EE 8374: Fundamentals of Computer Vision

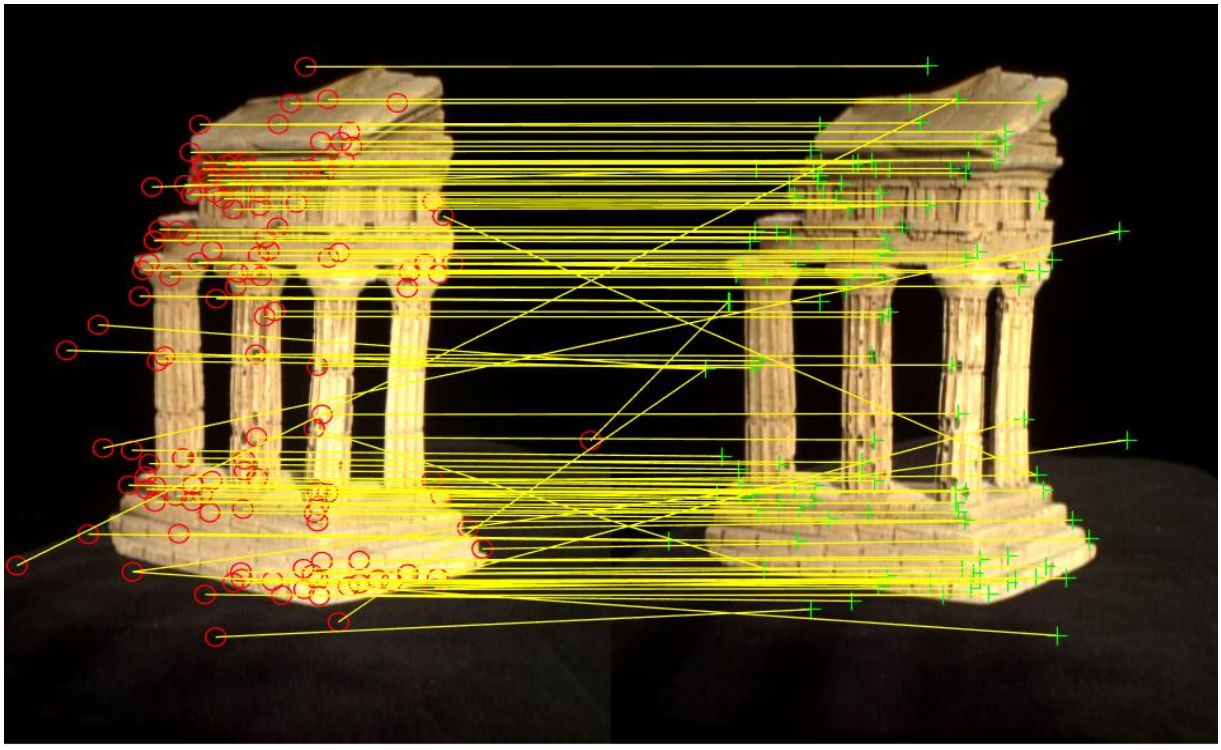
Homework-5

Mingze Sun

47505501

Epipolar geometry [50 points]

- *Identifying putative matching correspondences:*



- *Least Median of Square*

Similarities: Both methods are based on randomly selecting matched points and are both iterative methods. And the calculation speed is rather slow.

Differences: LMedS calculates the median of the square of the error and seeks to minimize this. Additionally, LMedS is robust as it can select feature point matches when the original sample has up to 50% of poorly matched points.

The RANSAC algorithm consists of two steps. First just enough feature point matching pairs are randomly chosen to compute model parameters. Next, this method checks the number of elements of the input feature point dataset which are consistent with the model just chosen. RANSAC repeats the two steps within a specified threshold until it finds the maximum number of elements within a model. It then selects this model and rejects mismatches.

References: Zhaowei Li and David R. Selviah , "Comparison of Image Alignment Algorithms ". Available: http://www.ee.ucl.ac.uk/lcs/previous/LCS2011/LCS1115.pdf

- *Inferring camera position:*

Image1:

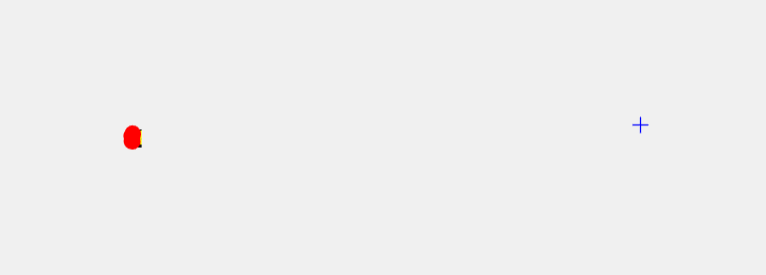
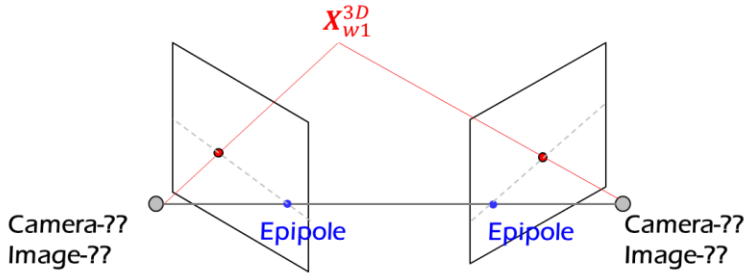


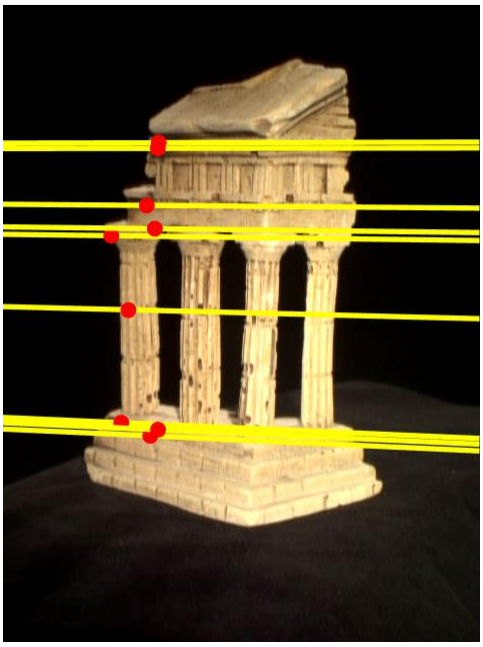
Image2:



So left camera is corresponding to image1, right camera is corresponding to image2.

- *Overlaying the epipolar lines:*

Epipolor lines in view-1:



Epipolor lines in view-2: