

15463 Assignment 6

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1 Implementing structured-light triangulation

1.1 Video Processing

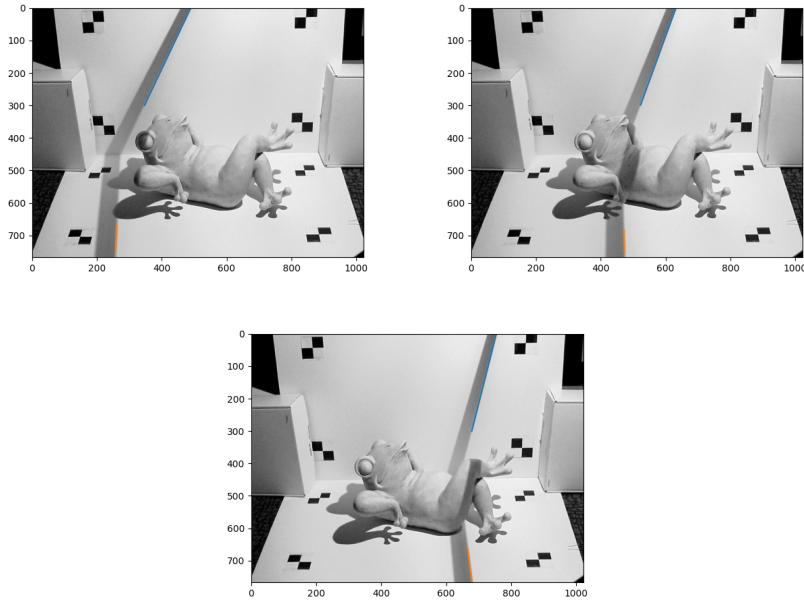


Figure 1: per-frame shadow edge estimates at frame $t = 60, 90, 120$

1.2 Reconstruction

Choices to improve reconstruction:

- (1) remove all the points that have absolute coordinates larger than 2000
- (2) return all the pixels where $I_{max} - I_{min} < threshold(0.10)$
- (3) remove all the points that are too far away. (where the distance from the center of all 3D points are outside of 1.5 standard deviation from the mean of the distribution)

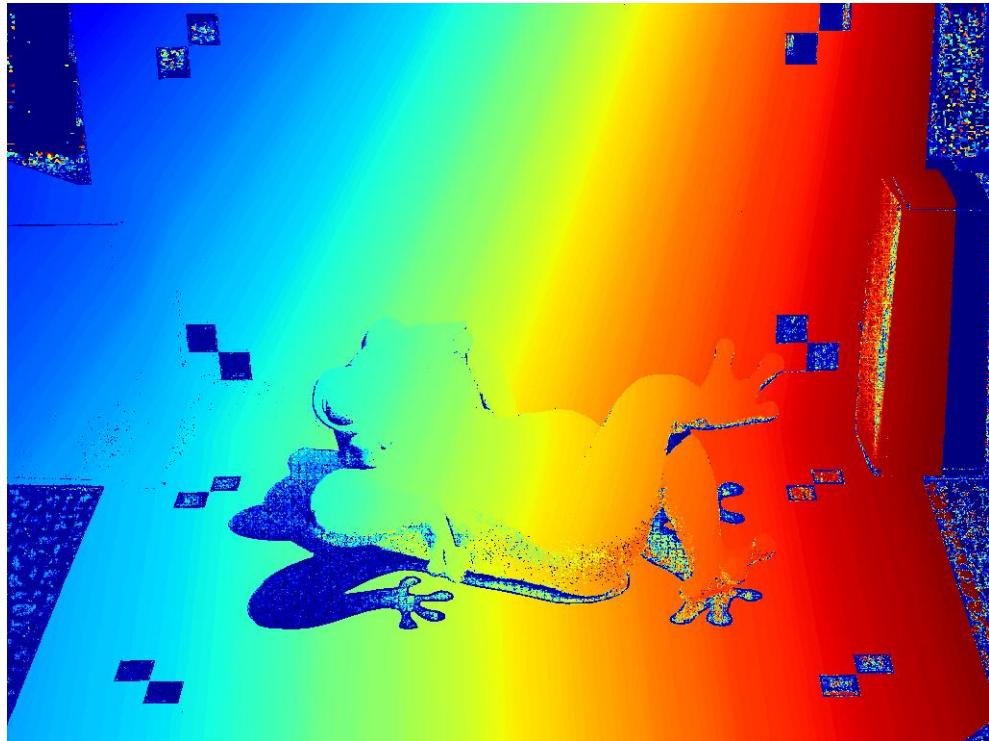


Figure 2: per-pixel shadow time estimates

2 Building your own 3D scanner

As we can see from the shadow time map for guoba and cabi(my two projects), when I was moving the sticks my hand and arm shakes a lot, which created a lot of "back and forth" for the shadow frames(for instance from left to right the pattern is yellow-green-yellow). This may cause my reconstruction to only have the generic shape rather than the specifics in detail.

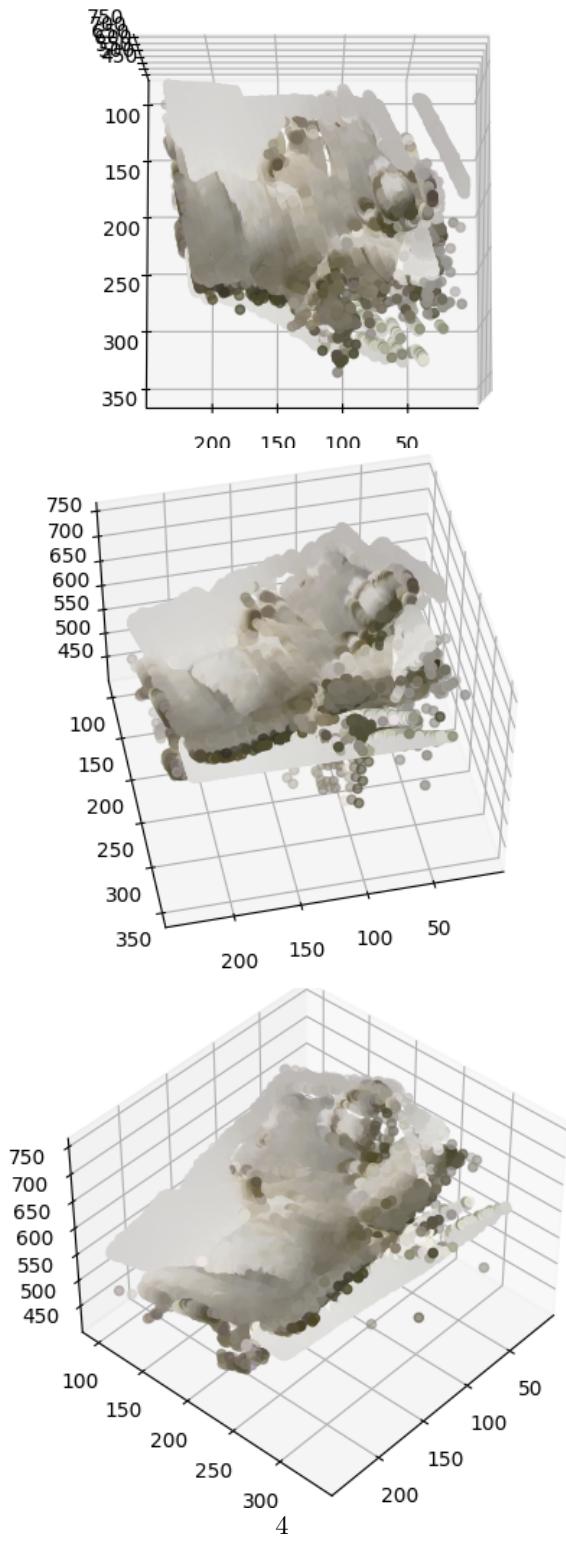


Figure 3: frog reconstructed 3D views



Figure 4: experiment set up

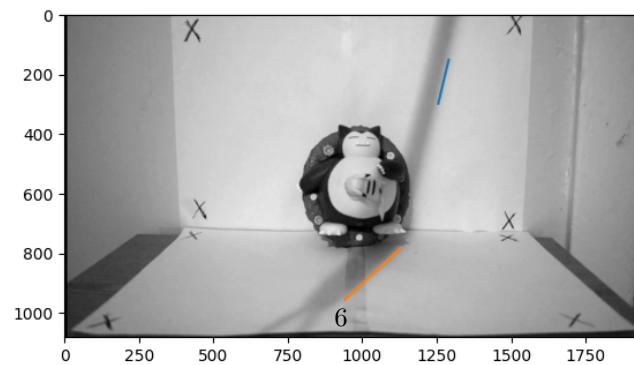
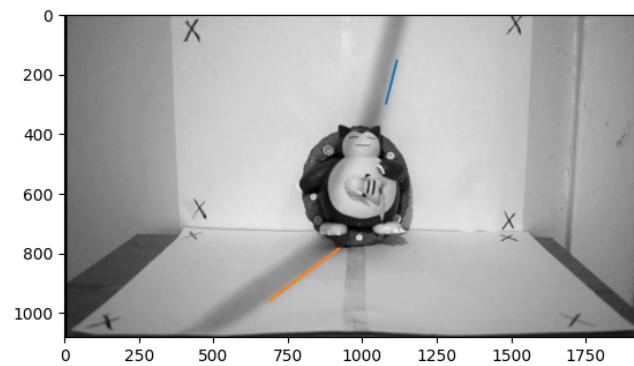
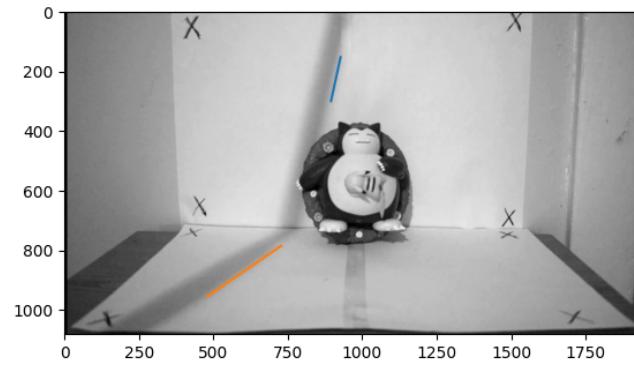


Figure 5: cabi(object1) shadow lines

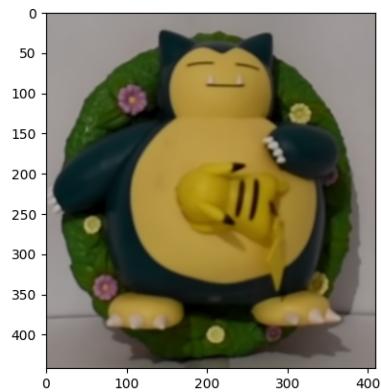
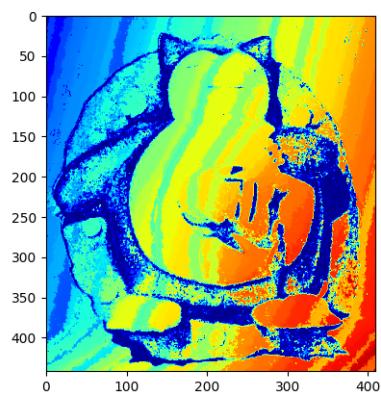
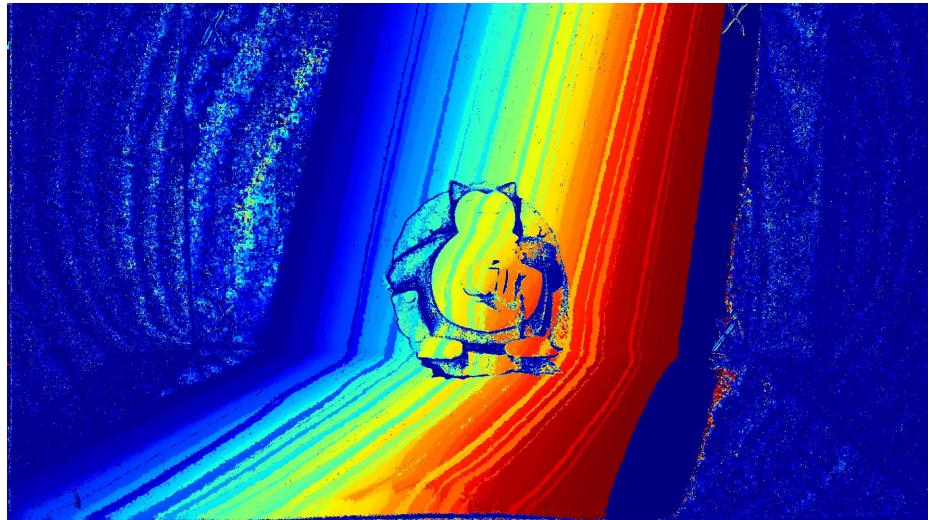


Figure 6: cabi(object1) shadow time map and region of interest

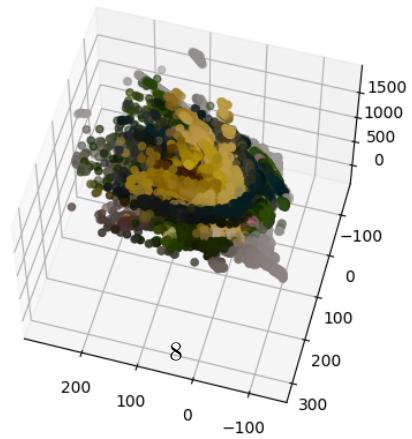
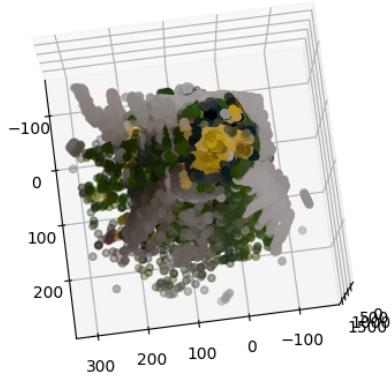
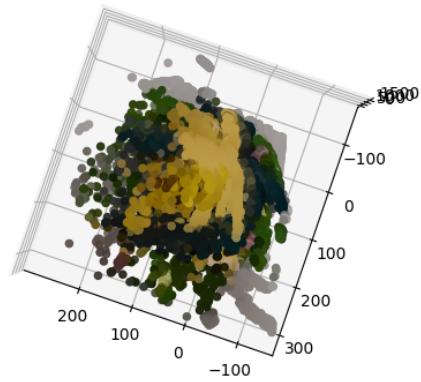


Figure 7: cabi(object1) reconstructed 3D views

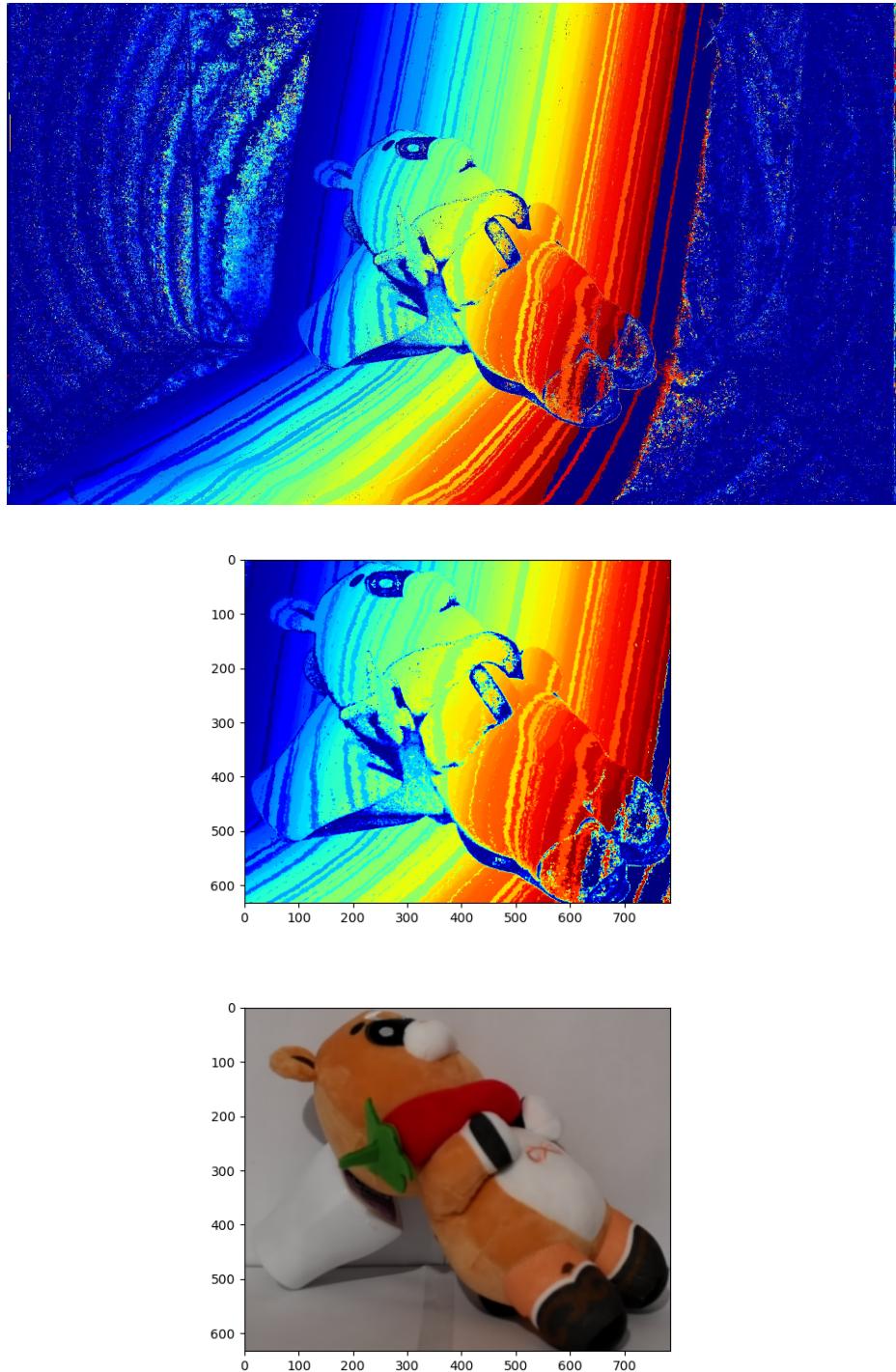


Figure 8: guoba(object2) shadow time map and region of interest

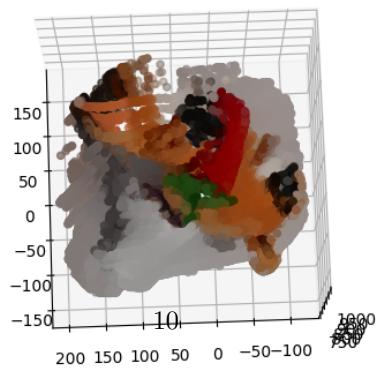
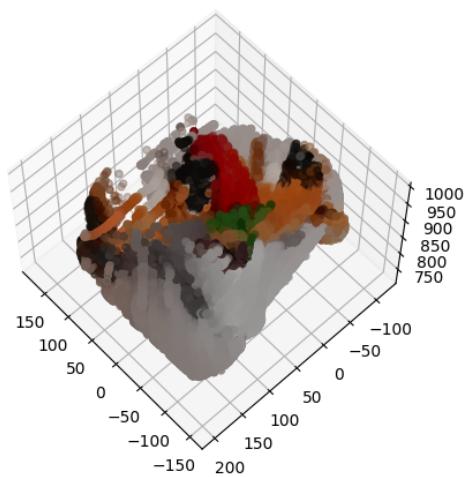
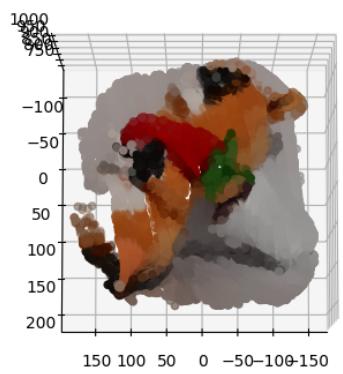


Figure 9: guoba(object2) reconstructed 3D views