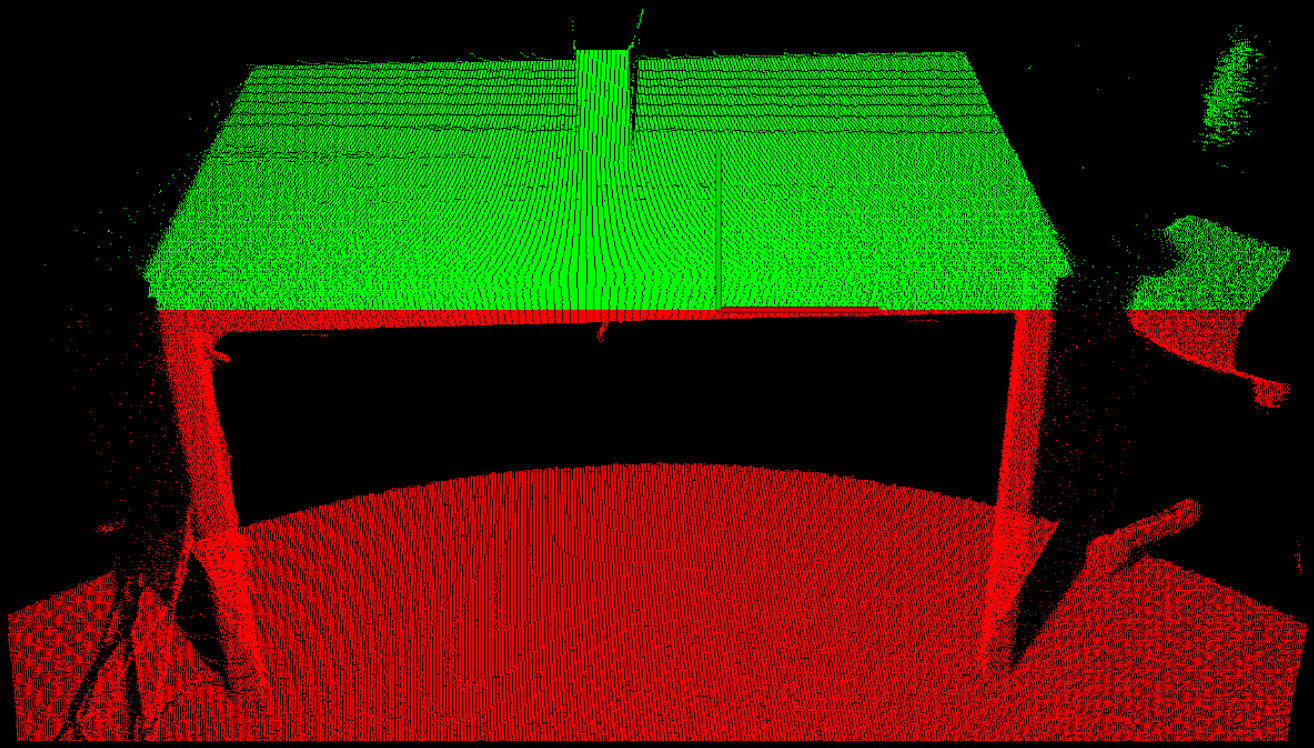
DIPARTIMENTO
DI INGEGNERIA
DELL'INFORMAZIONE

Exercise 1 (lab1)

Exercise 1: Create a point cloud XYZRGB (*cloud_out*) with

- only points from the input cloud with x < 0
- all colored in blue

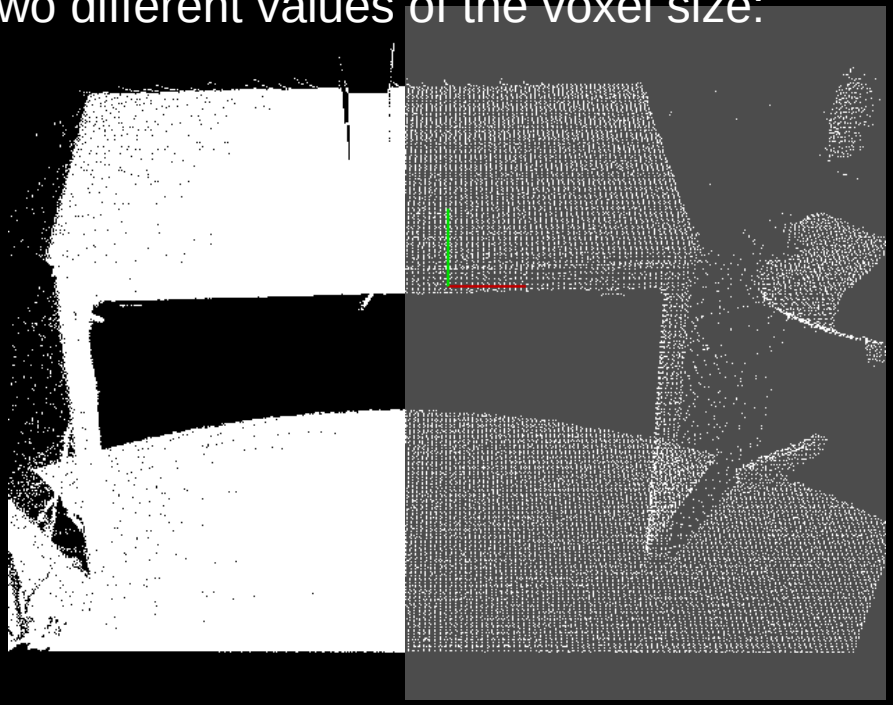


Exercise 2 (lab1)

Exercise 2: create a point cloud obtained applying four different values of the leaf size of the voxel grid filter to different parts of the point cloud and by using different colors for the different parts:

- x < 0, y < 0: leaf size = 0.005, points color: red
- x < 0, y > 0: leaf size = 0.01, points color: green
- x > 0, y < 0: leaf size = 0.05, points color: blue
- x > 0, y > 0: leaf size = 0.1, points color: white

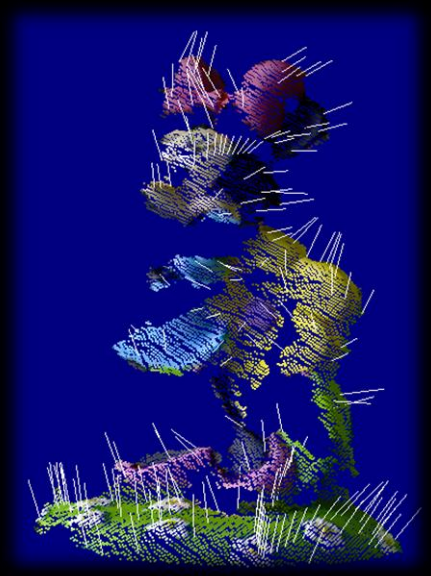
Example with two different values of the voxel size:



Exercise 3 (lab2)

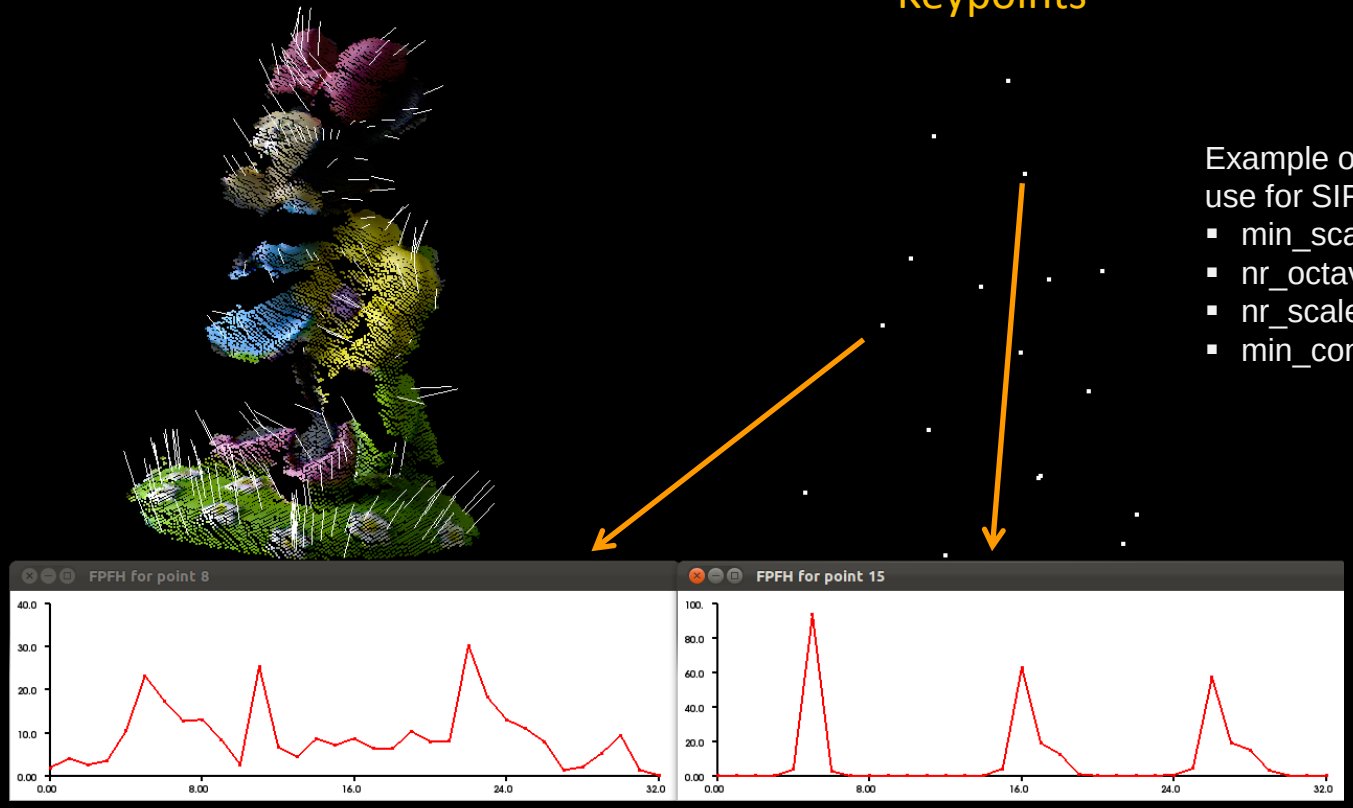
- Normals are computed at every point of the input point cloud
- One normal every 100 is visualized with PCL viewer
- Try this demo with these two input point clouds:
  - "../dataset/minimouse1_segmented.pcd" (without ground plane)
  - "../dataset/minimouse1.pcd" (with ground plane)

- **Exercise 1:**
  - Compute normals with two different values (0.03 e 0.002) of the «search radius» parameter and compare the results with the visualizer in 2 viewports side-by-side.



Exercise 4 (lab2)

- **Exercise 2:**
  - Create a file «demo_compute_keypoints_and_FPFH» that computes SIFT3D keypoints and then compute FPFH features only at the keypoints location.
  - Verify if the keypoints descriptors are different to each other by visualizing them.

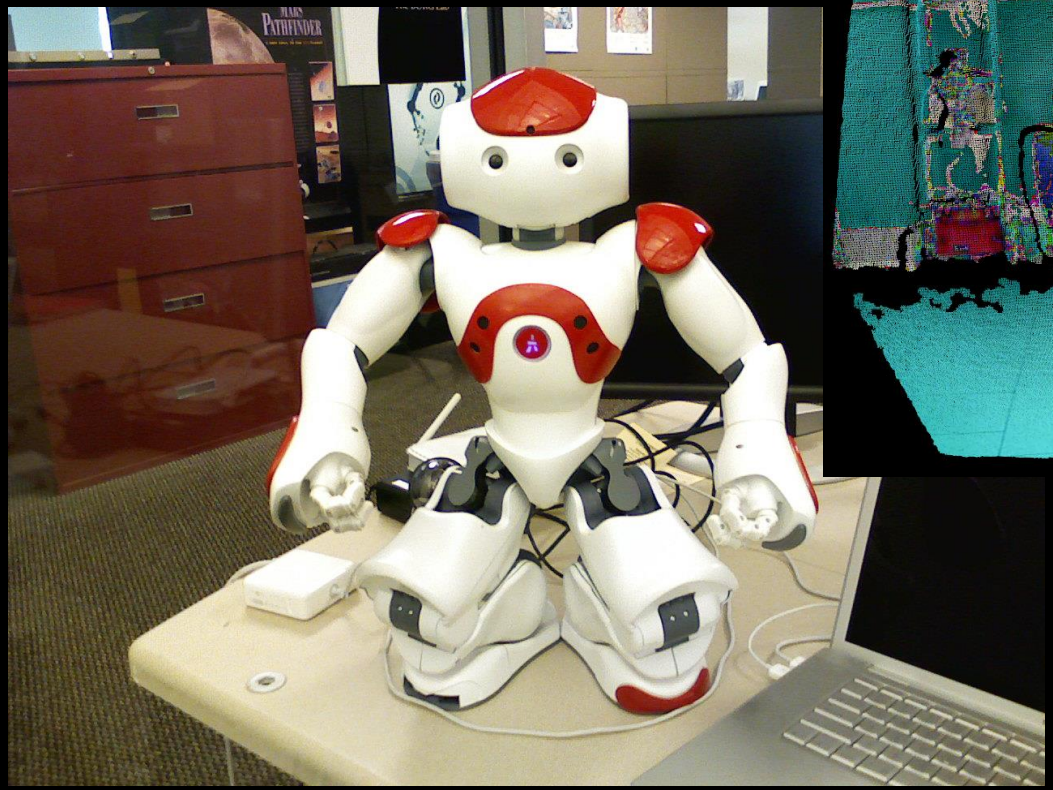


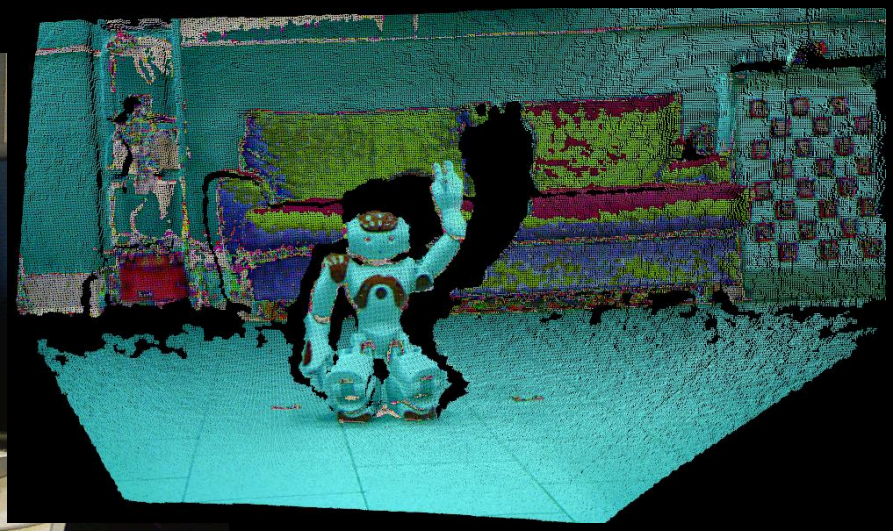
Example of parameters to use for SIFT3D keypoints:

- min_scale = 0,01
- nr_octaves = 3
- nr_scales_per_octave = 2
- min_contrast = 0

Exercise 5 (lab4)

- Register together at least five out of the six pointclouds provided in ‘data/nao’ folder of PCL Lab 4.
- Keep only the part of the clouds corresponding to the robot.
- You can visualize the test clouds with ‘show_clouds_nao’.





Exercise 6 (lab4)

- Implement automatic ground plane estimation to be used for people detection in point clouds.
- Color the detected ground plane points in red.
- It should work on point clouds from different point of views, but with plane yOz perpendicular to the ground plane (camera roll = 0°).
- Test it with the images provided in 'data/people' folder of PCL Lab 4.