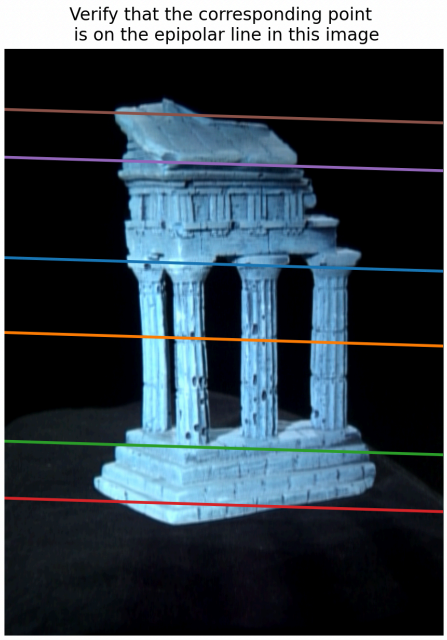
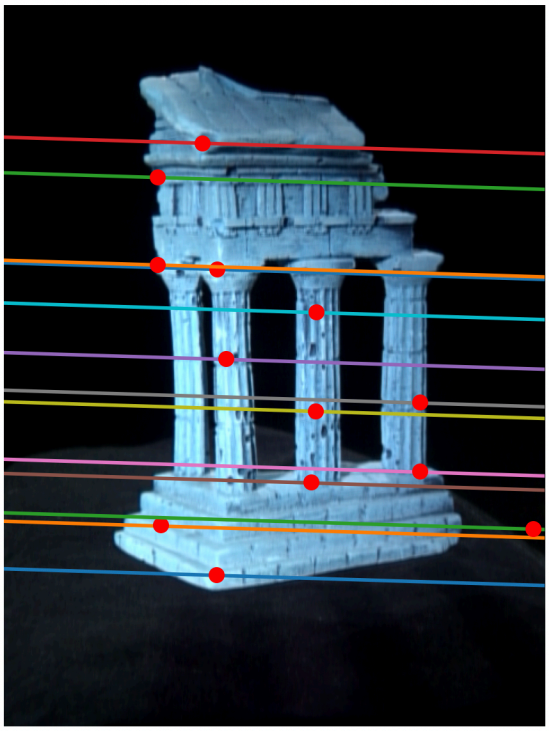
3D Reconstruction

1) Eight point Algorithm to estimate F:



2) Epipolar Correspondences:



Calendar

i) I used SSD (Sum of squared Differences) as a matching criteria on a window of 21*21 pixels
ii) It fails to pick up points on the background as there are no distinct features and the SSD is the same for a lot of points on the epioplar line.

3) Essential Matrix: The essential matrix computed is:

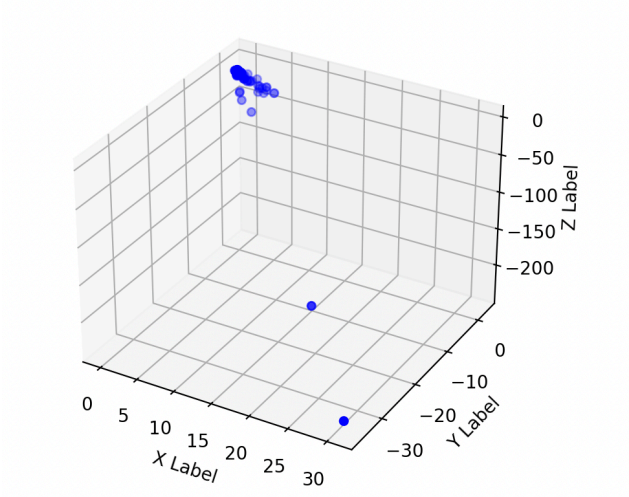
E = [[-1.35913265e-02 1.42681429e-03 5.11504918e-02]
[4.42323081e-01 -4.00170202e-03 -1.66574075e+00]
[-1.18487599e-02 1.68592082e+00 1.99280159e-03]]

4) Triangulation:

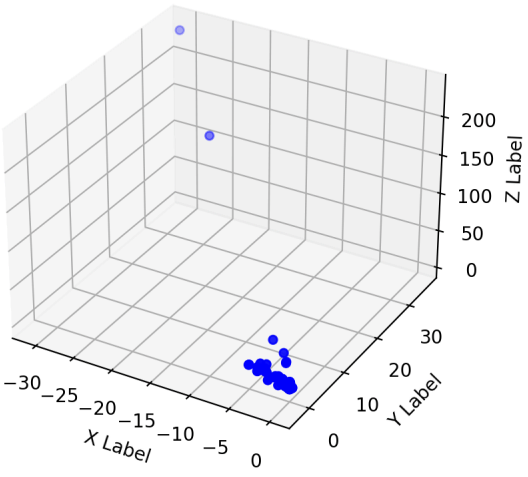
I have done a linear triangulation.
The function for the triangulation I've written returns three values: The 3-D points, re-projection error and condition for positive depth.

Given below are the 3d scatter plots with their reproduction errors and condition for positive depth for all four extrinsic matrix possibilities of camera 2.

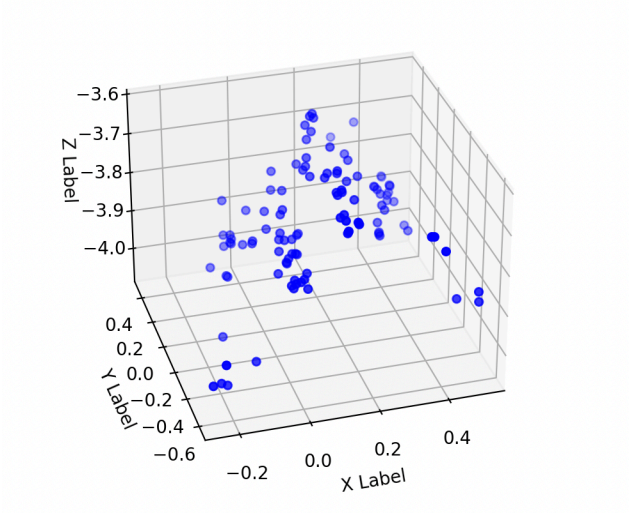
1.90667069572154 False



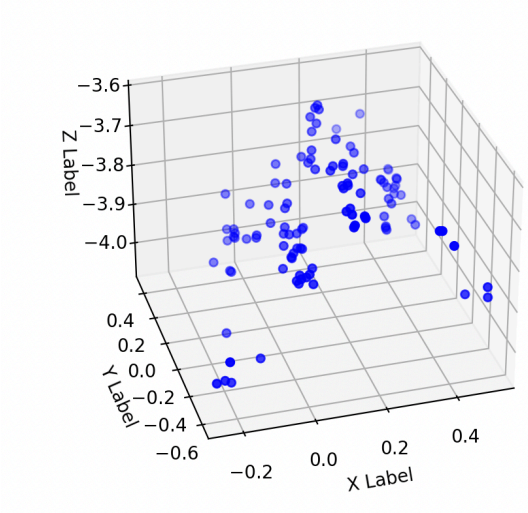
1.90667069572154 True



1.9066710979314627 False



1.9066710979314627 True



Description of files uploaded:

simulate.py -> Demonstrates all the above sub parts