

Assignment 6: Computational Photography

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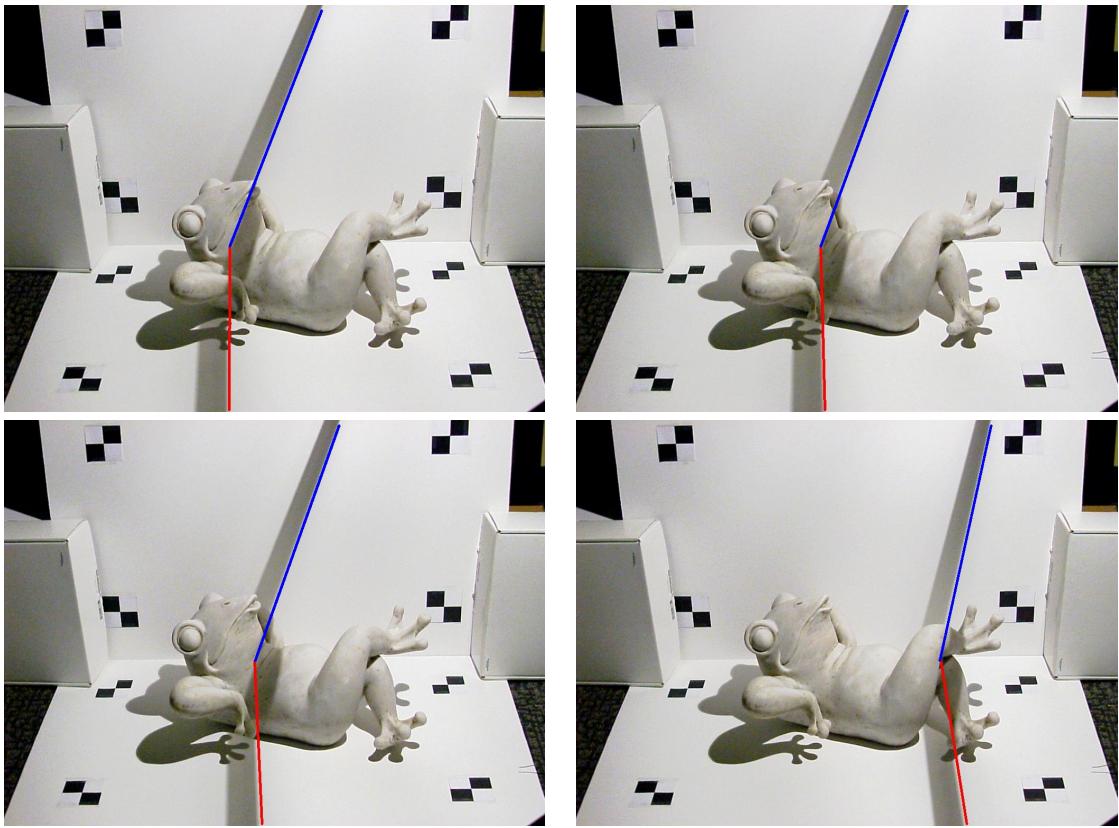
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1 Implementing structured-light triangulation

1.1 Video processing



Figure 1: Per Pixel Shadow Time estimation (166 bins)



Per frame shadow edge estimation (4 random frames)

1.2 Intrinsic and extrinsic calibration

The necessary .npz files have been uploaded in the data folder.

Intrinsic calibration:

`data/intrinsic_calib.npz`

Extrinsic calibration:

`data/extrinsic_calib.npz`

Reconstructed 3D points for all frames:

`data/four_shadow_pts.npz`

Shadow plane parameters (p_1 , n):

`data/final_planes.npz`

1.3 Reconstruction

Initially I observed a large number of outliers and shadow as shown in 1.1. I then implemented the outlier removal approach by contrast thresholding mentioned in the Hints section. I used a contrast threshold of 0.33.

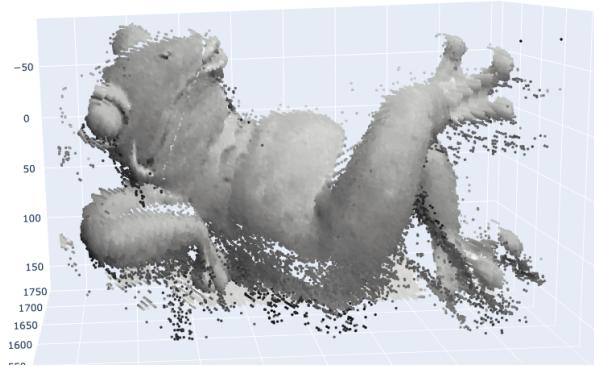
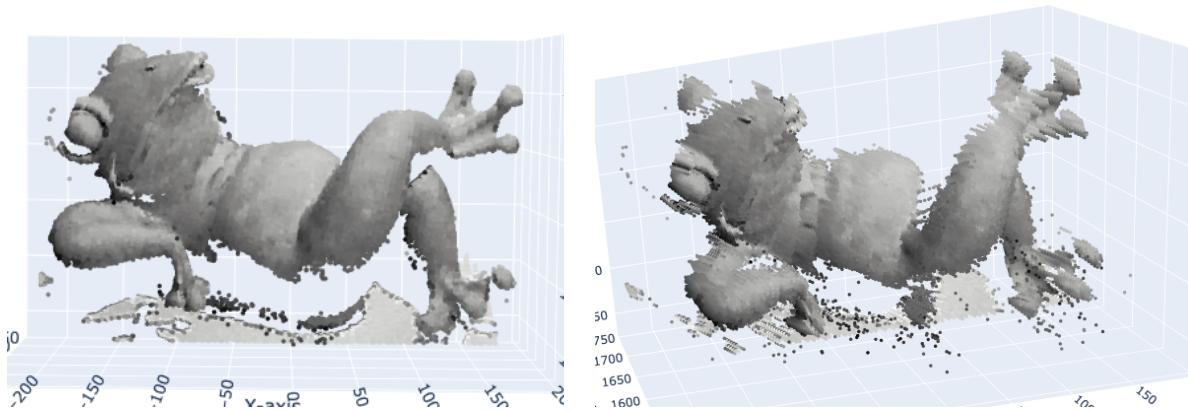


Figure 2: Reconstruction with outliers



Reconstructed object from different views with contrast threshold 0.33

2 Building your own 3D scanner



Figure 3: 3D Scanner Setup

Object 1

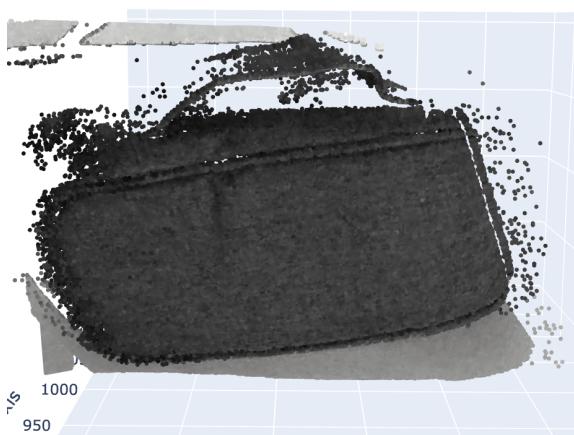


Input View 1

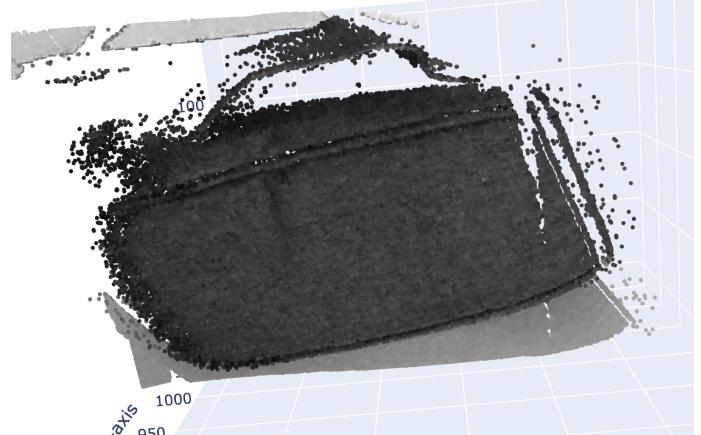


Input View 2

3D Reconstruction

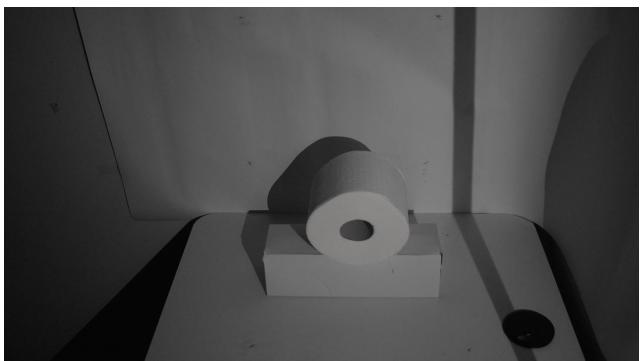


3D Reconstruction View 1

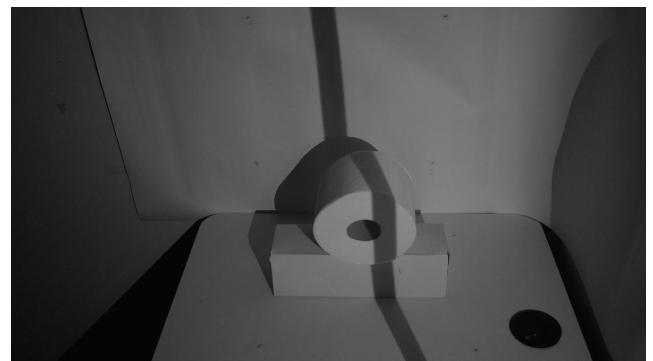


3D Reconstruction View 2

Object 2

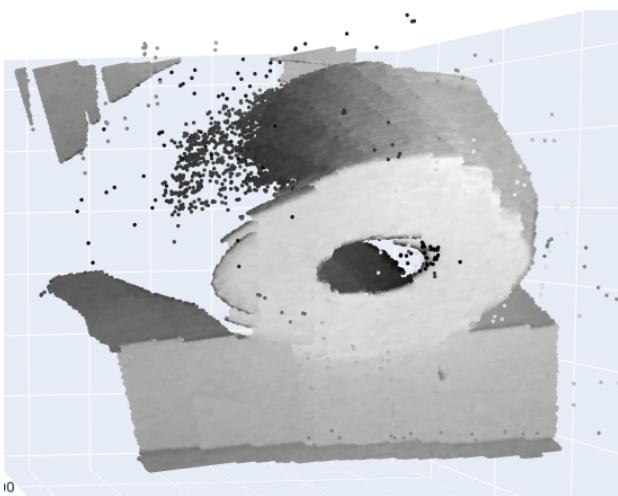


Scene Image 1

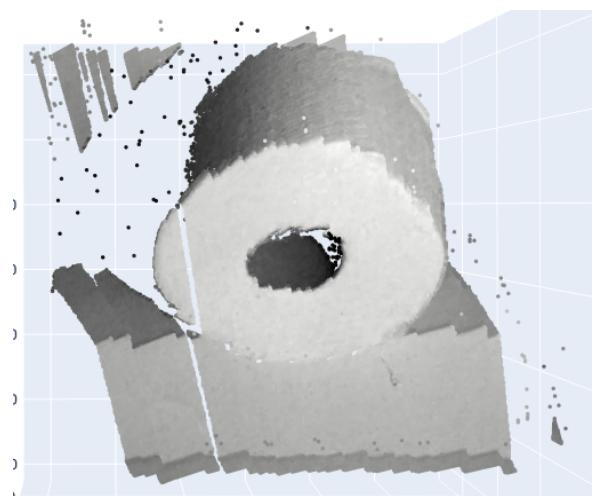


Scene Image 2

3D Reconstruction



3D Reconstruction View 1



3D Reconstruction View 2