Assignment 3

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CMPT 762 Computer Vision

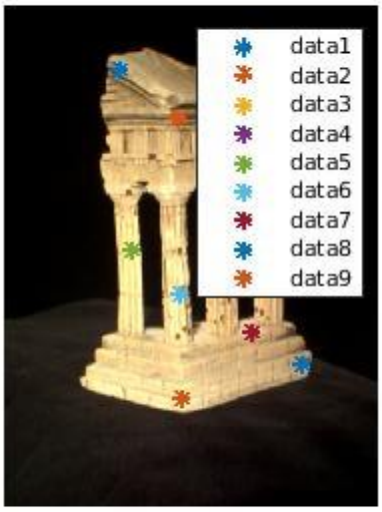
Author Note

I am using two late day to not get a penalty for submitting late

Assignment 3

3.1.1. Implement Eight Point Algorithm

Sorry for the block in between the image



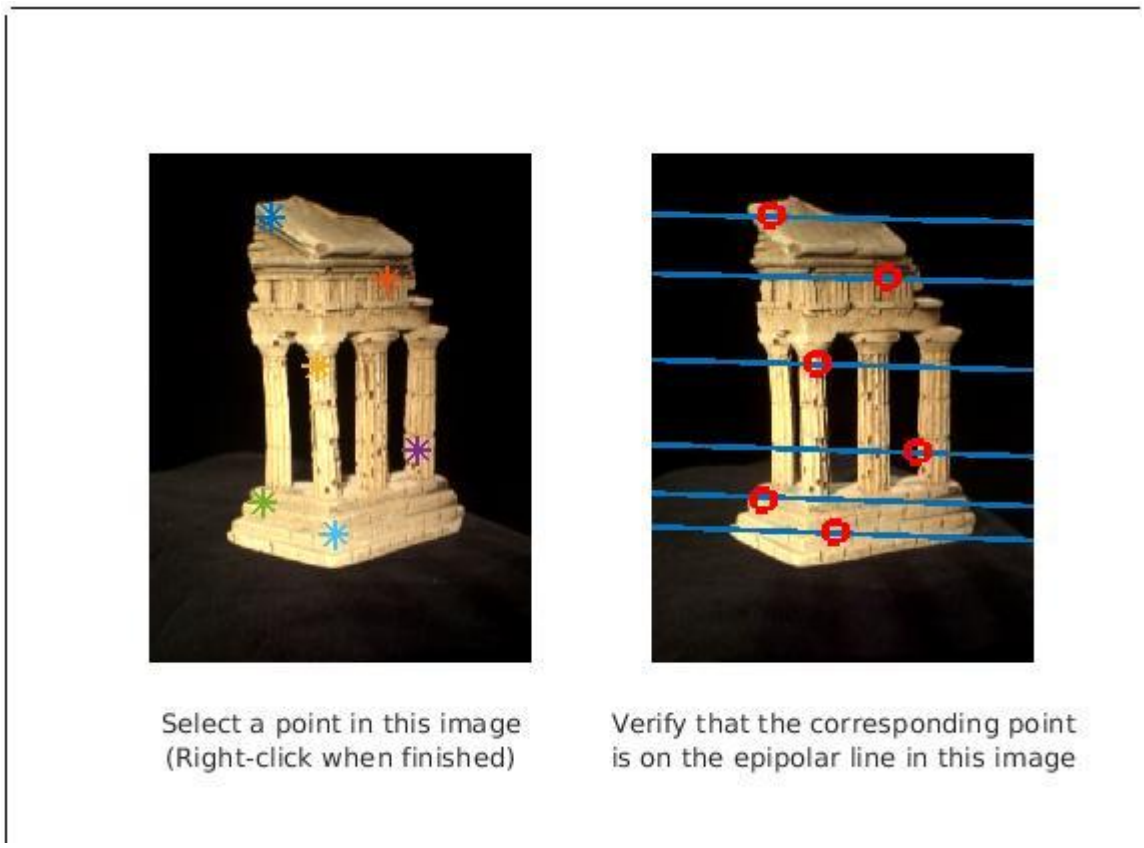
Select a point in this image
(Right-click when finished)

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

```
>> testTempleCoords
Fundamental Metrix
    0.0000   -0.0000   -0.0000
   -0.0000   -0.0000    0.0005
    0.0000   -0.0005   -0.0021
```

3.1.2. Epipolar Correspondance

The similarity matrix used is Euclidean distance. The method used is similar to what is described in the handout having a window run through and getting the similarity scores. The window size I choose is 2.



3.1.3 Essential Matrix

Essential matrix for the given temple image is: -

```
>> testTempleCoords
Essential Metrix
    0.0040   -0.0433   -0.0192
   -0.1498   -0.0009    0.7264
    0.0019   -0.7352   -0.0008

>>
```

3.1.4. Implement Triangulation

Performed positive depth test and checked the z value for all the 4 values and if the z value of the projection matrix is greater than zero for all the points then it is selected. In the current code the second matrix is correct.

Reprojection error is:-

```
>> testTempleCo
Error
    0.6252

    0.6316

fx >>
```

3.1.5. Test Script

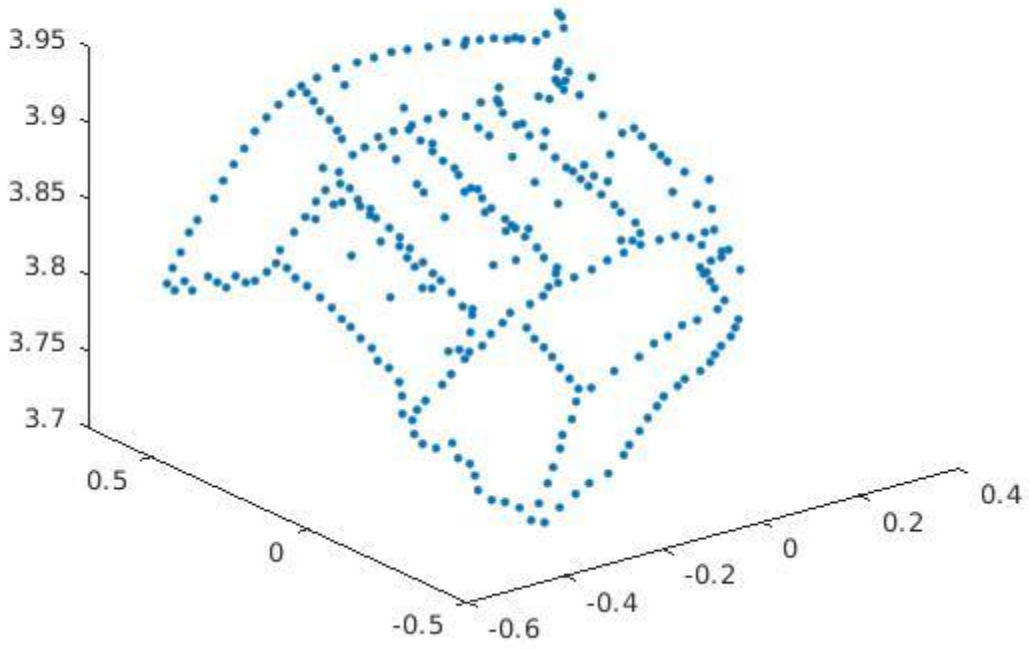


Figure 1 XYZ Image

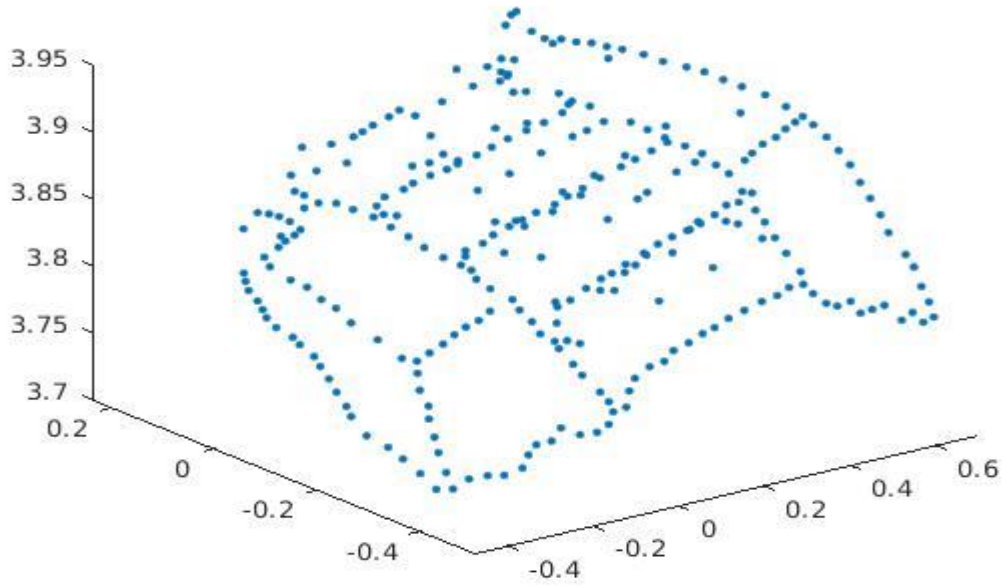


Figure 2 YXZ Image

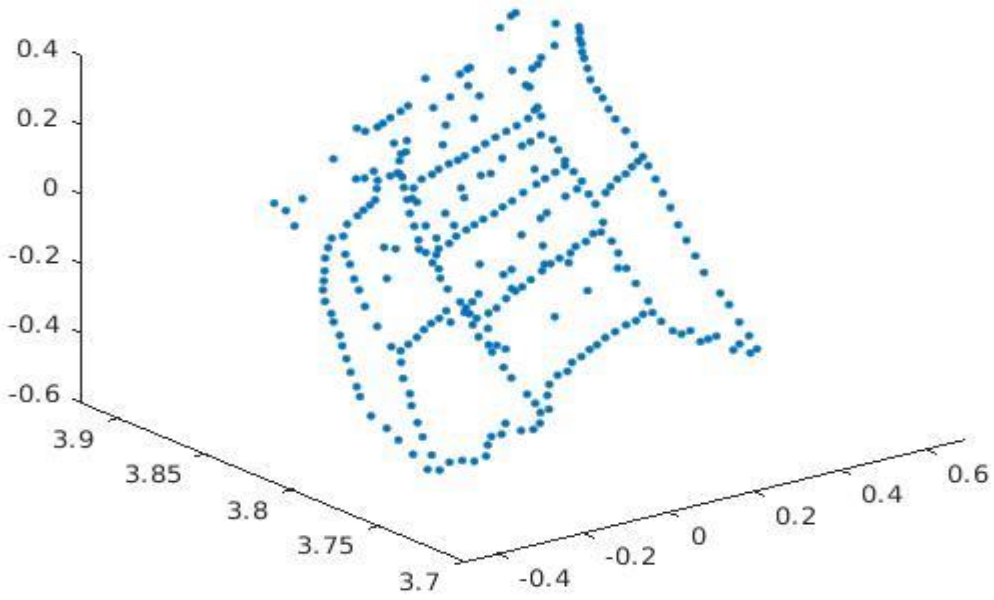
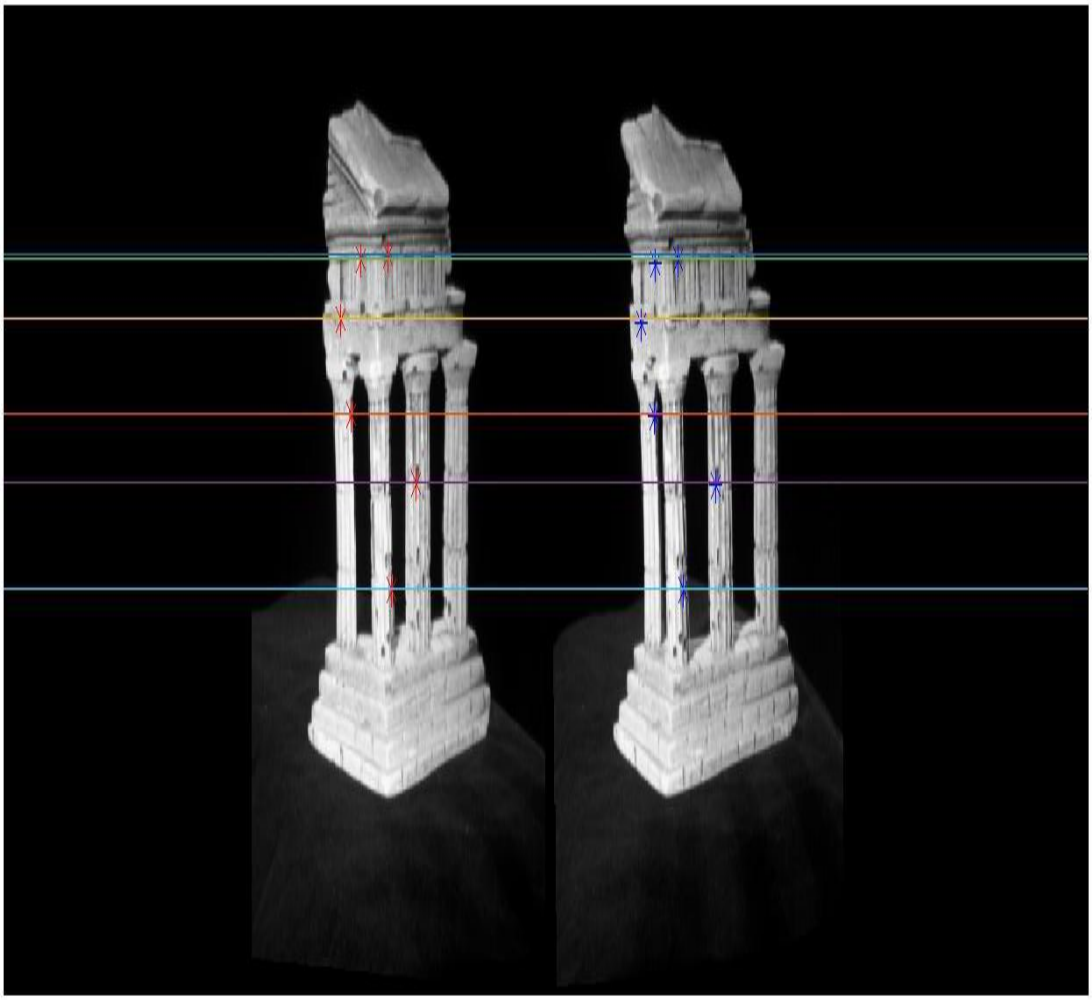
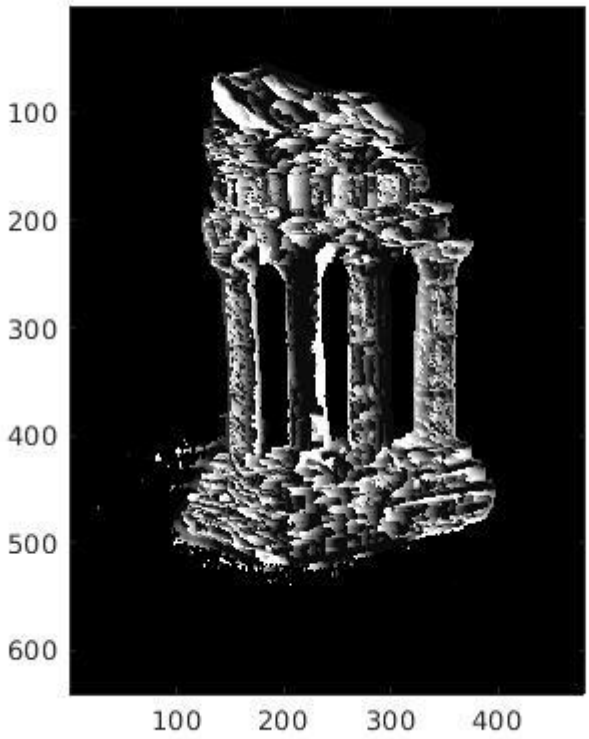


Figure 3 YZX Image

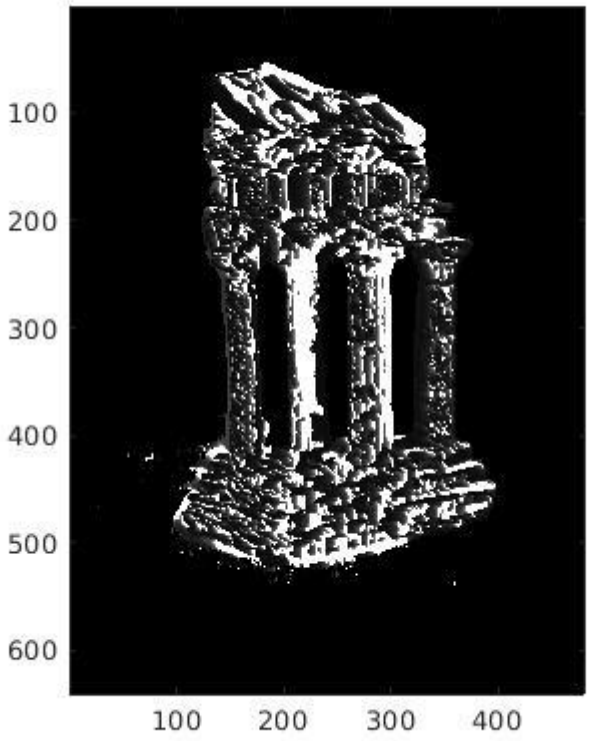
3.2.1. Image Rectification



3.2.2. Dense window matching to find per pixel density



3.2.3. Depth Map



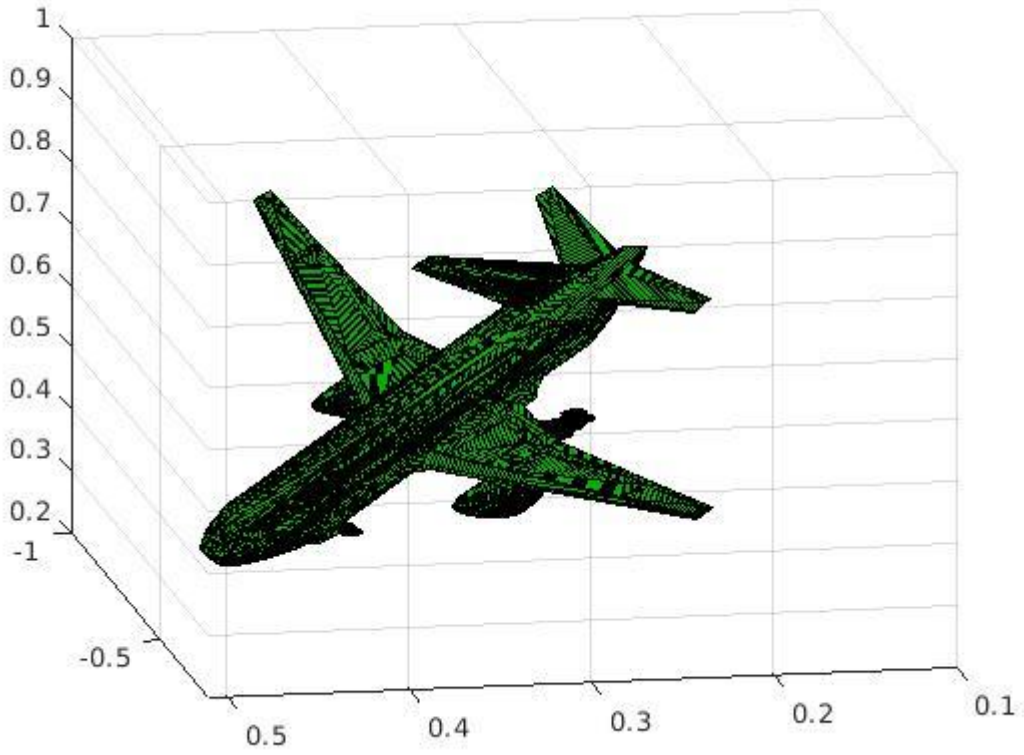
3.3.1. Camera Matrix P

```
>> 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 0.6836
Rotation Error with clean 2D points is 0.1858
Translation Error with clean 2D points is 0.2980
>>
```

3.3.2. Intrinsic/Extrinsic Parameters

```
Command Window
>> 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 2.8659
Pose Error with noisy 2D points is 0.0561
>> clear
>> clr
```

3.3.3. CAD model


1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
-1
-0.5
0.5
0.4
0.3
0.2
0.1