3D OBJECT RECONSTRUCTION

18551, SPRING 2017, GROUP 3, FINAL REPORT

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Project Idea

❖ Modeling without prior knowledge

❖ WayfairView and AR apps have preloaded models

❖ Be able to make a model of anything

Implementation

Get Point Cloud Data from Tango Tablet

Filter Outlier Data Points

Registration of Different Perspectives of Object

Object Segmentation from Scene and Meshing

Get Final Object Model

Computational constraints and bottlenecks

❖ Registration requires a lot of data from each perspective

❖ Android Studio File I/O with External Storage was a bottleneck for testing

Other struggles

Problem	Solution
Android Studio File I/O	Voxxlr
PCL setup	Windows + Visual Studio
Registration	Lazy Susan
Tango Visualization/Demo	Voxxlr
Sharing Tablet	Spend ECE money

Algorithm

Voxxlr for Point Cloud data collection

Point Cloud Library (PCL)
- ❖ Statistical Outlier Removal

- ❖ Incremental Pairwise Registration
  - ▪ Iterative Closest Point (ICP)

- ❖ RANSAC Segmentation

- ❖ Fast Triangulation Meshing

Results: It worked! … except

❖ 360-degree models

❖ Model = Mesh model

❖ Interact with model on Tango

Voxxlr Optimization

❖ 0.5 Voxel Resolution

❖ 50 cm to 150 cm range
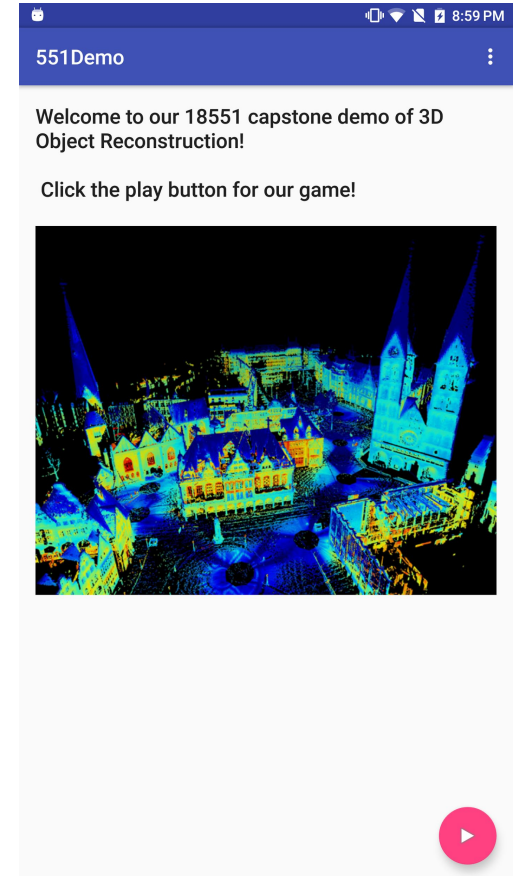
❖ 2 s/v frame rate

❖ Point Cloud Data size is 1-10 MB

Demo Day!

❖ Point Cloud to Object Guessing Game

❖ Data Collection Setup

❖ Voxxlr Laptop Interactive Session

Code

Android Studio - Java & C++
◦ File I/O

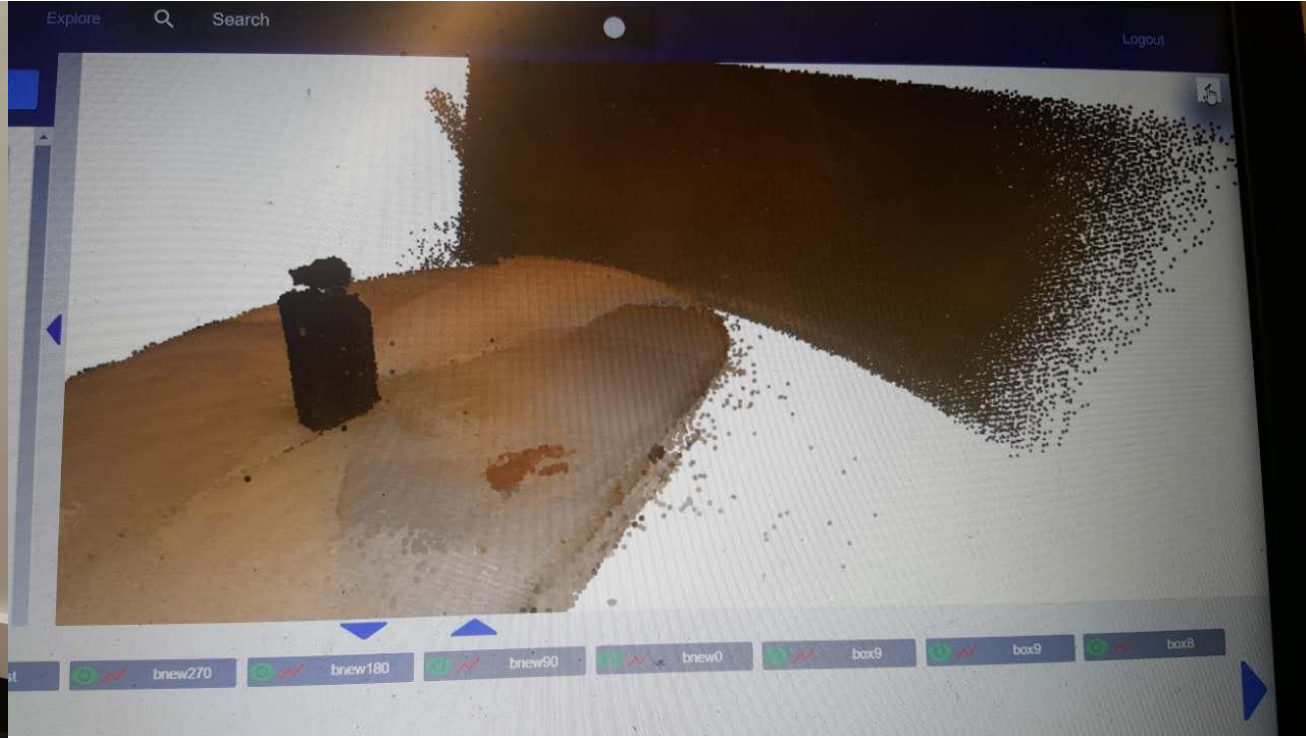PCL - C++ using Visual Studio
◦ Point Cloud Computations

Schedule: Who and What

Tasks	People Assigned
Android Studio File I/O	David Buzzell
Point Cloud Data Retrieval and Collection	Pragna Mannam
PCL Filtering and Registration	David Zhou
PCL Segmentation and Meshing	Pragna Mannam, David Zhou
Demo app	David Buzzell, Pragna Mannam

Thank you for listening!
See you tomorrow ☺