



Virtual Fossil Fragmenter

Hack The Deep
AMNH - Hackathon
February - 2018

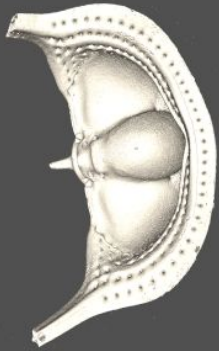
Team & Repository

Sean McGuffee, Sophia van Valkenburg
Teodora Szasz, and Luis Ibanez

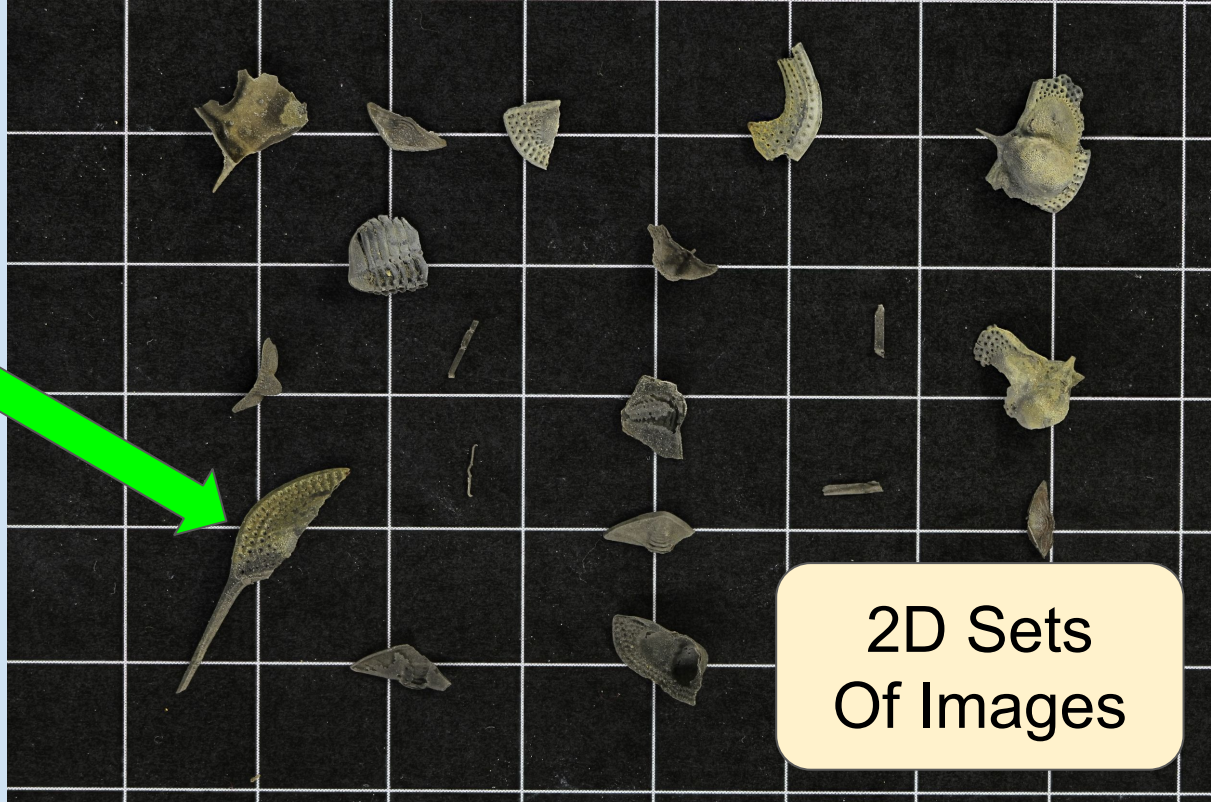
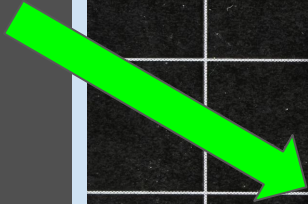
<https://github.com/HackTheDeep/virtual-fossil-fragmenter>

https://github.com/amnh/HackTheDeep/tree/master/challenges/Virtual_Fossil_Fragmenter

The Challenge

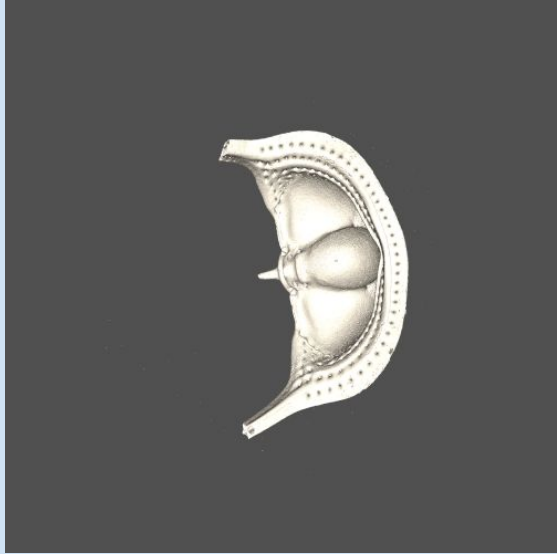


3D Surface
Model

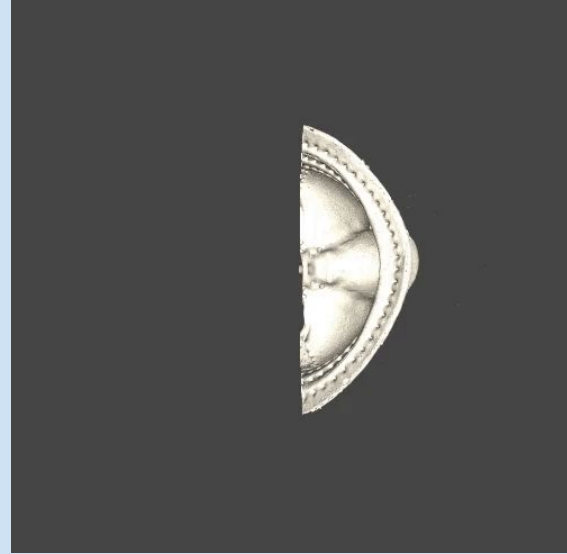


2D Sets
Of Images

3D Model → Fragments



3D Surface
Model



3D Surface
Fragment

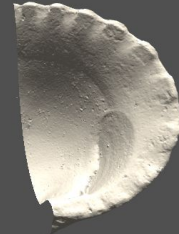
3D Model → Fragments



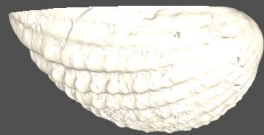
TRILOBITE HEAD



TRILOBITE THORAX



BIVALVE



BIVALVE



TRILOBITE HEAD



TRILOBITE THORAX

2D Images → Fossil Features



Shell

Conic
Outline



Thorax

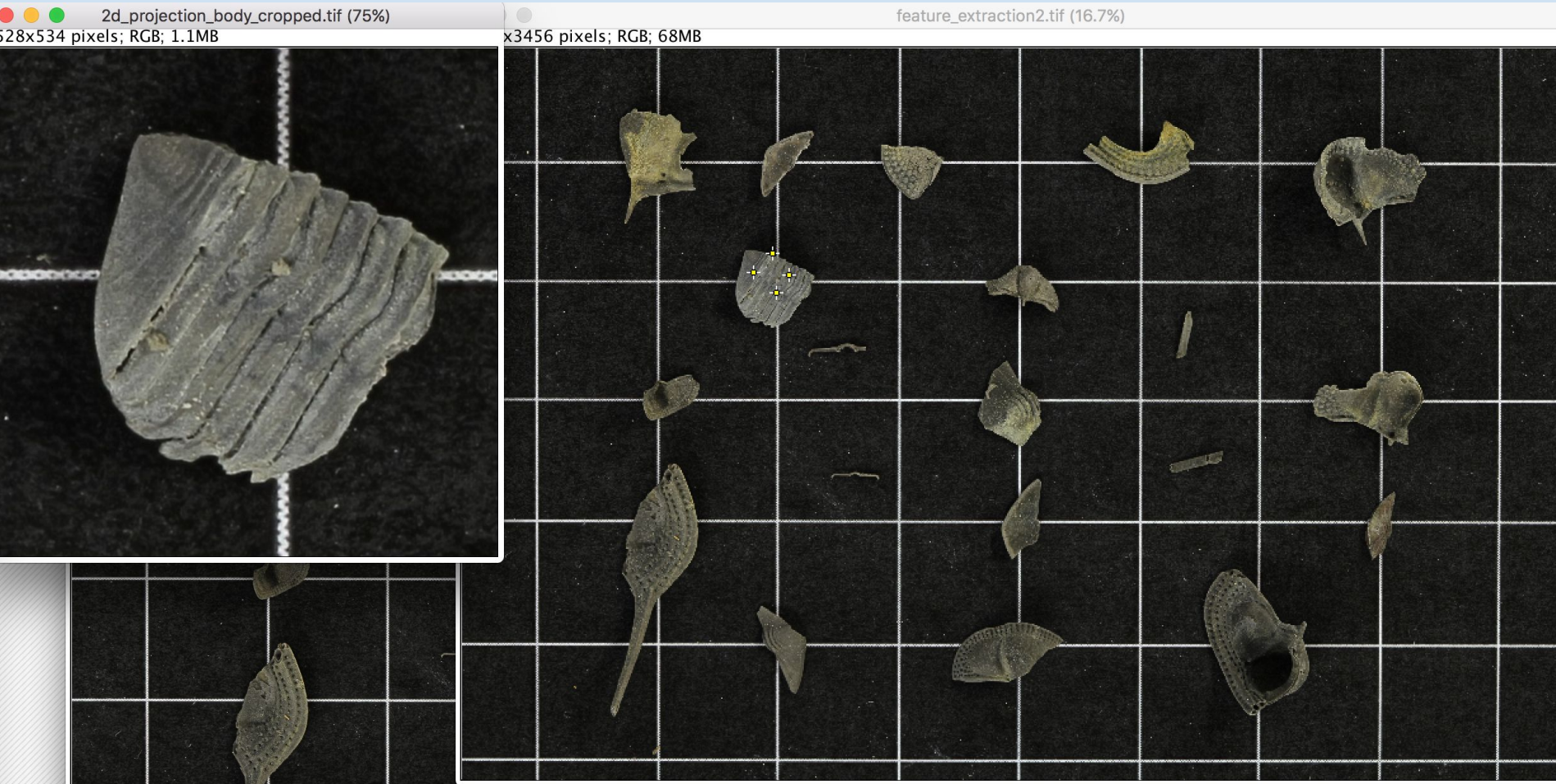
Parallel
Ridges



Head

Circular
Holes

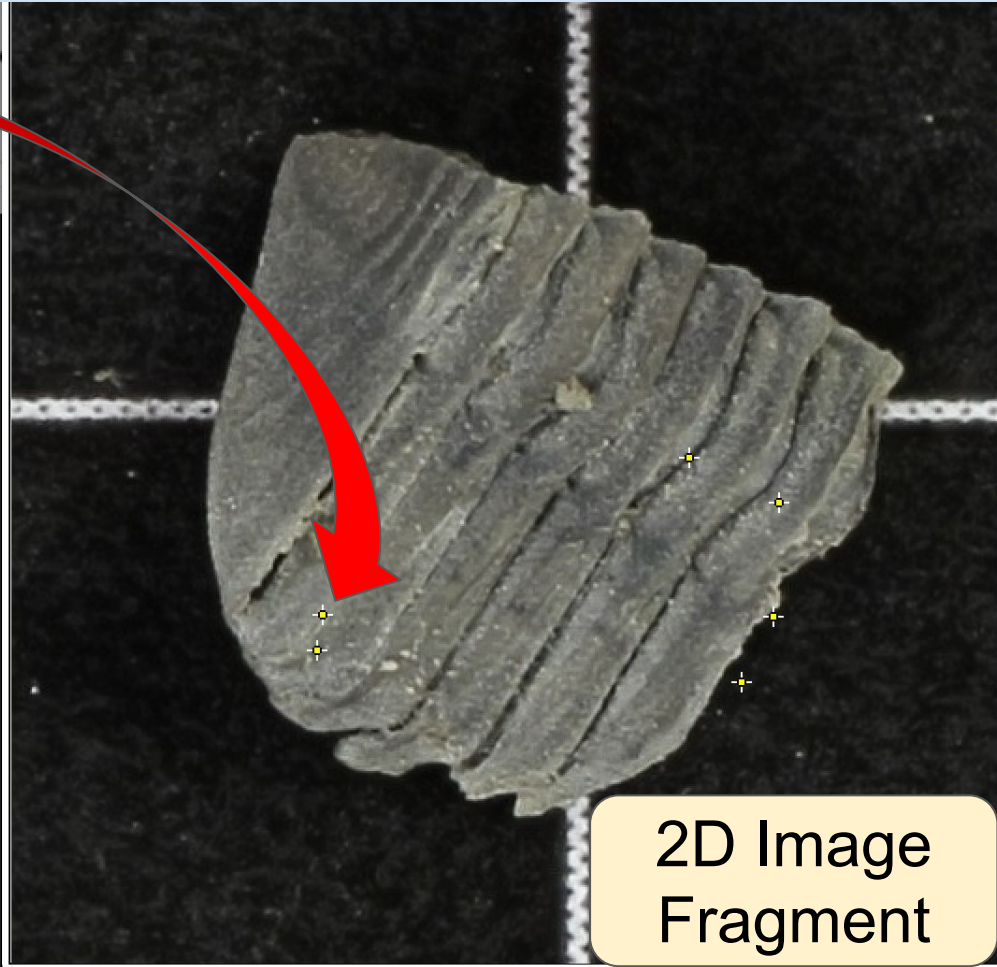
Feature Based Detection (MOPS)



Feature Based Detection - 3D Model to 2D image



3D Surface
Model
Projection



2D Image
Fragment

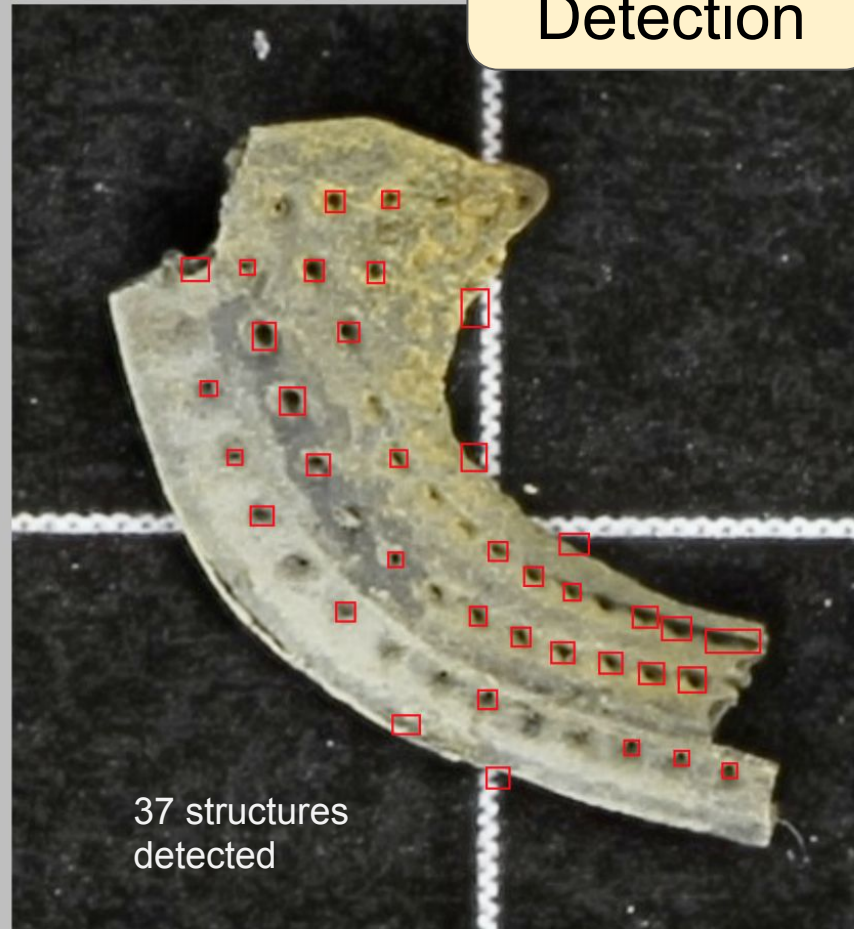
Original image

2D Image Fragment



Labeled image

Hole Detection



More Challenges → Future Work

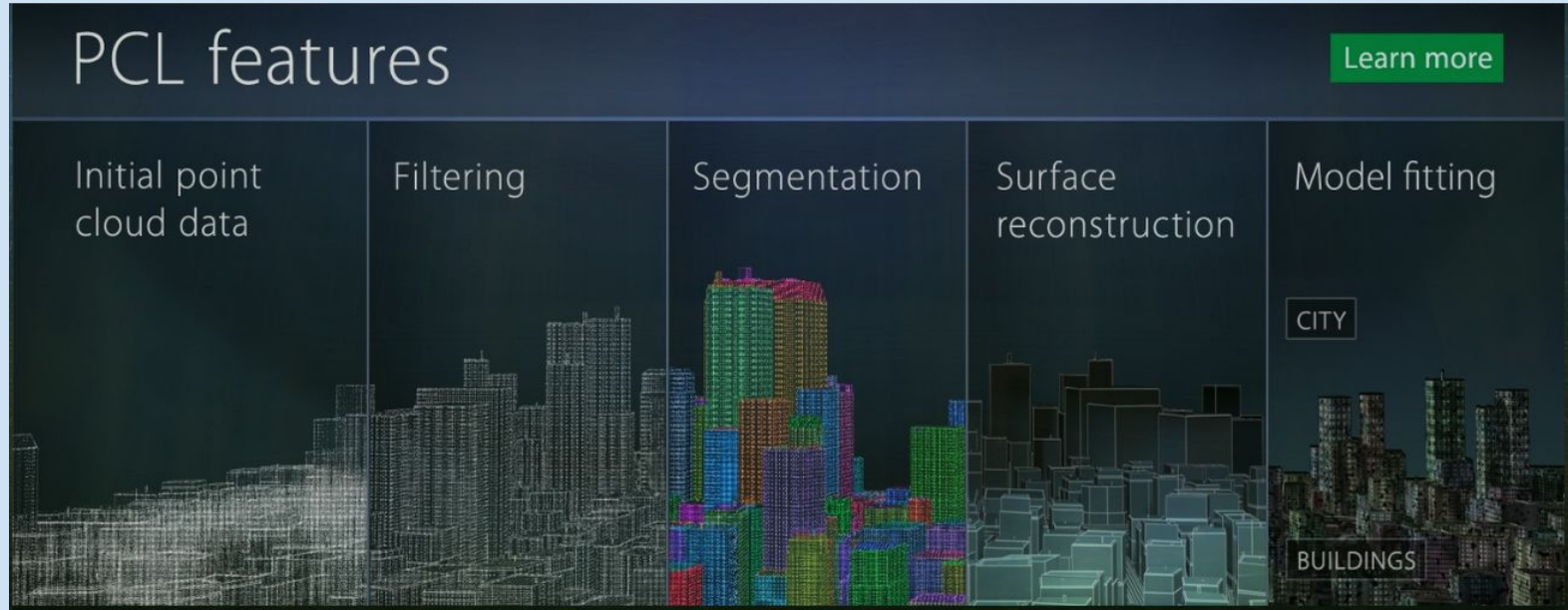
Original image



Labeled items



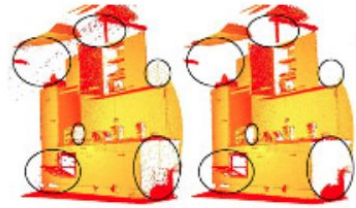
Other Explorations - Point Cloud Library



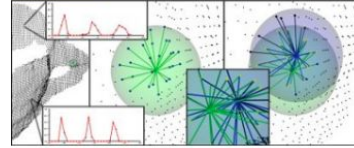
Other Explorations - Point Cloud Library

PCL is split in a number of modular libraries. The most important set of released PCL modules is shown below:

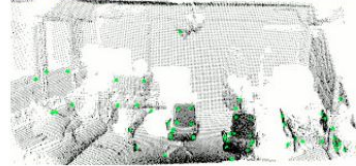
Filters



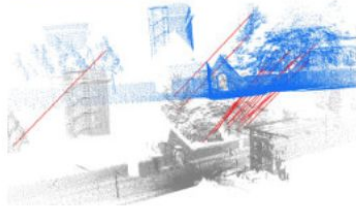
Features



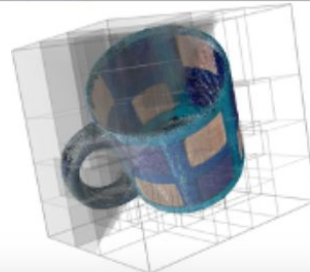
Keypoints



Registration



KdTree



Octree



The background of the slide is a photograph of a large number of fossil specimens. These include several trilobites, some showing their segmented bodies and others their heads with prominent eyes. There are also brachiopods, which are small, shell-like fossils, and various other marine organisms. The fossils are arranged on a light-colored, possibly white, surface, and the entire image has a slightly faded, blue-tinted appearance.

Thank You!