

BRIEF Modeling

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Motivation

Everything around us relies on plants!

From Nutrition, to Medicine, and the Environment

- Plant research is quite tedious, laborious, and includes constant meticulous measurement which is an inefficient use of highly-educated researchers time.
- And current assistive-modeling software out there requires hundreds-to-thousands of photos to model a single static plant.

Overview

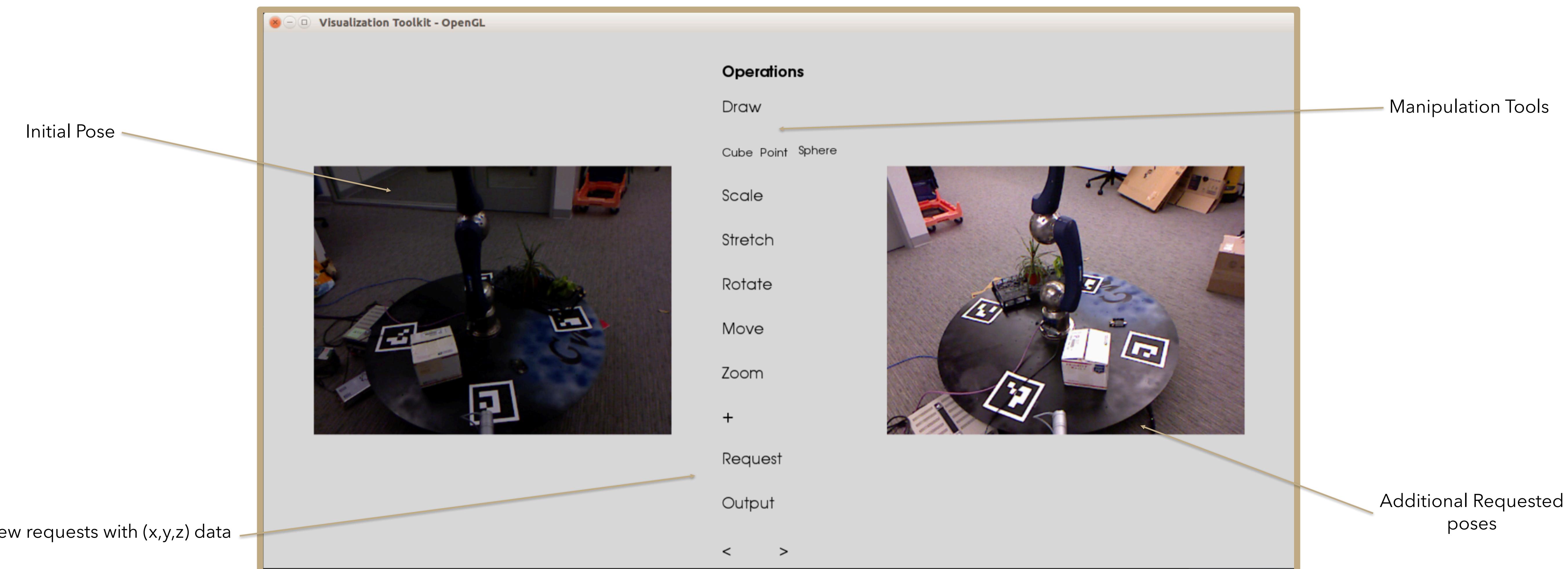
- BRIEF, the Biological Robotic Imaging Experimentation Framework, is a human-in-the-loop framework and utilizes known aspects of an object, to efficiently make to-scale models with minimal manipulation.
- Models can be easily exported and size information can be analyzed.
- In future iterations of BRIEF, our algorithm will be easily extended to model plants with just a few clicks.

Physical Set-Up



- Turntable used for placement of plants and objects to be modeled.
- Central SHUNK arm for movement of objects.
- 4 QR codes placed on the axes of the turntable.
- Robotic Optical Arm (focus of our project) rotates around the turntable to get images utilizing it's 4 motors (A stepper for rotation, 2 arm motors, and a servo for camera angle)
- Images are taken via a Microsoft Kinect Version 1 atop the arm.

User Interface



The Modeling GUI is the front-end application responsible for drawing and manipulating 3D models on top of the image of each pose. The app will communicate with the Calibration & Actuation API to deliver poses to the window, and the user is responsible for building models and requesting new poses to model the object in multiple reference frames. When the user is satisfied with the model they've built, the system will output the model in the user's desired output format for future use.

How it works

