Computer Vision and Image Processing

Homography and fundamental matrix estimation

Name: Prachi Jayakumar Patil
Person Number: 50247309
UBIT Name: ppatil3

PART A: Homography estimation

To run the code, send the image as:

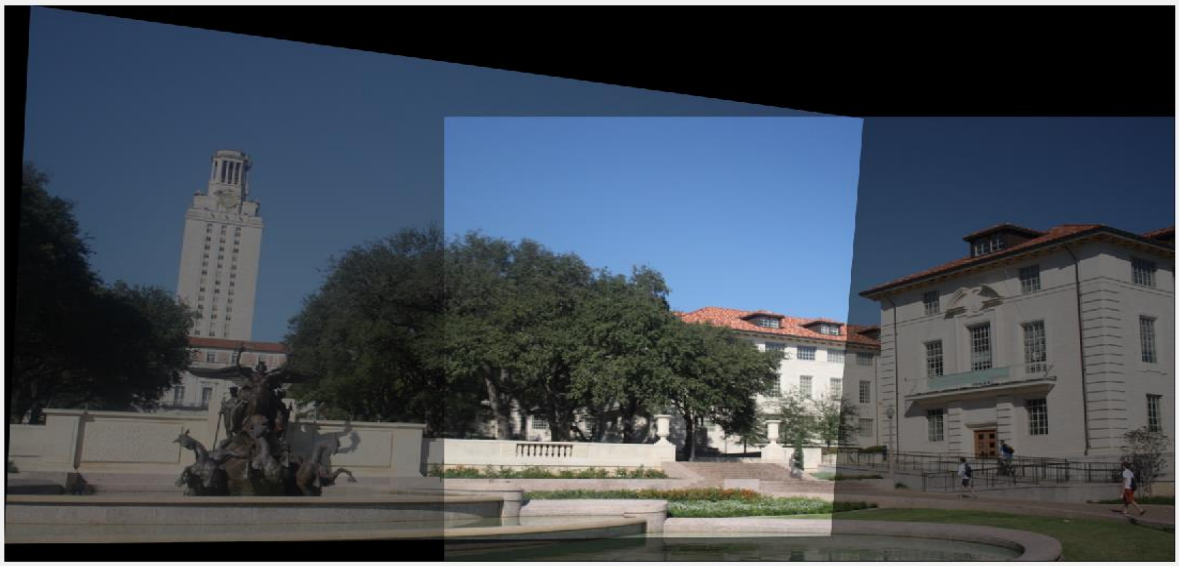
image1 = imread(image1_path);

image2 = imread(image2_path);

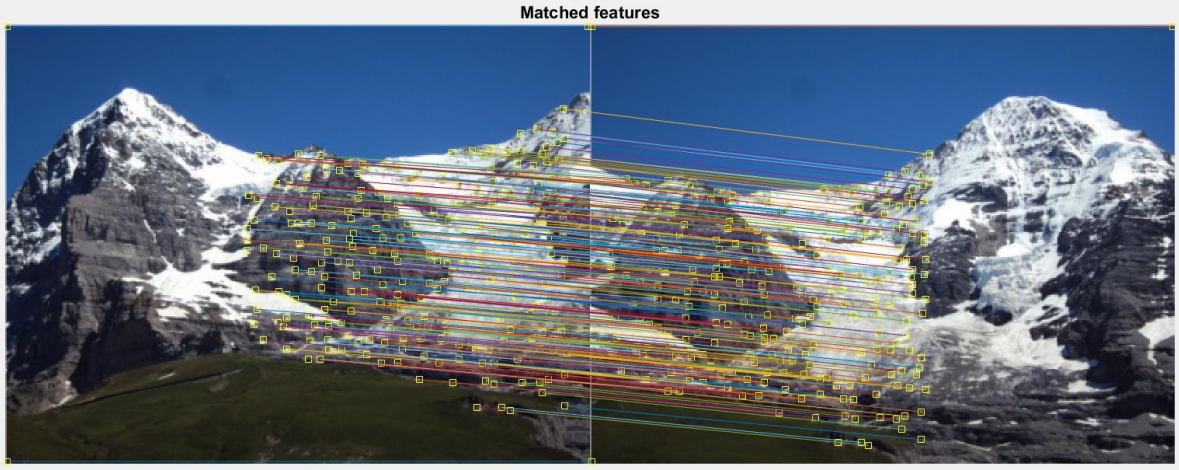
image_stitch(image1, image2);

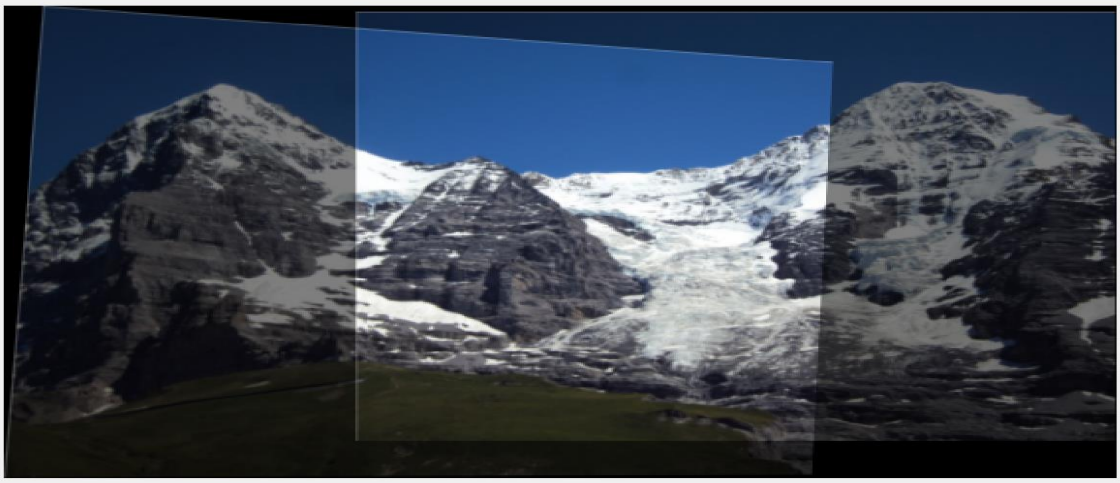
1) Uttower:

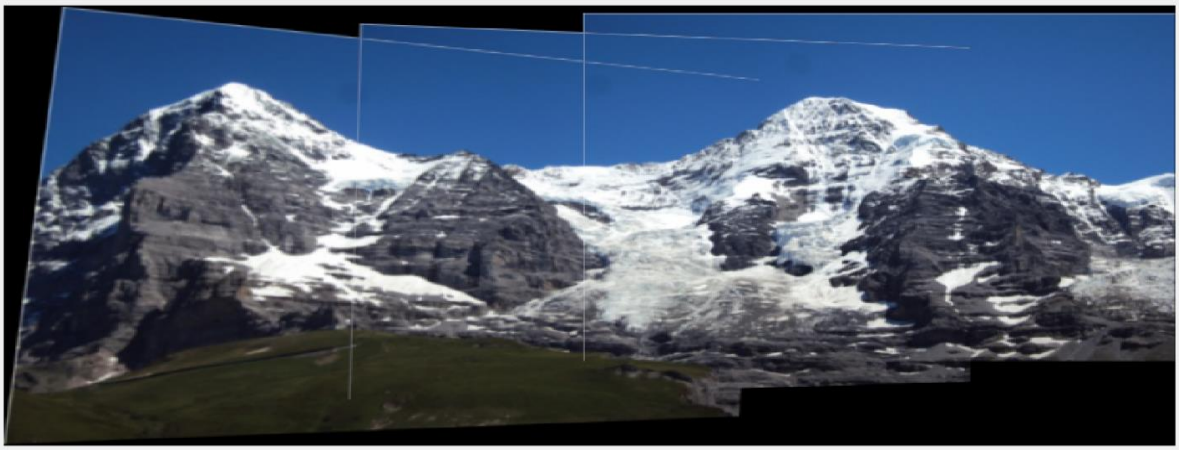
Number of inliers: 186
Average residual/error for inliers: 0.3632

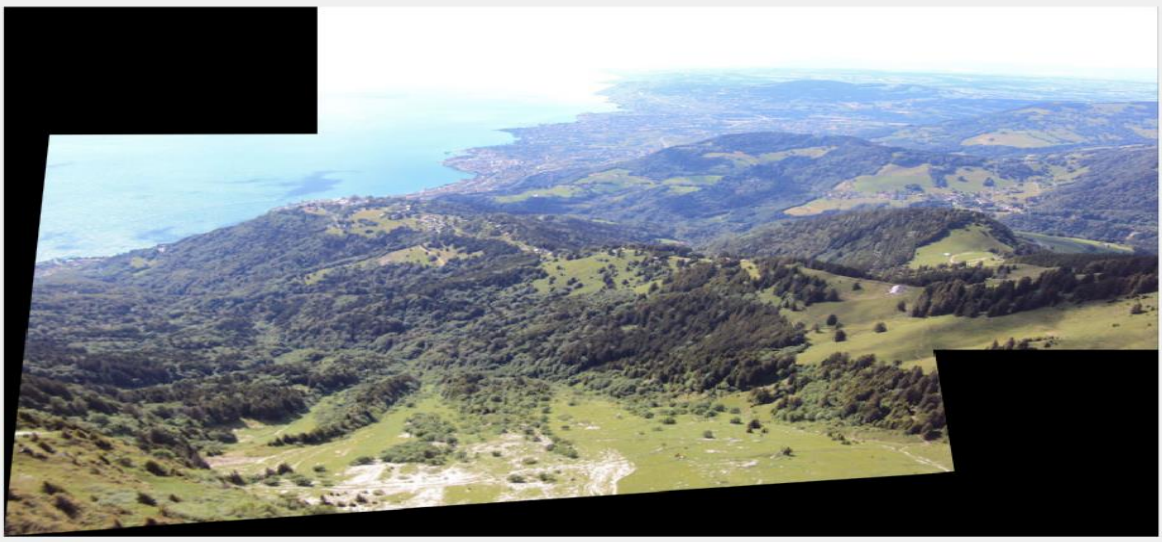


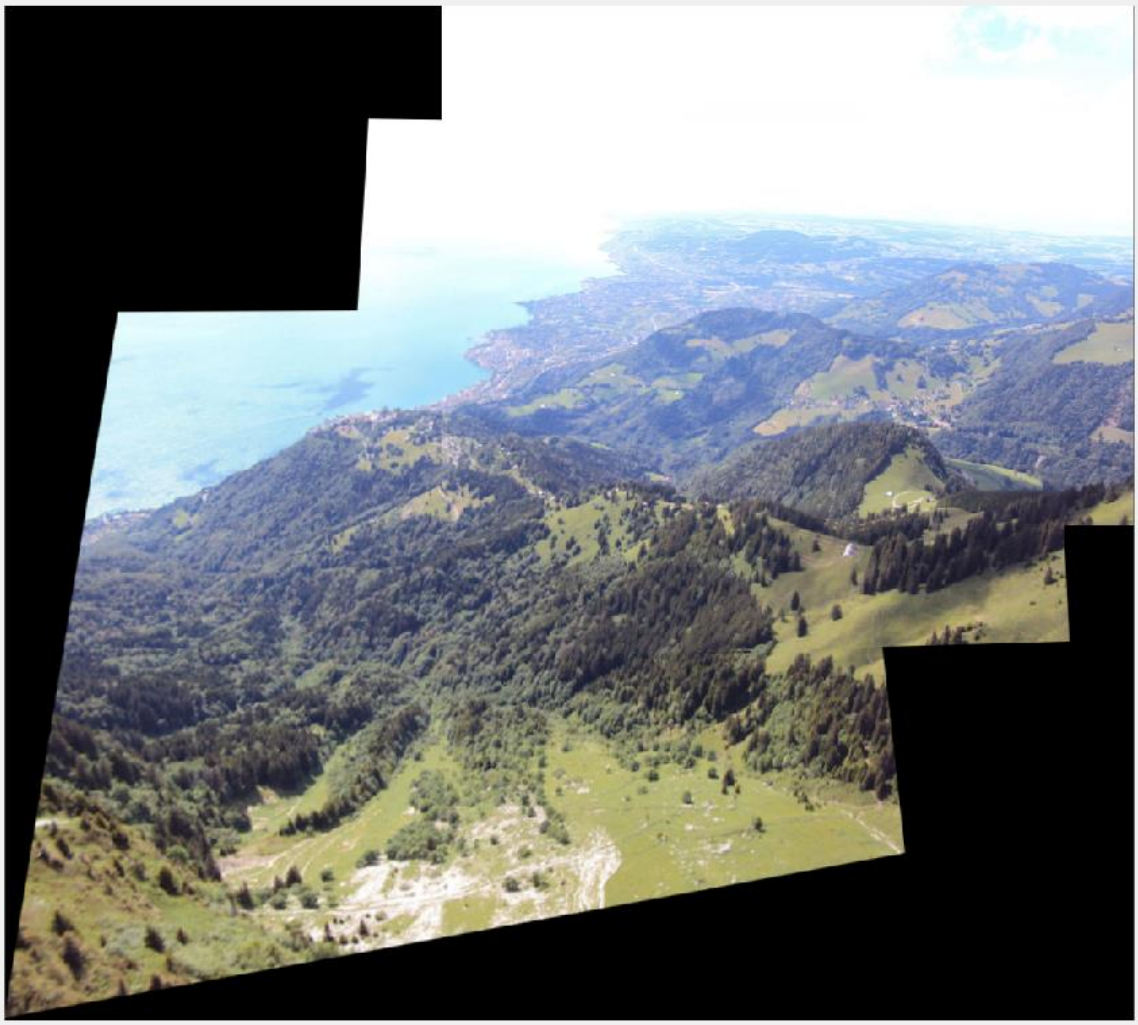
2) Hills:





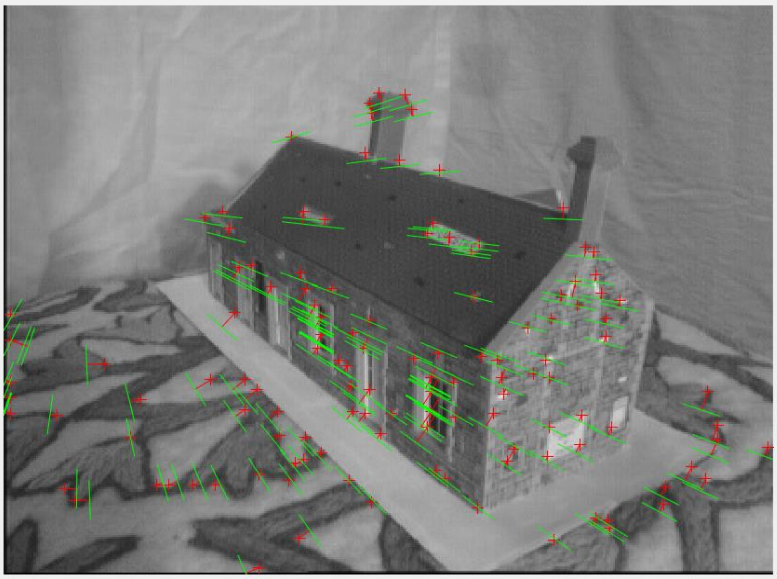




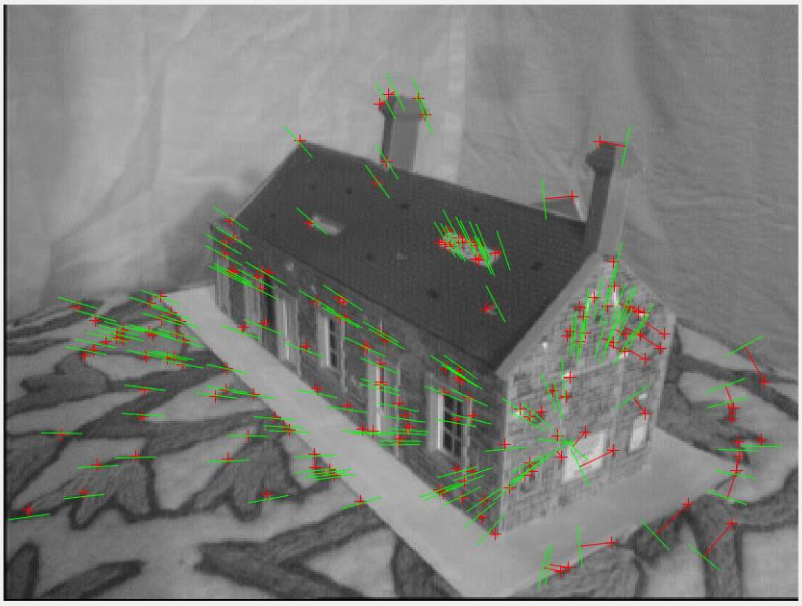


Part2:Fundamental Matrix Estimation and Triangulation

1) House:
   a) With Ground truth Matches:

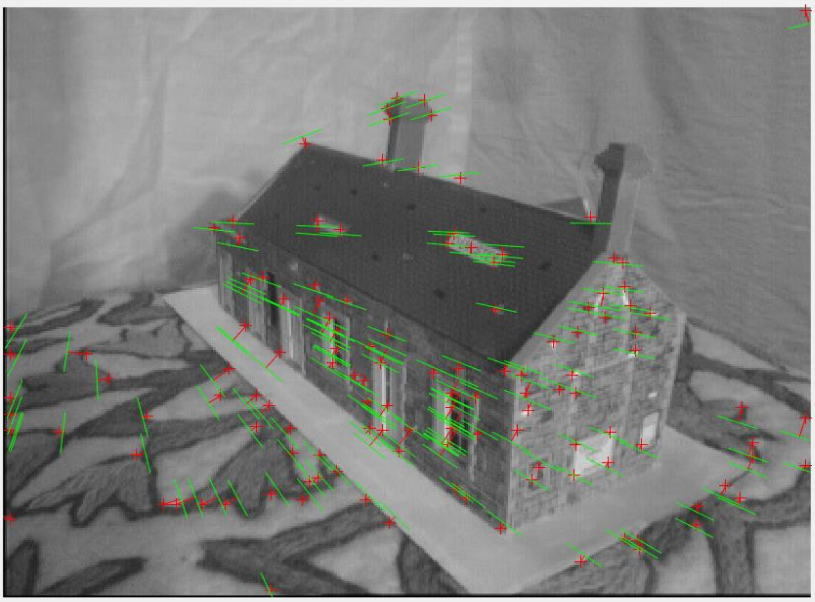


normalised



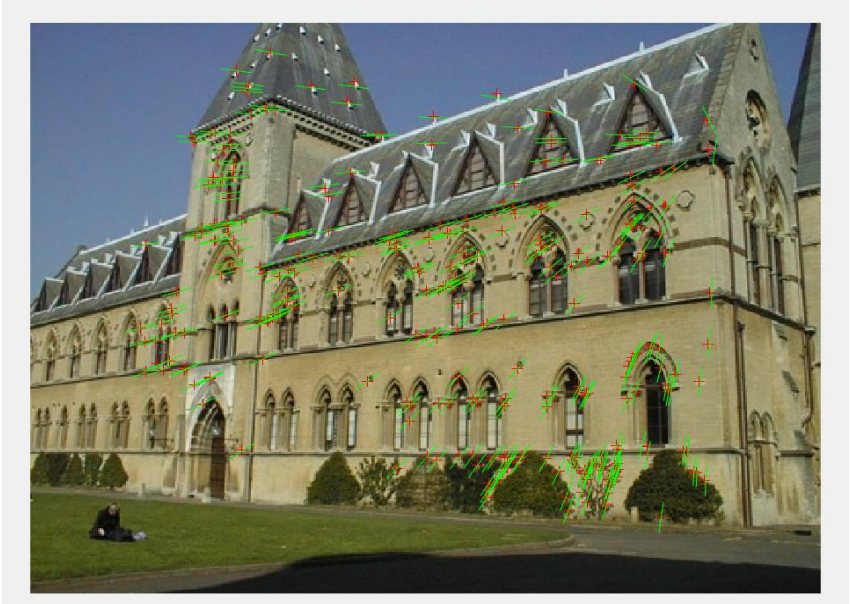
Unnormalized

b) Without ground truth Matches:

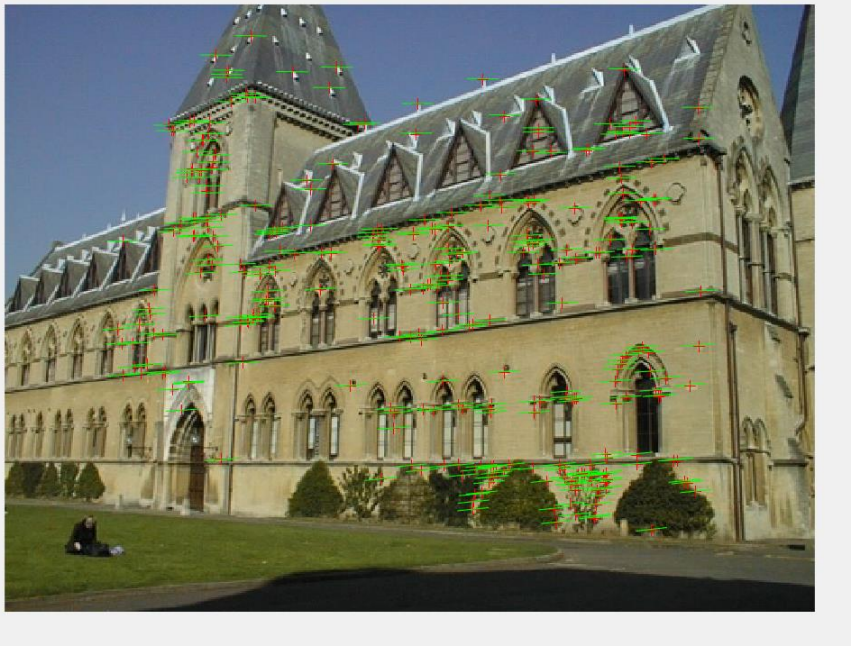


normalised

2) Library:
   a) With ground truth Matches:

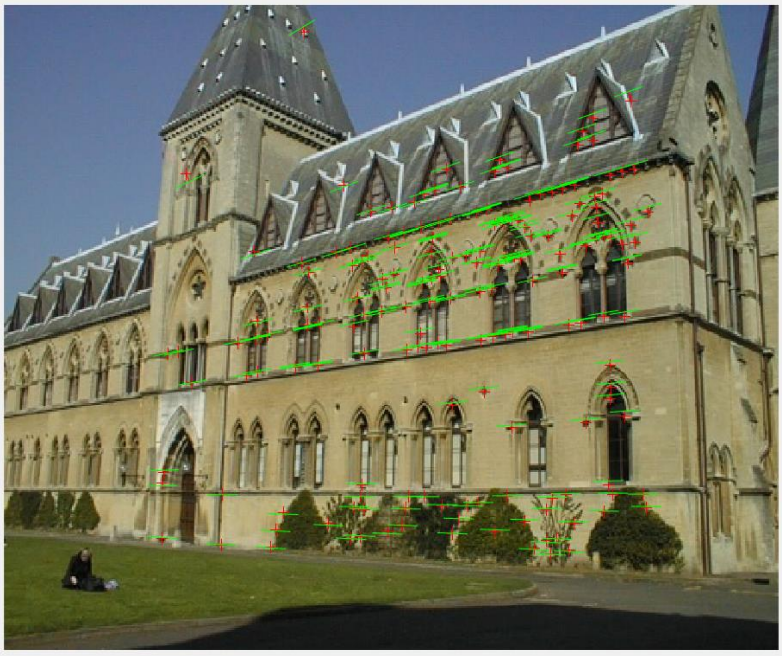


Normalized



Unnormalised

3) Without ground truth matches:



Normalized

With ground truth Matches:

Residual for Unnormalized:

House: 3.0342

Library: 0.5236

Residual for Normalized:

House: 2.8905

Library: 0.3385

Without ground truth matches:

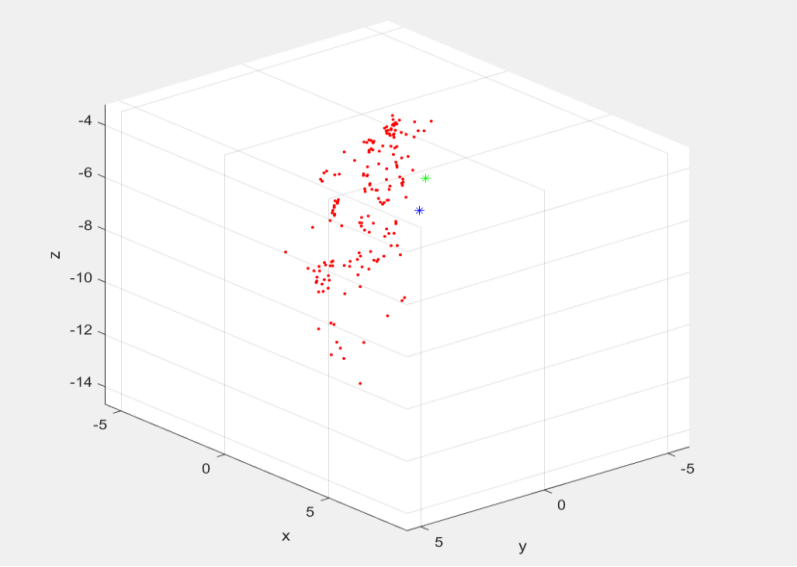
Images	Normalized Residual	Inliers
House	4.6166	156
Library	3.5288	247

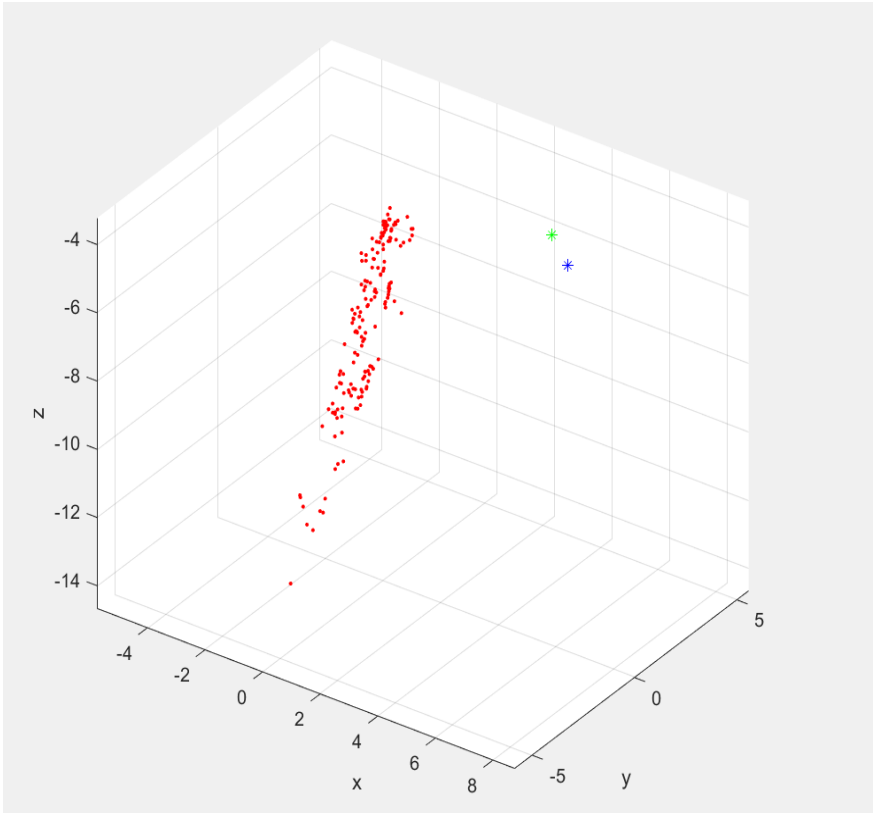
Without the ground truth matches, the normalized residual is higher than with the ground truth matches.

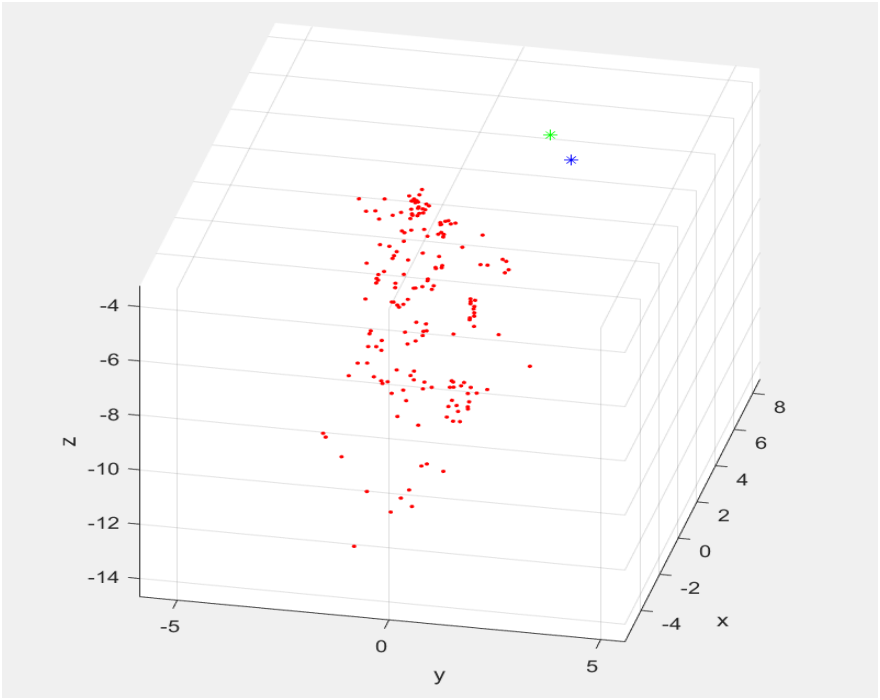
Triangulation:

a) **Library:**

mean residual for left image
347.6150
mean residual for right image
1.9196e+03




-4
-6
-8
z
-10
-12
-14
-4
-2
0
2
4
6
8
x
5
0
-5
y


-4
-6
-8
z
-10
-12
-14
-5
0
5
y
8
6
4
2
0
-2
-4
x

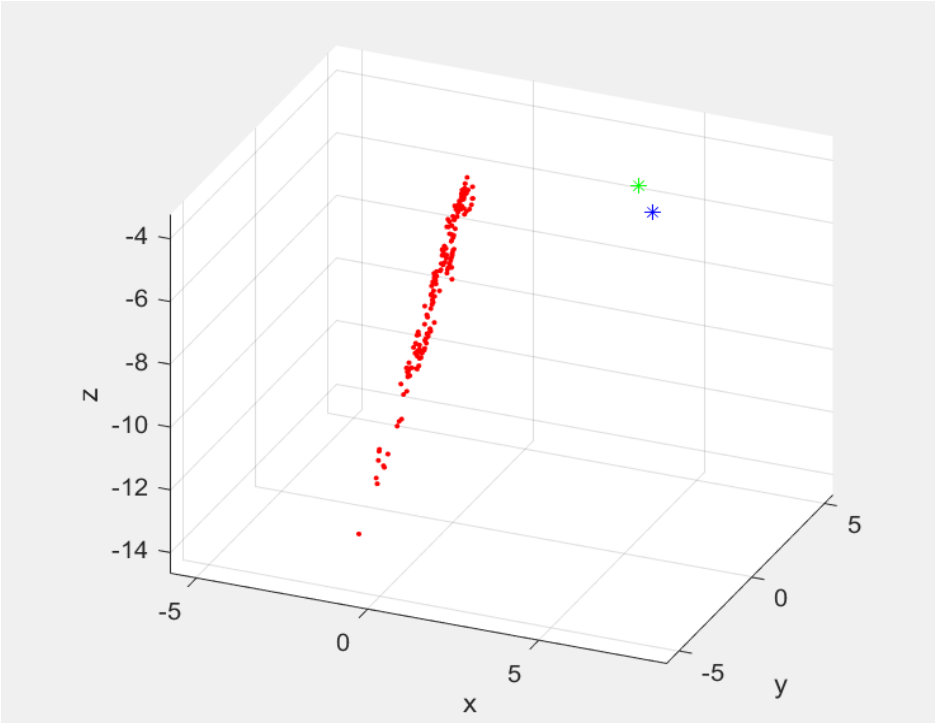
b) House:

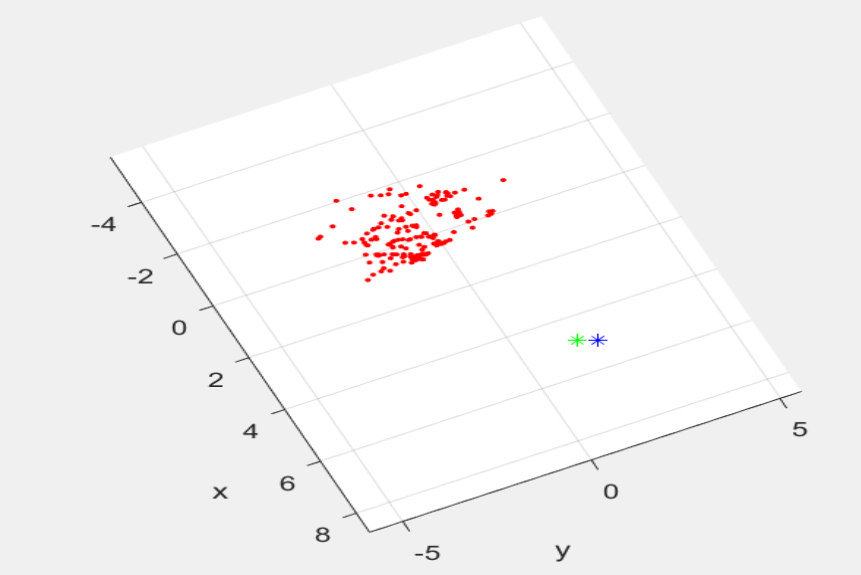
mean residual for left image

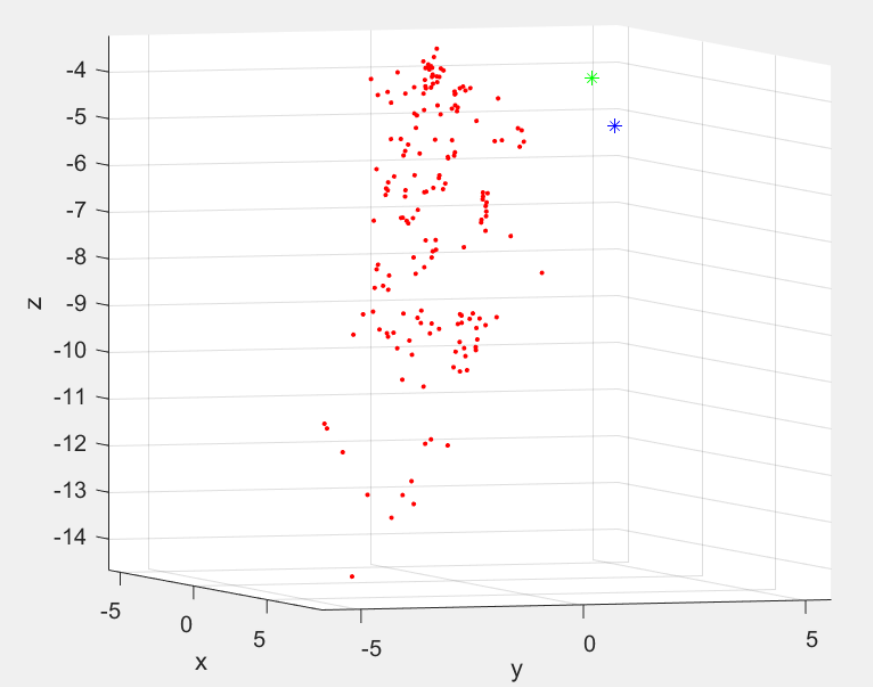
3.6626

mean residual for right image

873.0394







Extra Credit:

Run the stitch_multiple_images(img1, img2, img3)

This code will stitch 3 images.

Reference:

1) http://dcyoung.weebly.com/computer-vision.html