
Status Report: Project name

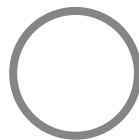
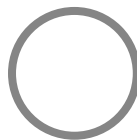
— Yu Sun • 11.26.2018 —

3D Descriptor for Object Detection

Recent progress

- Fixed multiple build errors
- Fixing Bugs from Uniform Downsampling
- 3D-Descriptor (SHOT)
- KNearestNeighbor search

Project Recap



Downsample the point cloud (features)

Compute Normals

Compute Descriptor

Local reference frame

Use normals and color information

Descriptor Correspondence

Possibly Rejection

RANSAC

Grouping

Compute transformation

Progress - Build Errors

Linker Error from thrust

- Cmake version issue

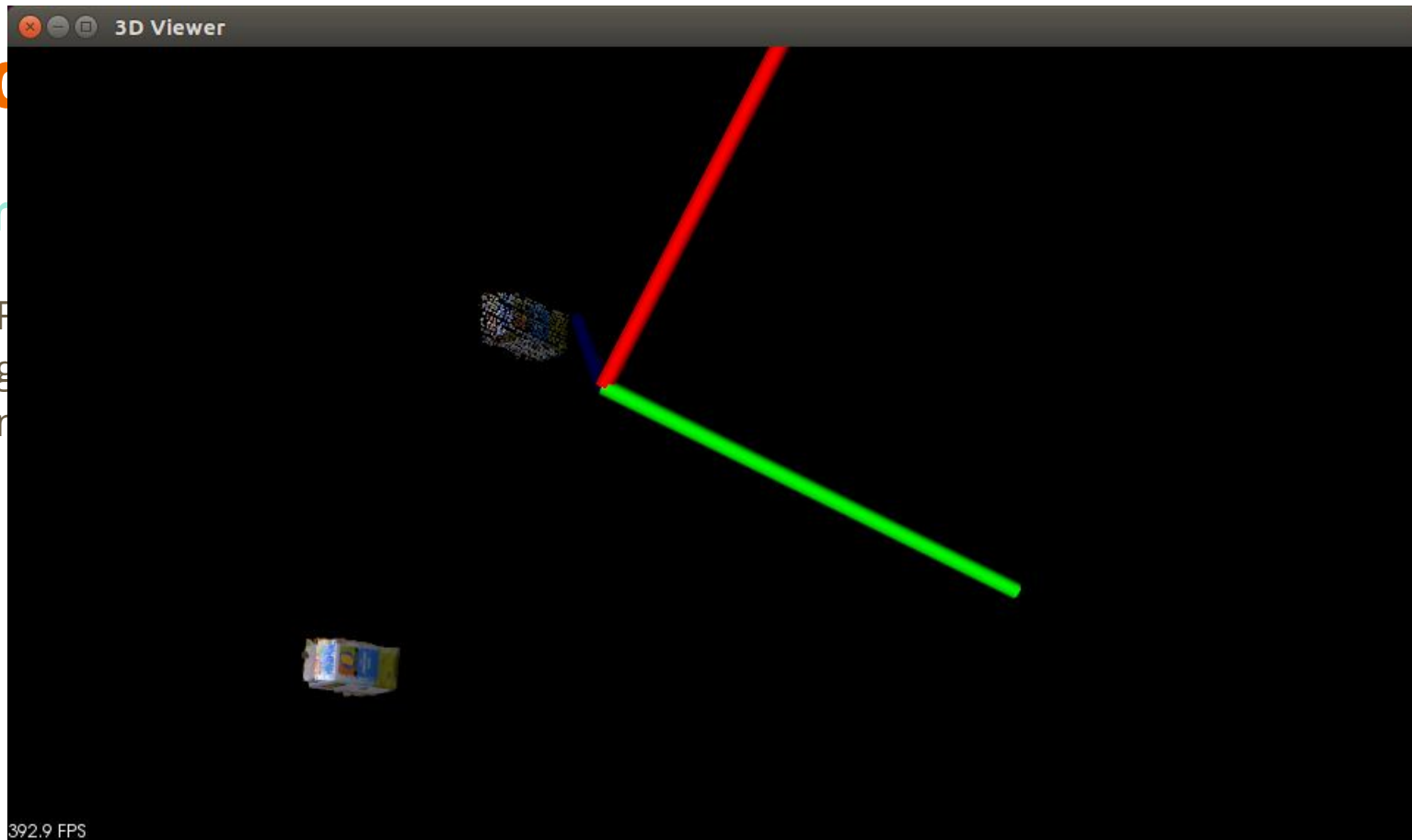
Eigen Align Segfault

- Reinstalled Ubuntu with newer version of Boost, cmake, and pcl resolves the issue
- Enables more detailed views

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3D-Descriptor Color-SHOT

Base Class for Descriptor

- Design to allow me add other types of Descriptor to Use
- SHOT use local reference while there exists other descriptor that uses geometric information

Color-SHOT

$$D(P) = \bigcup_{i=1}^m SH_{(G,f)}^i(P)$$

- Chain signatures of histogram relative to different <property, measurement> pairs
- Color and Normals

$$l(R_P, R_Q) = \sum_{i=1}^3 |R_P(i) - R_Q(i)|$$

$$f(G_P, G_Q) = p(N_P, N_Q) = N_P \cdot N_Q$$

KNearestNeighbor Search

Radius Search

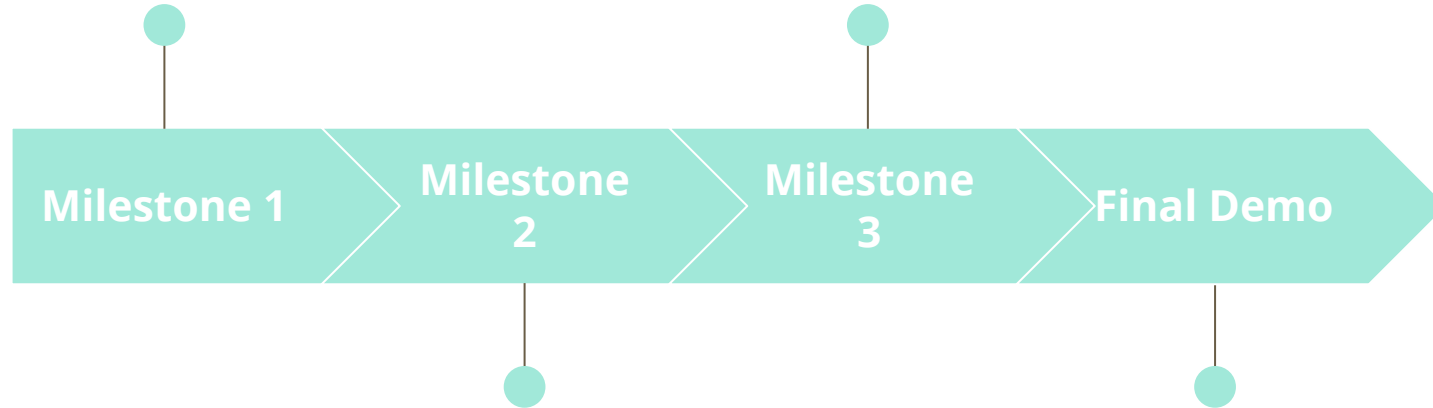
- Similar to Project 1
- Return indices of neighbors within radius
- Used in many places
- Rewriting the code for more efficient use

KDTree

- Have the basic structure, debugging now

Writing cmake file and
having things compiled,
uniform downsampling
and some basic Search
function

Descriptor and
Descriptor
Correspondence



Fixing multiple errors,
working on
descriptors and
search methods

Grouping and
transformation

Possible Optimization

Next steps

Descriptor

Finish the implementations for descriptors

Search and Rejection

Improve searching functions so that they can generalize to different search types and methods. Possibly rejection for better results