

3D Scanning using Calibrated Camera Arrays

EE 367 EE 368

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Motivation: Our primary motivation is to develop an economical and robust 3D scanner for producing 3D models of sub-meter scale objects with sub-centimeter resolution. Current 3D scanning technologies use high-cost depth cameras, and we aim to provide both the hardware and software techniques for achieving a similar depth resolution with lower-cost resources. If successful, the final 3D scan could be converted to the required file format for existing 3D printing technologies, demonstrating a use in rapid prototyping.

Goal and Methodology

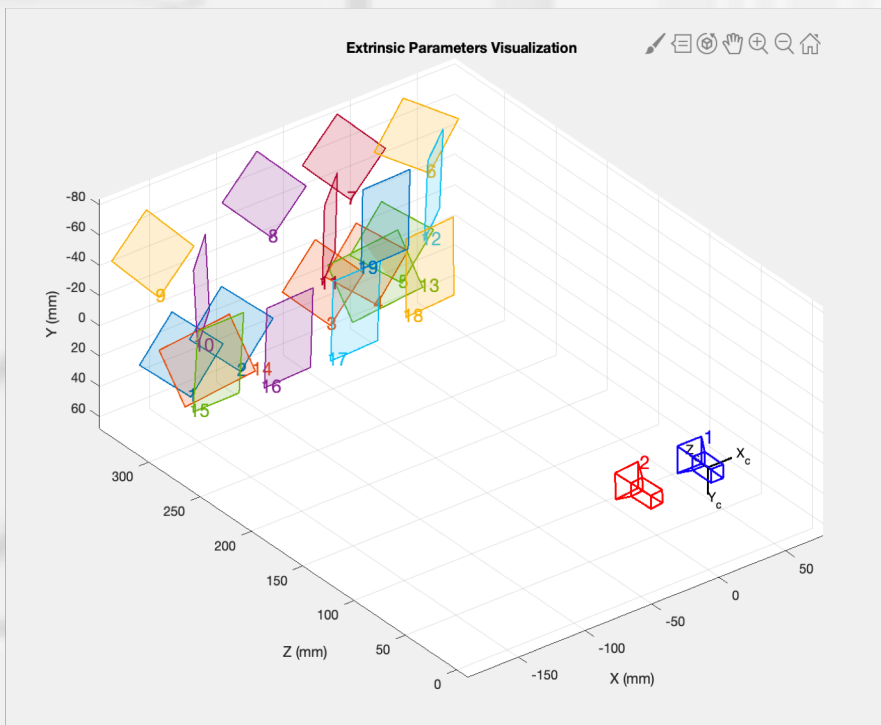
Goal Only use one button click to:

1. Autonomously scan an object
2. Merge 3D point clouds to construct a high quality accurate 3D model
3. Produce a STL file for rapid 3D printing prototyping.

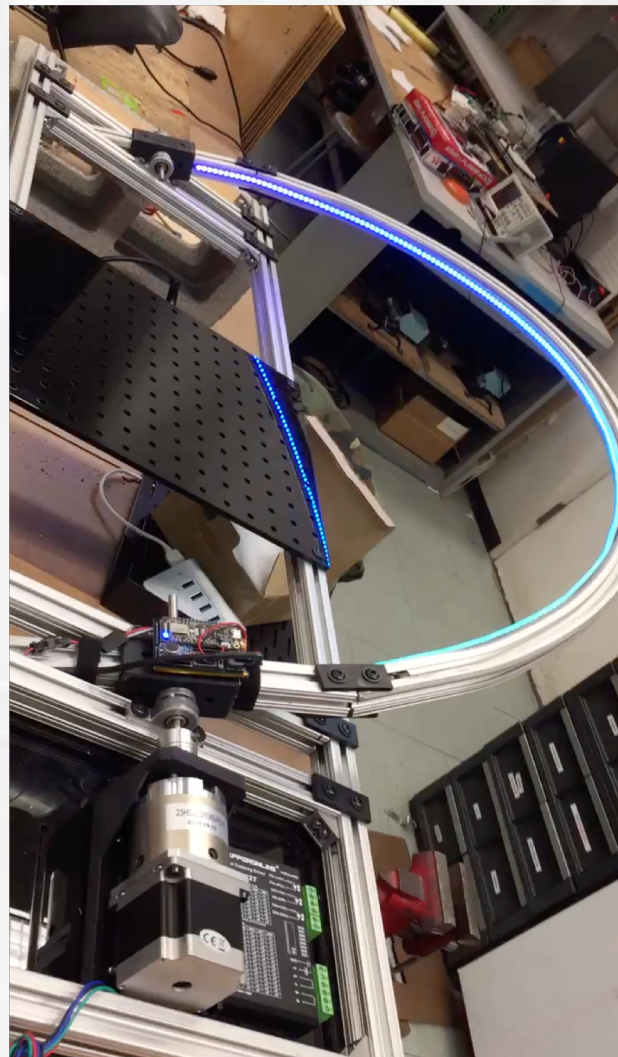
Plan of Action

1. Fully autonomous system control using a GUI
2. Achieve autonomous camera calibration
3. Use image processing to interpolate 3D point cloud data to improve 3D models

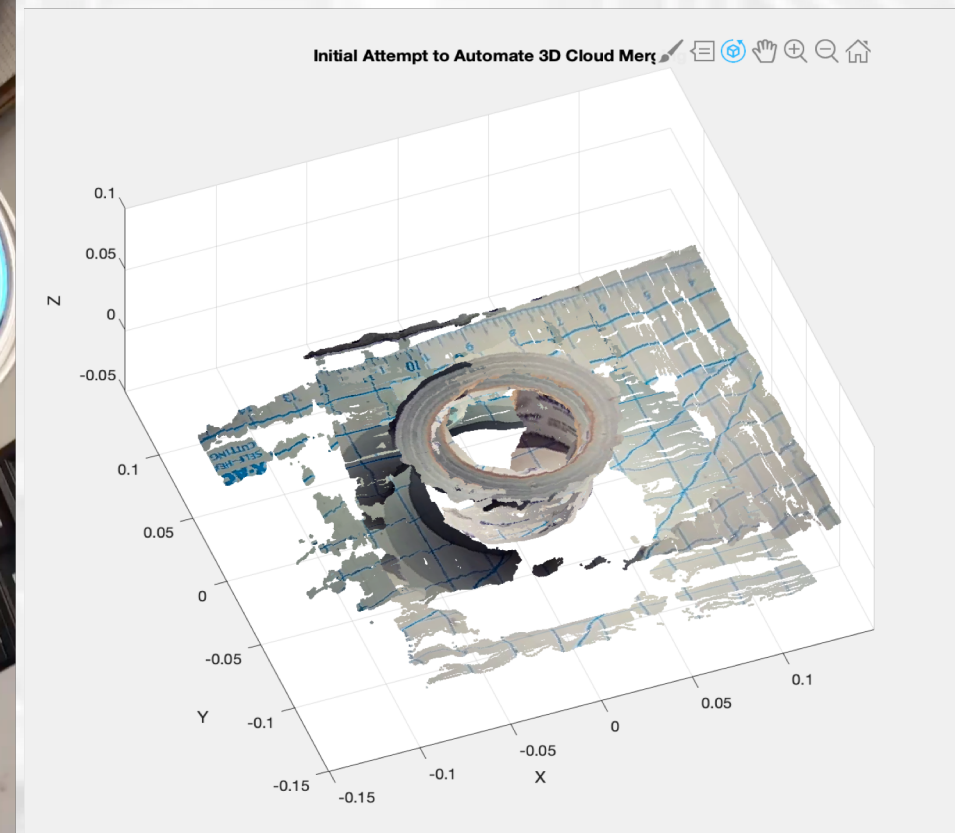
Results



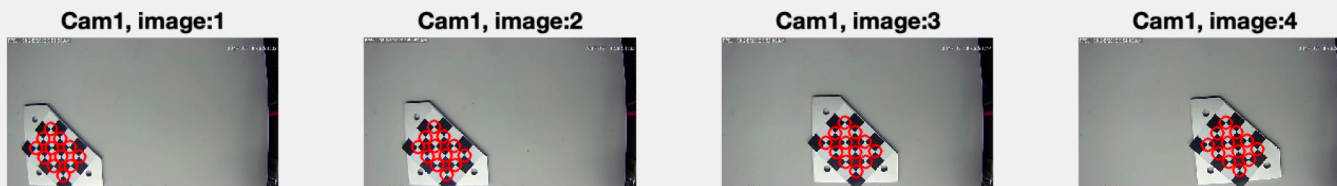
Static manual camera calibration



Completed Hardware



First attempt at 3D point cloud merge



Camera Calibration