

16385-HW3

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October 2023

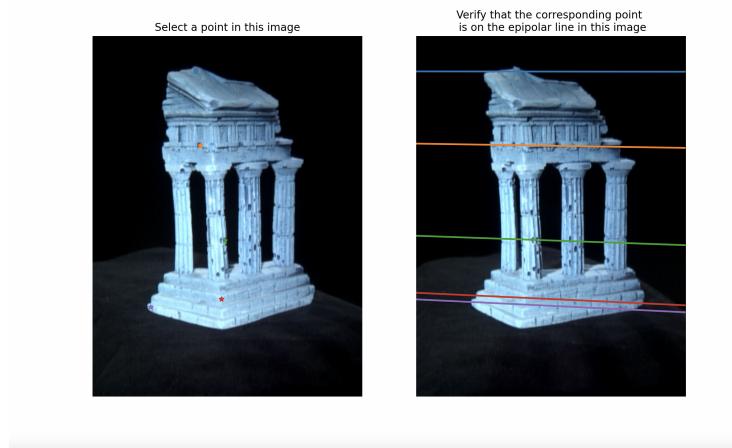


Figure 1: 2.1 Example of epipolar lines given points

Q2.2 In my algorithm, I generated a window of size 2 around the point in image 1, and for every point on the epipolar line in img2, I generated window around the point with same size. I use Euclidean distance to compare the two windows. The matching algorithm consistently fails for the points in the middle of the pillar. I think this is because the change of intensity is not obvious.

Q2.4 The correct extrinsic matrices will have the most positive depth after performing triangulation, meaning the resulted 3D points are projected in front of both image planes. Therefore, I iterates the triangulation computed by each possible extrinsic matrices and return the one with most positive depths. The re-projection score is around 2.38 which is slightly higher than what we expected.

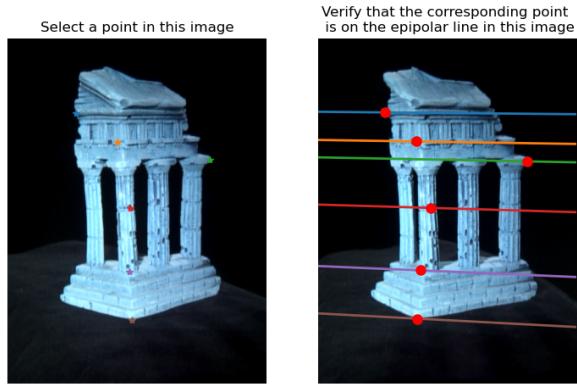


Figure 2: 2.2 Example of pairs of corresponding points in two images

```
[[ -2.60800934e-03  2.85991814e-01  3.62515026e-02]
 [ 1.48729944e-01  2.43851830e-04 -1.66625521e+00]
 [ 3.53308718e-03  1.68735216e+00  1.91423881e-03]]
```

Figure 3: 2.3 Essential matrix

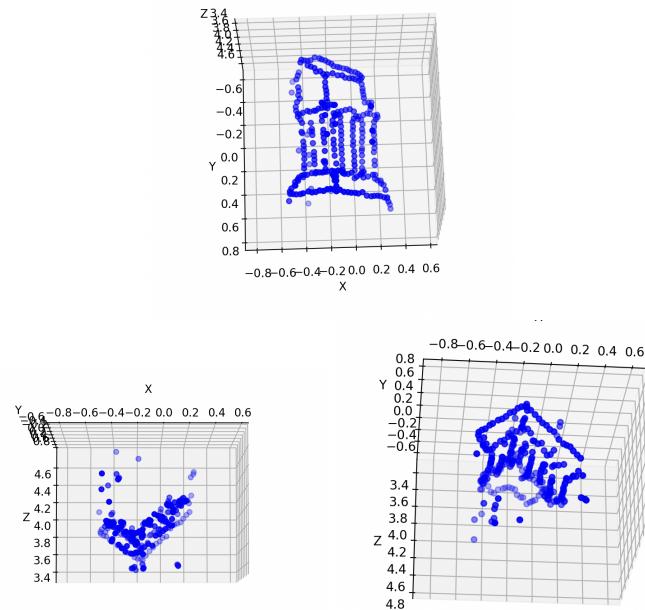


Figure 4: 2.5 Different angles of temple triangulation

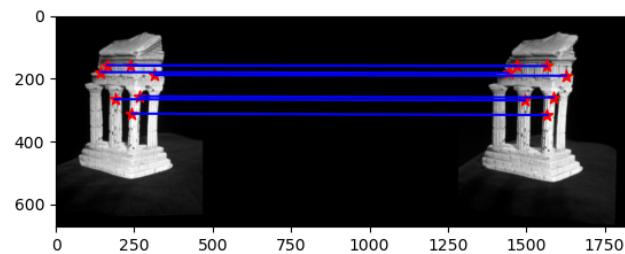


Figure 5: 3.1 Example of rectified image

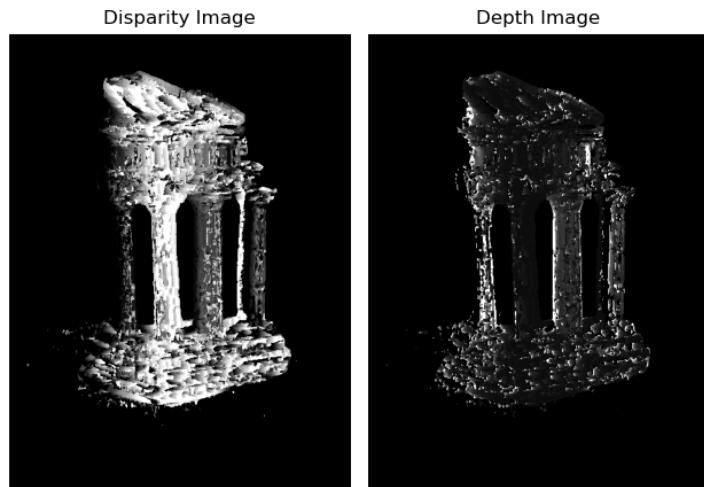


Figure 6: 3.3 Example of disparity and depth maps

```
● (base) yunchuchen@MacBook-Air python % python test_pose.py
Reprojection Error with clean 2D points: 1.0628748389623987e-10
Pose Error with clean 2D points: 4.7225421938698e-12
Reprojection Error with noisy 2D points: 5.691474494548283
Pose Error with noisy 2D points: 0.9938945448759032
```

Figure 7: 4.1 test pose

```
● (base) yunchuchen@MacBook-Air python % python test_params.py
Intrinsic Error with clean 2D points: 141.45222019497035
Rotation Error with clean 2D points: 1.8751171651567498
Translation Error with clean 2D points: 2.908357428862982
Intrinsic Error with noisy 2D points: 141.45217970344416
Rotation Error with noisy 2D points: 1.875097070192268
Translation Error with noisy 2D points: 2.908543069926249
```

Figure 8: 4.2 test params