Mobile Robotics

Assignment -3

Two View Sparse Reconstruction

Report

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20161236

The 20161236 folder consists of 2 sub folders ‘images’ and ‘codes’. The codes folder consists of different functions whose names are similar to those given in the problem pdf.

sparseReconstruction.m: The code reads the images and finds the matched features between the two features. It calls which use these matched features to solve for Fundamental Matrix, Essential matrix, Rotation Matrix, Translation matrix and also reprojects the points into 3D.

estimateFundamentalMatrixRANSAC.m: This code solves for the Fundamental matrix using the RANSAC algorithm. It takes the matched features as input and outputs the Fundamental matrix and the matched inliers as output.

normalize2DPoints.m: This code normalizes the input matrix.

decomposeEssentialMatrix.m: Code takes Essential matrix and the Feature amtches inliers and calculates the Rotation and Translation Matrices.

algebraicTriangulation.m: Converts 2D points to 3d points.

The Fundamental matrix:

0	0	-0.0132
0	0	0.0715
0.0164	0.0615	1.0000

The Rotation Matrix:

0.9934	-0.1181	-0.0946
0.1160	0.9977	0.0272
-0.0971	0.0160	1.0000

The Translation Matrix:

-3.2620

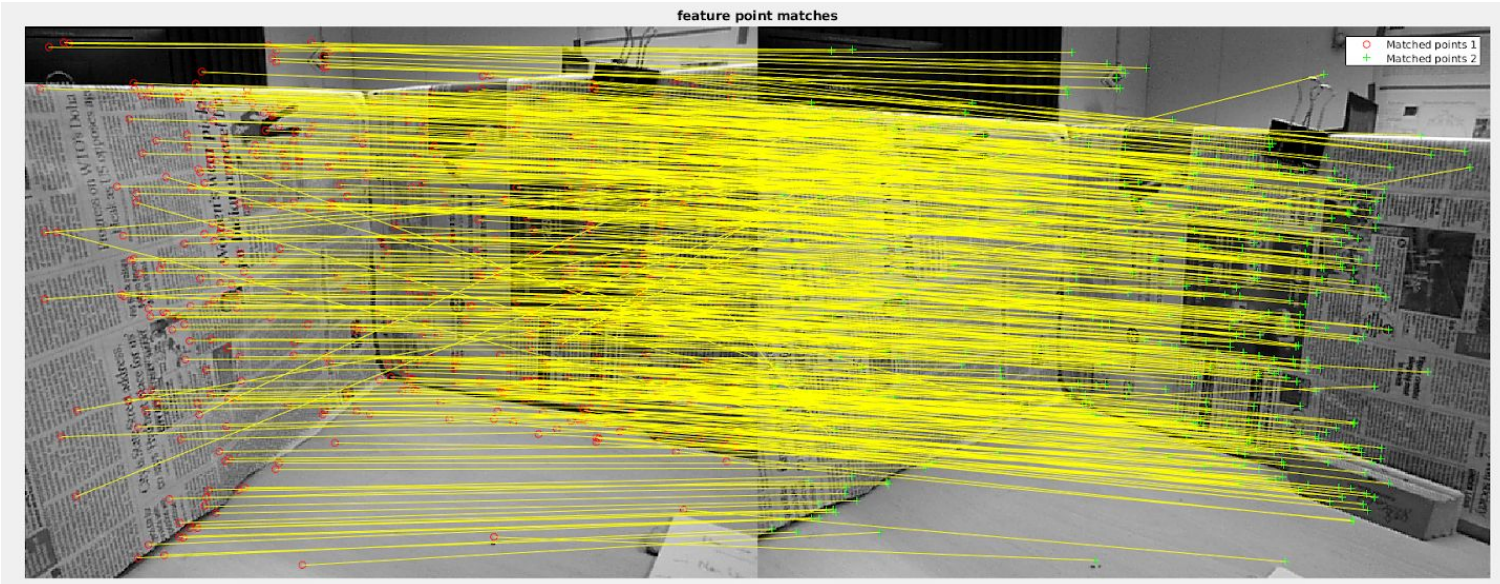
0.0954

1.0000

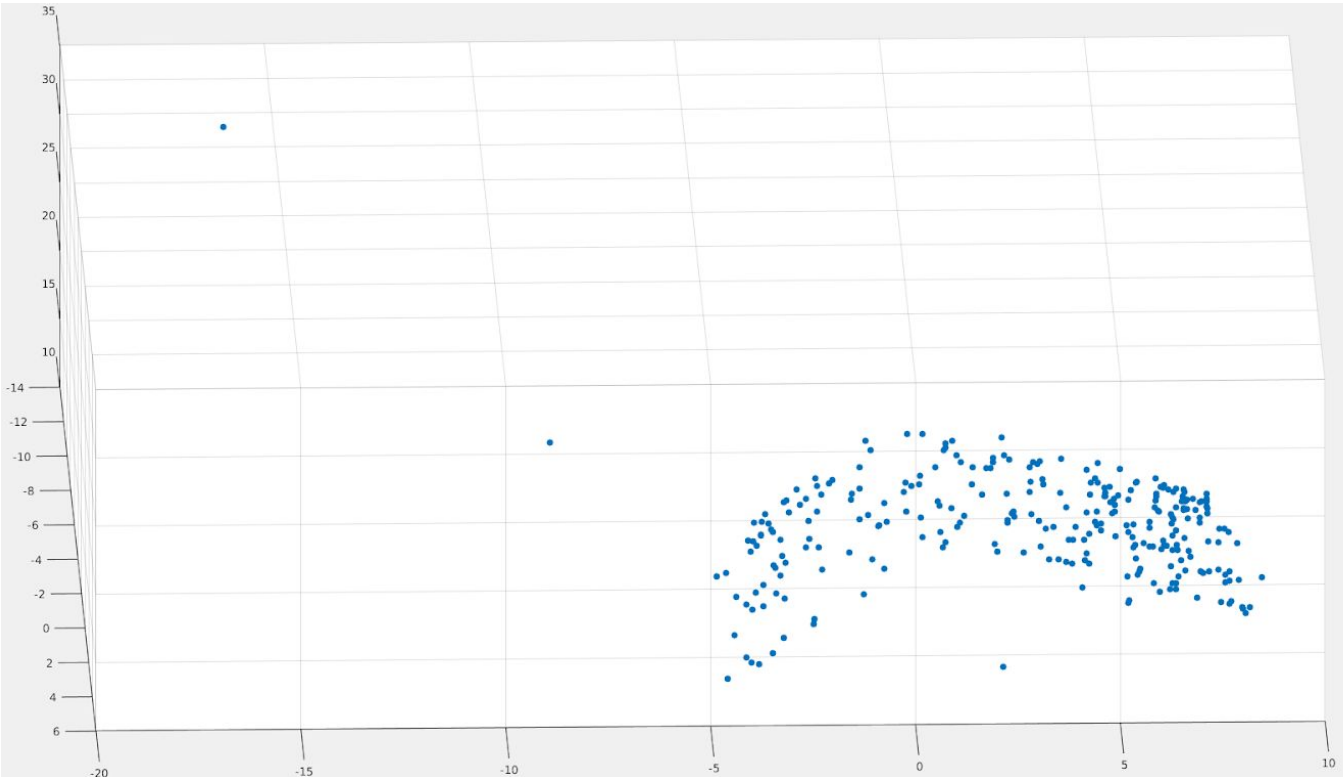
The values of these may vary slightly as sets of matched features used to estimate the fundamental matrix may vary.

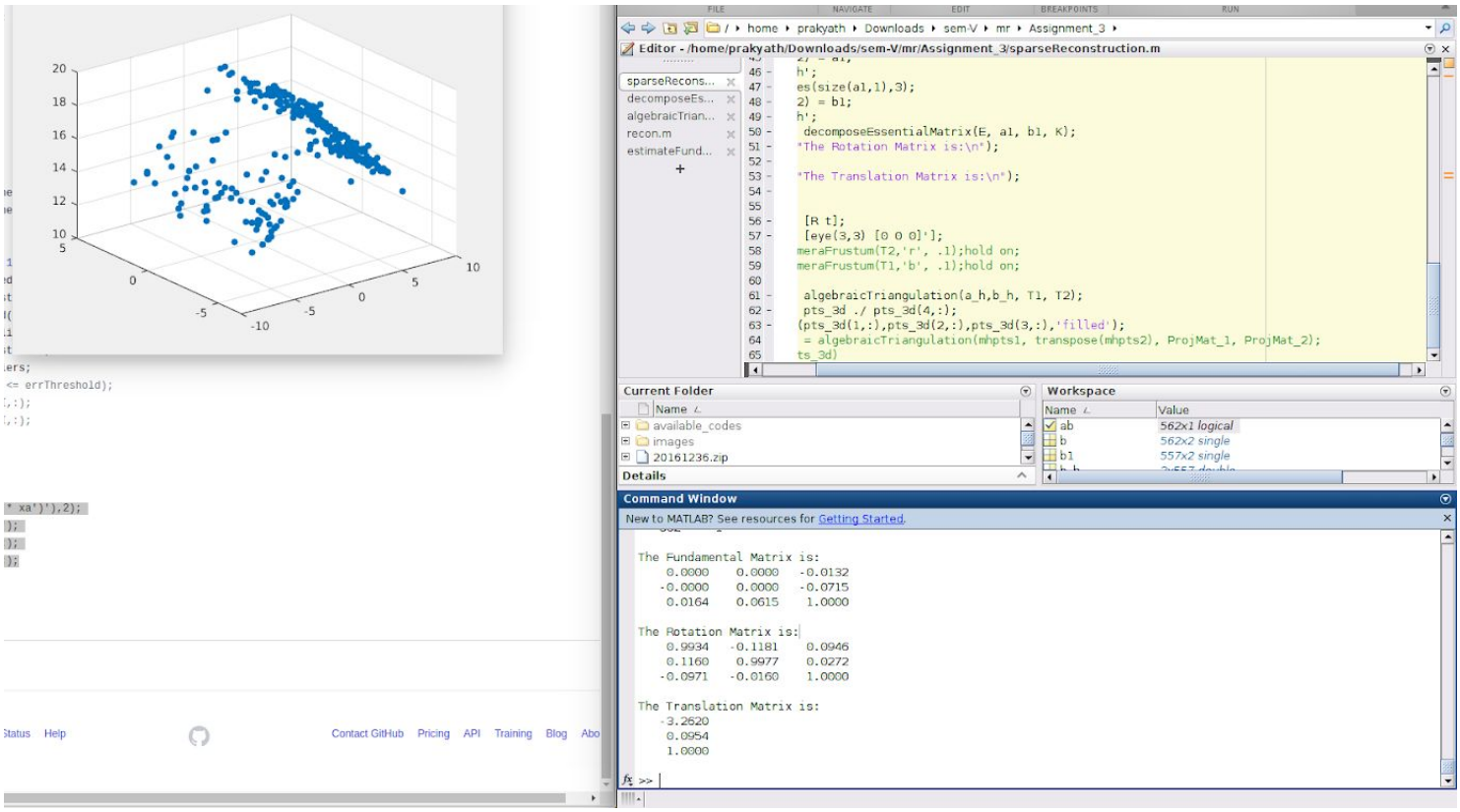
OUTPUT PLOTS

MONTAGE PLOTS



THE REPROJECTED 3D POINTS





- THE 3D PROJECTION PLOT MAY VARY SLIGHTLY EVERYTIME WE RUN THE CODE.
- SOMETIMES DUE TO THE INCLUSION OF A FEW OUTLIER FEATURE MATCHES, THE PLOT MIGHT ADJUST ITSELF TO ACCOMMODATE THE OUTLIERS.
- INORDER TO VIEW THE INLIERS WE NEED TO ZOOM AND ROTATE TO A PROPER SCALE.