

# Computational Photography Assignment 6

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## 1 Implementing structured light triangulation

### 1.1 Video processing

Figure 1: Shadow Edge Estimate 1

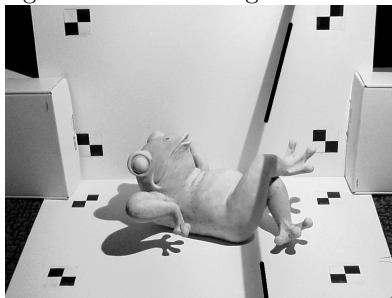


Figure 2: Shadow Edge Estimate 2

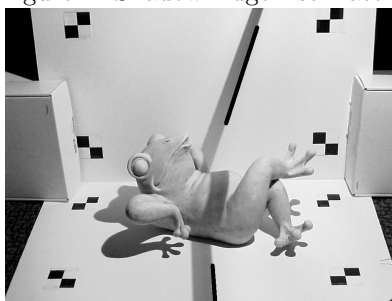
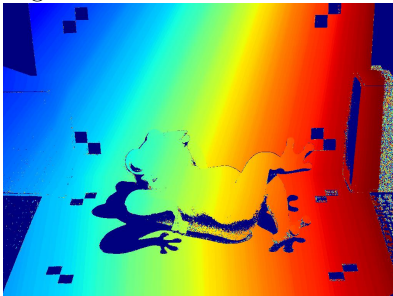


Figure 3: Shadow Time Estimate



## 1.2 Intrinsic and Extrinsic calibration

### 1.2.1 Intrinsic calibration

The .npz file is in the data folder.

### 1.2.2 Calibration of ground planes

The .npz file is in the data folder.

### 1.2.3 Calibration of shadow lines

line\_pts.npz is in the data folder.

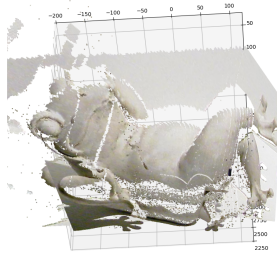
### 1.2.4 Calibration of shadow planes

shadow\_planes.npz is in the data folder.

## 1.3 Reconstruction

To improve the quality of the reconstruction, I significantly trimmed the image sequence. Additionally, I filtered the final reconstructed 3D points based on the distance from the median of all the points. Here is an image of the final reconstruction:

Figure 4: Reconstruction



## 2 Building your own 3D scanner

I scanned two objects using the setup I built: a toy pomegranate and a toy banana. The banana reconstruction doesn't look as nice because I just reconstructed the middle section of the banana as the shadow lines did not cross the other parts while also crossing the planes. The reconstruction of just the middle section looks reasonable.

Figure 5: Setup

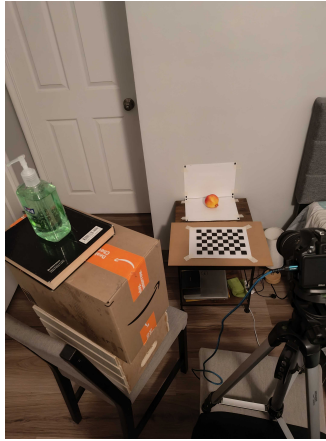


Figure 6: Image of pomegranate

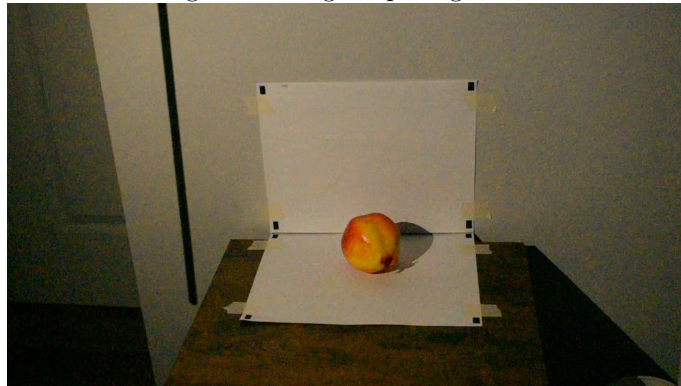


Figure 7: Reconstruction of pomegranate

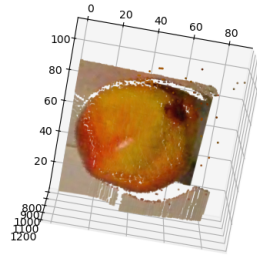


Figure 8: Image of banana

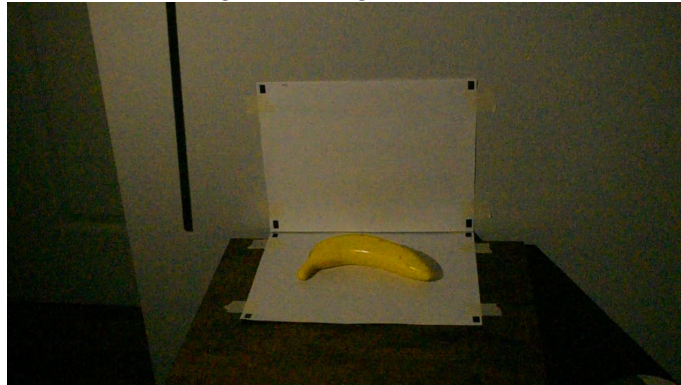


Figure 9: Reconstruction of banana

