



Fall 2021, Computer Vision
Homework 3

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Problem Set 3

Problem 1:

- Keypoints found first:



Figure 1: Image 1 Keypoints



Figure 2: Image 2 Keypoints



Figure 3: Matches

b. answer:

```
ps3_CELIK --zsh -- 80x24
Last login: Sun Jan  2 19:28:37 on ttys000
rumeyascelik@Rumeysas-MacBook-Pro ps3_CELIK % python ps3_1and2.py
Calculating ORB features...
Descriptor 1: 500
Descriptor 2: 500
ORB Matches: 500
ORB Best Matches: 199
ORB Correct Matches: 294
ORB Repeatability Rate is: 0.588
```

c. answer:

```
Corr size: 199  Numinliers: 1/1 Max inliers: 1/1
Given homography matrix: [[ 8.7976964e-01  3.1245438e-01 -3.9430589e+01]
 [-1.8389418e-01  9.3847198e-01  1.5315784e+02]
 [ 1.9641425e-04 -1.6015275e-05  1.0000000e+00]]
Ransac homography matrix: [[ 8.64087027e-01  3.00585063e-01 -3.67246997e+01]
 [-1.86709783e-01  8.87428126e-01  1.62005115e+02]
 [ 1.83072986e-04 -6.86201752e-05  1.0000000e+00]]
```

d. answer:

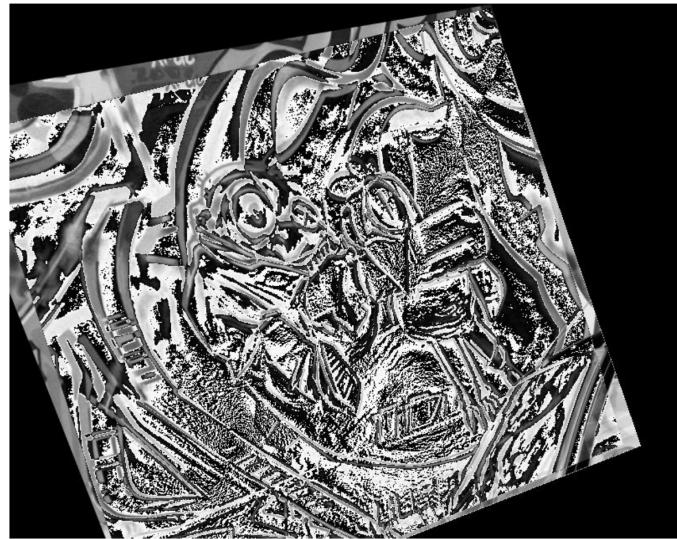


Figure 4: Residual Image

e. answer:



Figure 5: Stitched Image

Problem 2:

a. answers:

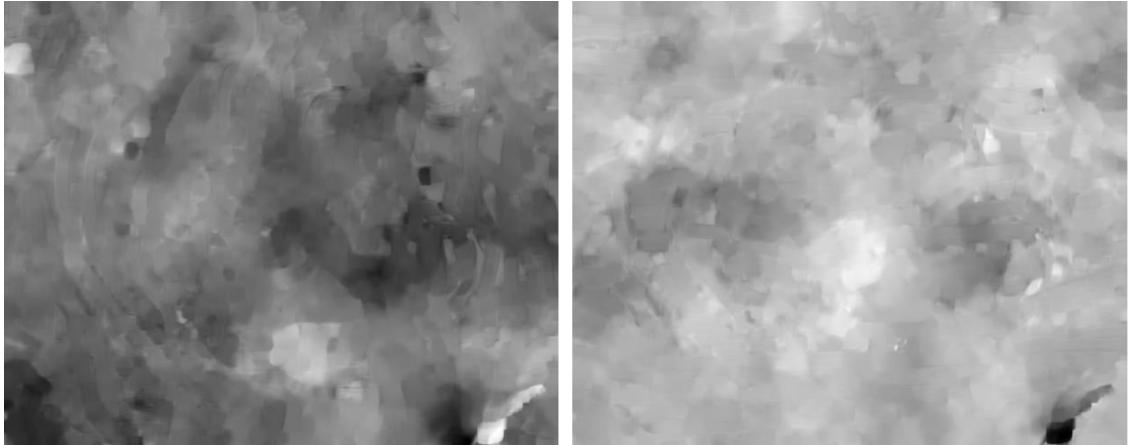


Figure 6: Optical Flow Horizontal and Optical Flow Vertical

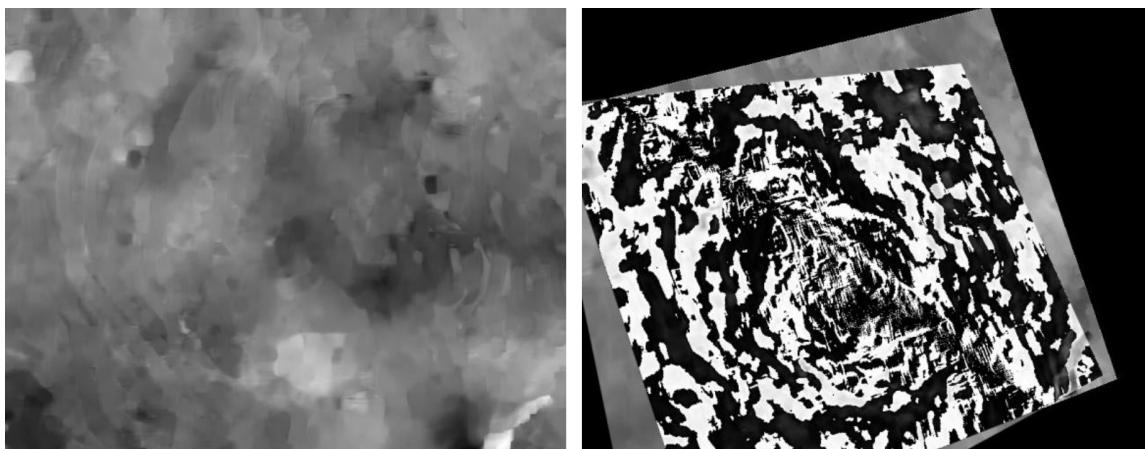


Figure 7: Optical Flow Warped Image and Optical Flow Residual

b. answers:



Figure 8: Shi-Tomasi Corner Points Image 1 and Shi-Tomasi Corner Points Image 2



Figure 9: Tracking with Lucas Canade method