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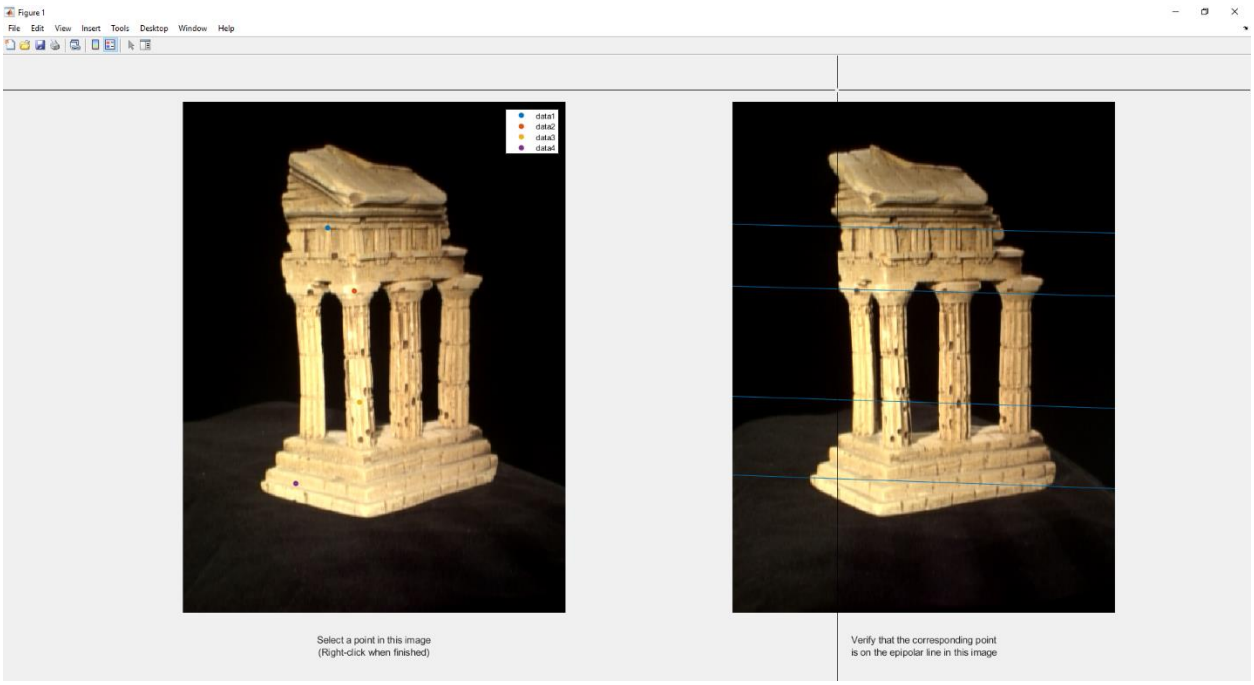
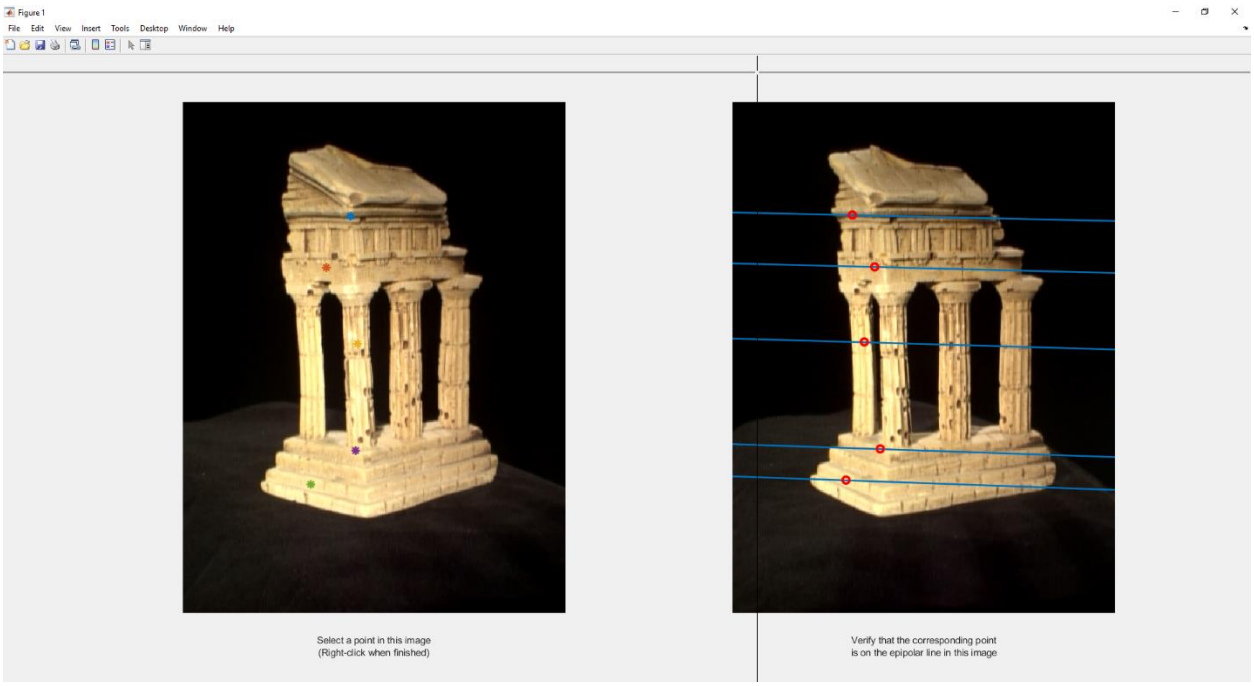
Project No – 3(3D Reconstruction)

4 free days were used because the work on this project was delayed due to some prior commitments

3.1.1 Implement the 8-point algorithm



3.1.2 Find the epipolar correspondences



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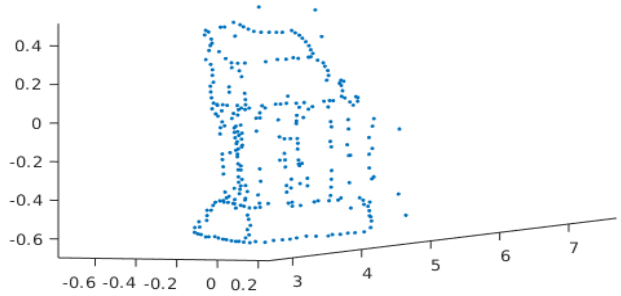
The reciprocal of the Manhattan distance between a target window of image 1 and candidate window of image 3, with window size of 7 was used as a similarity matrix. The matching algorithm's success rate is high usually, but it might fail when there are similar but unmatched windows along the epipolar line.

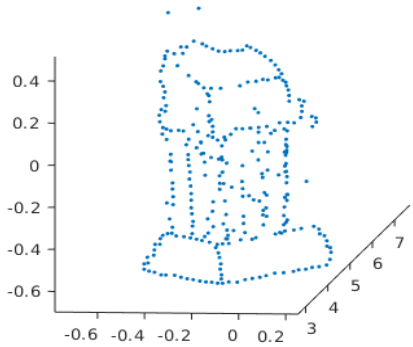
3.1.3 Write a function to compute the essential matrix

3.1.4 Implement Triangulation

The correct extrinsic matrix is determined by first computing the 4 sets of 3D points with the 4 candidate extrinsic matrices, then for each set we count how any points have a positive depth coordinate. Lastly, the candidate with the highest count is the correct extrinsic matrix(index 2). The re-projection error for pts1 is 0.5664 and for pts2 is 0.5711.

3.1.5 Write a test script that uses templeCoords





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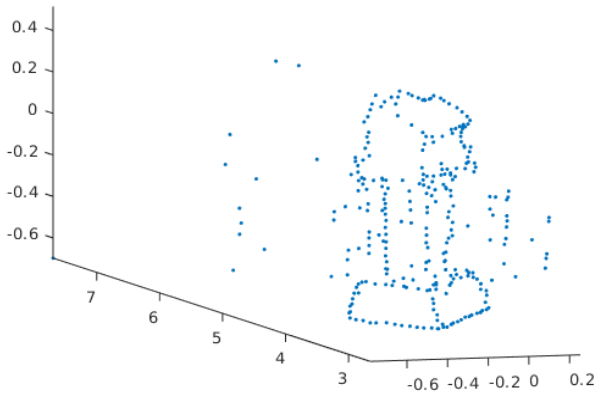

3.2.1 Image Rectification

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3.2.3 Depth Map & Disparity Map

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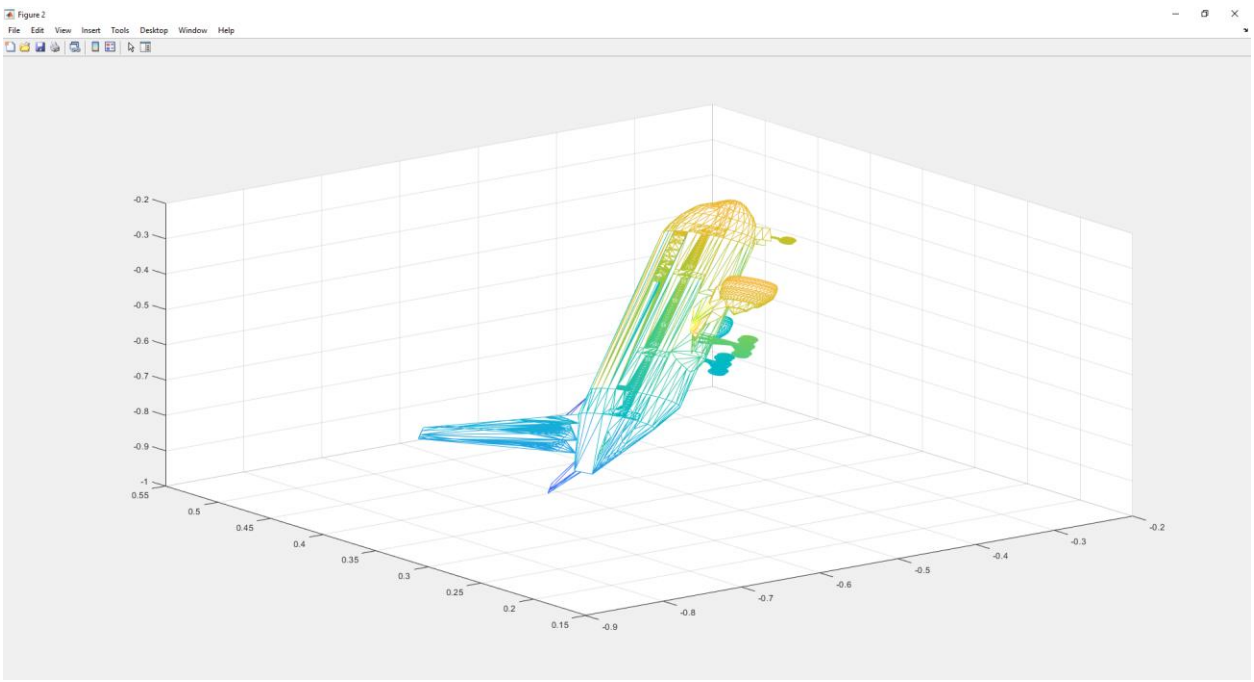
3.3.1 Estimate camera matrix P

```
>> 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 4.0188
Pose Error with noisy 2D points is 0.0488
```

3.3.2 Estimate intrinsic/extrinsic parameters

```
>> 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 0.7461
Rotation Error with clean 2D points is 0.0808
Translation Error with clean 2D points is 0.0843
```

3.3.3 Project a CAD model to the image



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