

CMPT412 Project 5 Report

Name: Hanjie Liu

Student number: 301404949

Late day: 0;

3.1.1:

I loaded pts1 and pts2 from someCorresp.m and applied eight point algorithm in "Test.m" file.

The result F is following:

```
>> Test

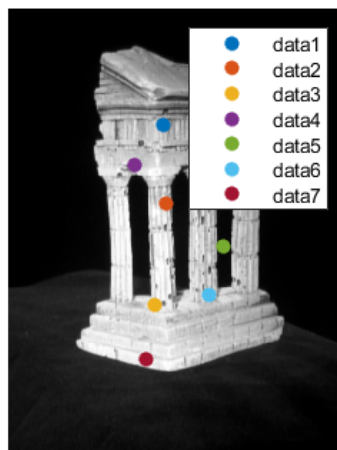
F =

    0.0000    -0.0000    -0.0000
   -0.0000    -0.0000     0.0005
    0.0000   -0.0005   -0.0021
```

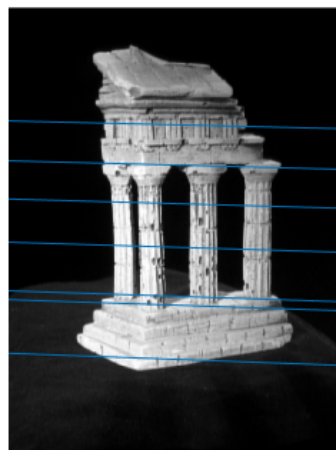
fx

Zoom: 100% UTF-8 LF

The result of "displayEpipolarF.m" run by "Test.m" is following:



Select a point in this image
(Right-click when finished)



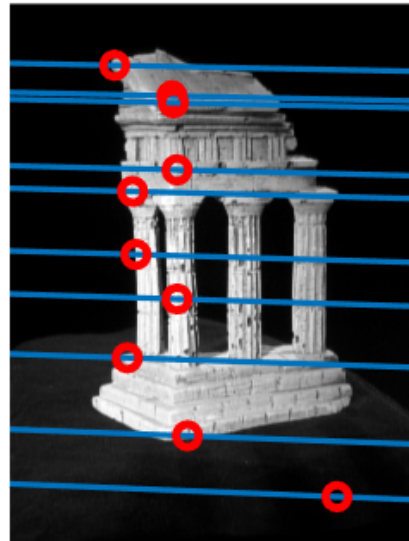
Verify that the corresponding point
is on the epipolar line in this image

Part 3.1.2:

I decide to set my windows size to 20, and for each window it is going to check 30 pixels left and right (total 60 pixels) as our candidate pixel round original coordinate. Each candidate pixel will compare with original pixel with its 400 neighbours and calculate its similarity using “**Euclidean distance**” based on difference of values of each windows. When I try windows size from 1 to 30, I found 20 is the most accurate one. I found that if I check all pixels along the epipolar line, it will cause dimension error(3d to 2d coordinate). It might because the edge case will make it matching false. The correct result is following:



Select a point in this image
(Right-click when finished)



Verify that the corresponding point
is on the epipolar line in this image

Part 3.1.3:

The result of essential matrix which run by script:

```
E =  
  
    0.0040    -0.0433    -0.0192  
   -0.1498    -0.0009     0.7264  
    0.0019   -0.7352    -0.0008
```

Part 3.1.4:

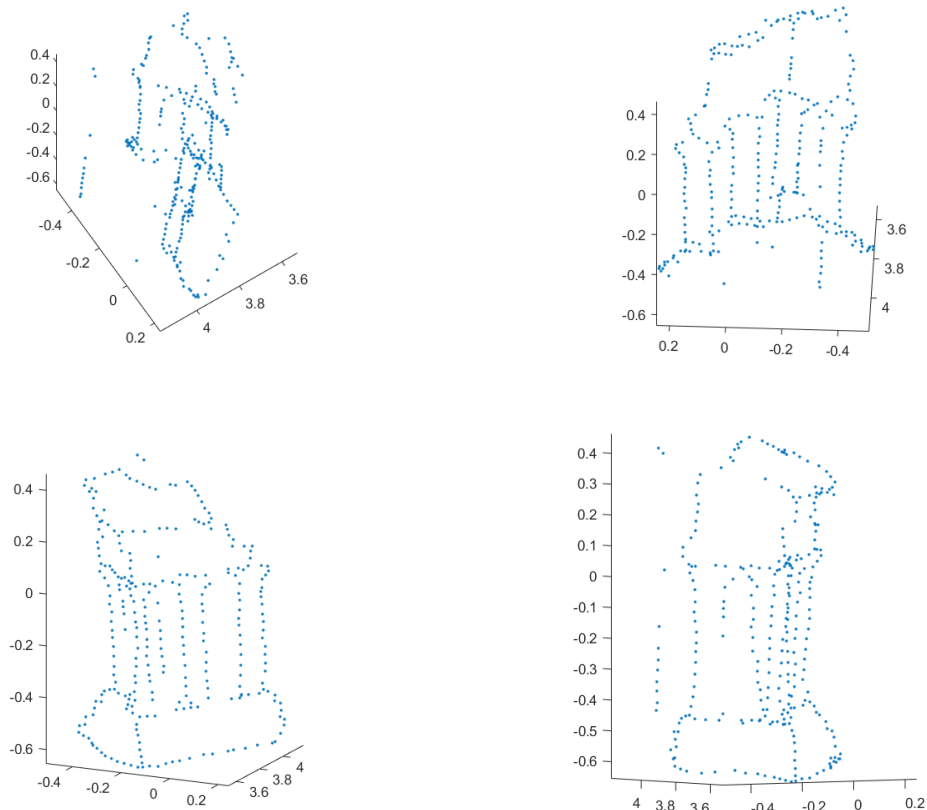
I got 4 extrinsic metrics that were given after calling camera2(E) function. We decide to choose the matrix which can give us the most number of 3D point in front of both cameras. We chosed the 4th extrinsic matrix and it has 288 correspondences.

The projection error of pts1(avgerr1) and pts2(avgerr2) are following:

```
avgerr1 =  
  
0.5586  
  
avgerr2 =  
  
0.5632
```

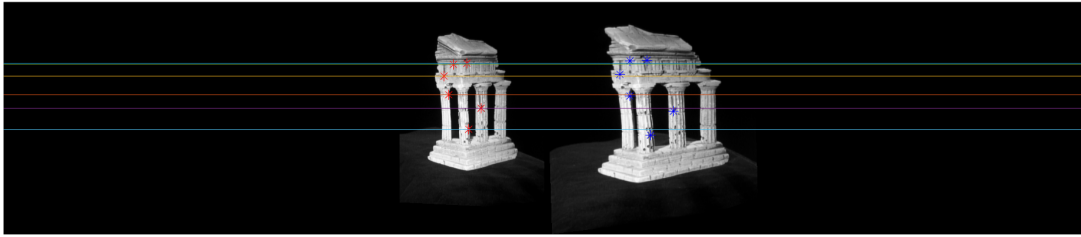
Part 3.1.5:

The result from TempleCoords with 4 different angles:



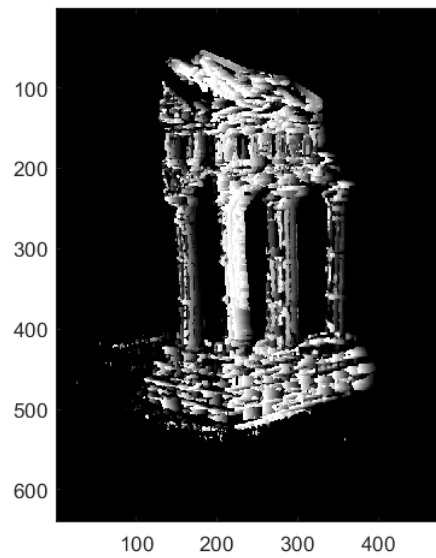
3.2.1:

The result of "TestRectify.m" is following:



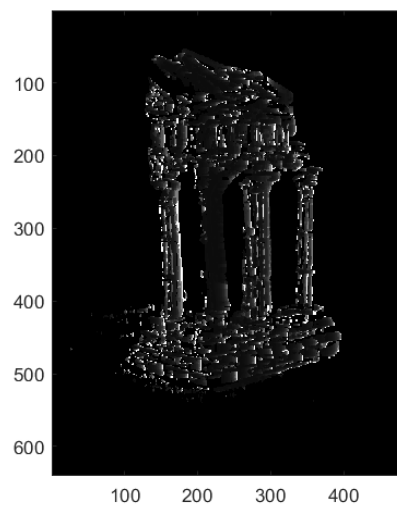
3.2.2:

The result of disparity map:



3.2.3:

The result of Depth map:



3.3.1:

The result of script "testPose.m":

```
>> testDepth
>> testPose
Reprojected Error with clean 2D points is 0.0000
Pose Error with clean 2D points is 0.0000
-----
Reprojected Error with noisy 2D points is 2.3516
Pose Error with noisy 2D points is 0.1831
fx >>
```

3.3.2:

The result of script "testKRt.m":

```
>> testKRt
Intrinsic Error with clean 2D points is 0.0000
Rotation Error with clean 2D points is 0.0000
Translation Error with clean 2D points is 0.0000
-----
Intrinsic Error with clean 2D points is 1.4995
Rotation Error with clean 2D points is 2.0000
Translation Error with clean 2D points is 4.0377
fx >>
```

3.4: