Assignment 3, Computer Vision FMA270

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1 Computer Exercise 1

The Fundamental matrix was calculated to:

$$F = \begin{bmatrix} 0 & 0 & 0.0058 \\ 0 & 0 & -0.0267 \\ -0.0072 & 0.0263 & 1 \end{bmatrix}$$

The histogram and the plot of the epipolar lines can be seen in figures 1 and 2, respectively.

2 Computer Exercise 2

The camera matrices are as follows:

$$P_1 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

$$P_2 = \begin{bmatrix} -0.0001 & 0.0005 & 0.0180 & -0.9790 \\ 0.0006 & -0.0023 & -0.0862 & -0.2040 \\ 0 & 0 & -0.0025 & 0 \end{bmatrix}$$

Find in figure 3 a plot of the image, with image points and projected points.

Disclaimer: This solution is clearly not adequate. The projected points in orange are obviously not where they ought to be. I have given this exercise tremendous time and effort but cannot seem to solve it. Thus I have to hand in an unfinished solution.

3 Computer Exercise 3

The Essential matrix is:

$$E = \begin{bmatrix} 8.9 & -1005.8 & 377.1 \\ 1252.5 & 78.4 & -2448.2 \\ -472.8 & 2550.2 & 1 \end{bmatrix}$$

Figures 4 and 5 depict the histogram and epipolar lines, respectively.

Disclaimer: Again, this solution is not adequate. I truly cannot understand what I have done wrong, however.

4 Computer Exercise 4

Figures 6 through 9 show 3D points, images, image points and projection points for all configurations of P2.

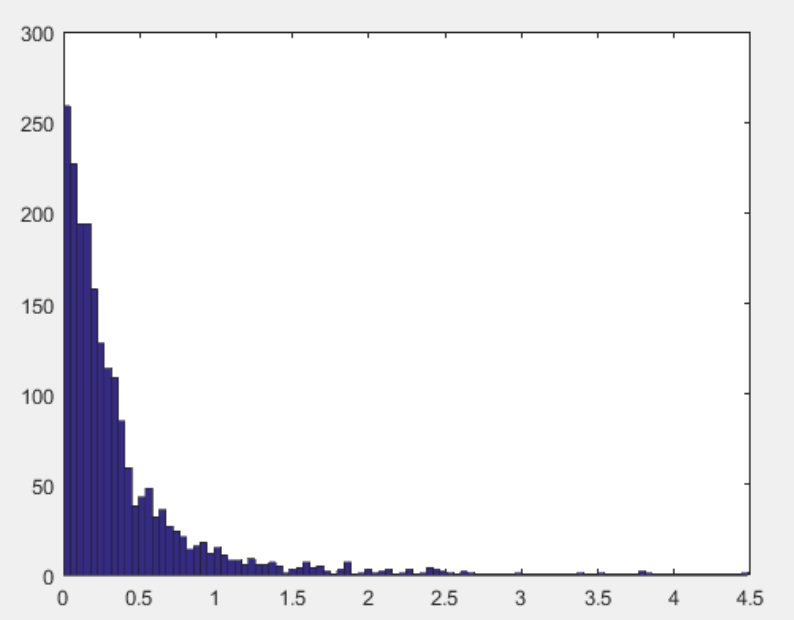

Figure 1: Histogram of distance between points and corresponding epipolar lines

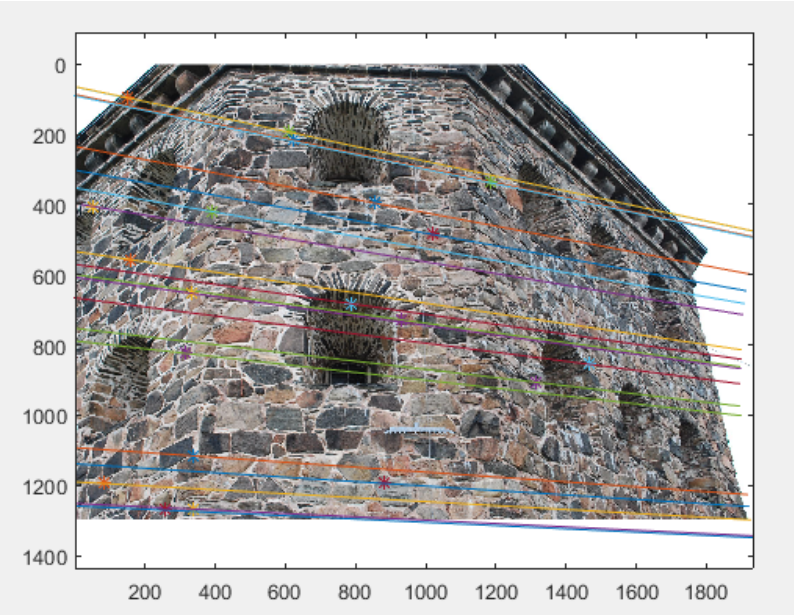

Figure 2: The second image with 20 random image points, as well as their corresponding epipolar lines

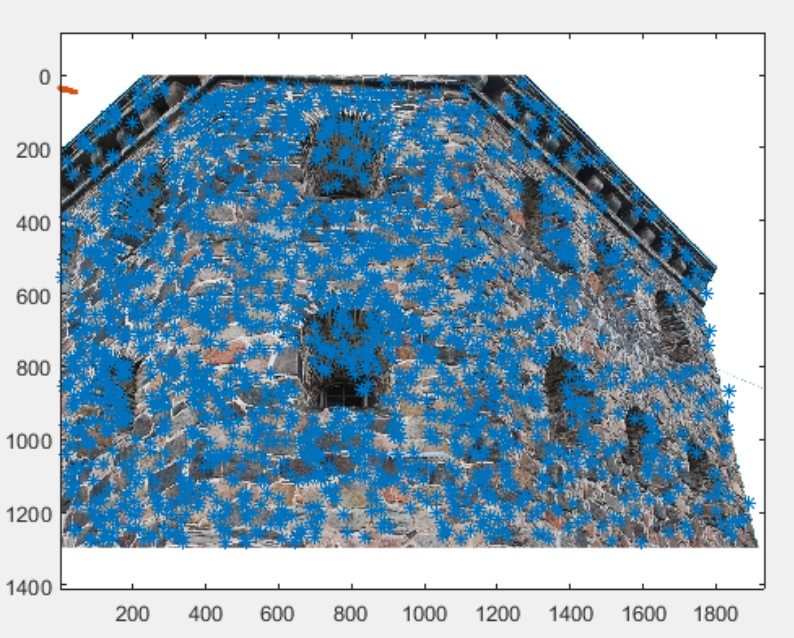

Figure 3: 2D plot of image 2, image points and projected points

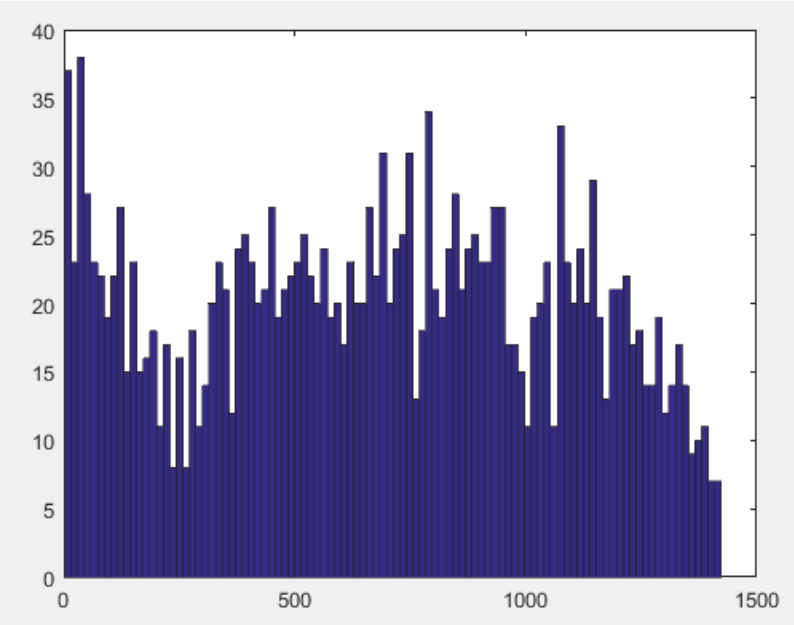

Figure 4: Histogram of distance between points and corresponding epipolar lines

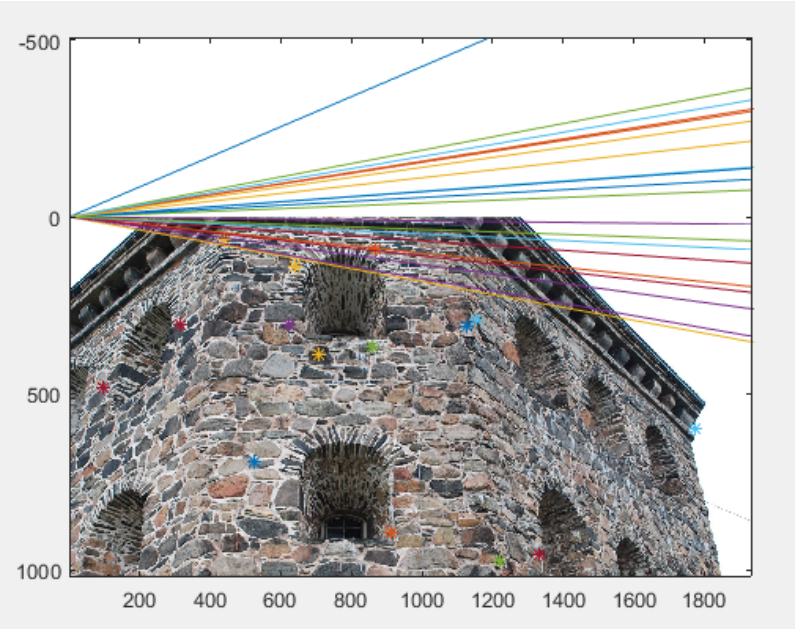

Figure 5: The second image with 20 random image points, as well as their corresponding epipolar lines

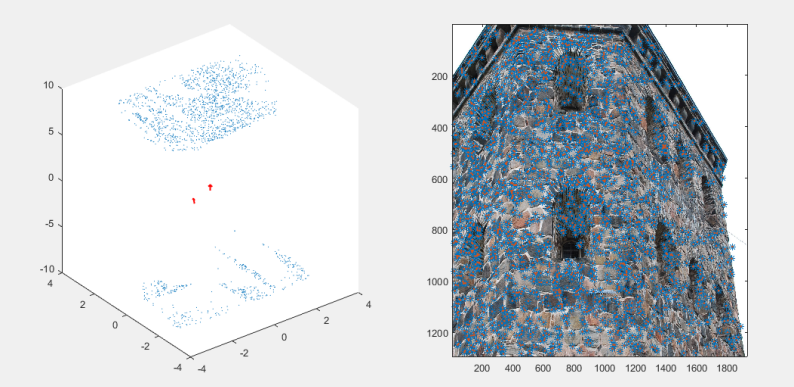

Figure 6: 3D points, cameras and projections for the first configuration of P2

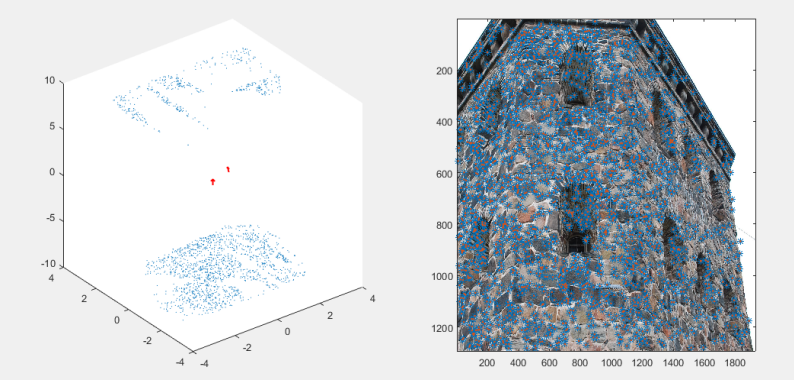

Figure 7: 3D points, cameras and projections for the second configuration of P2

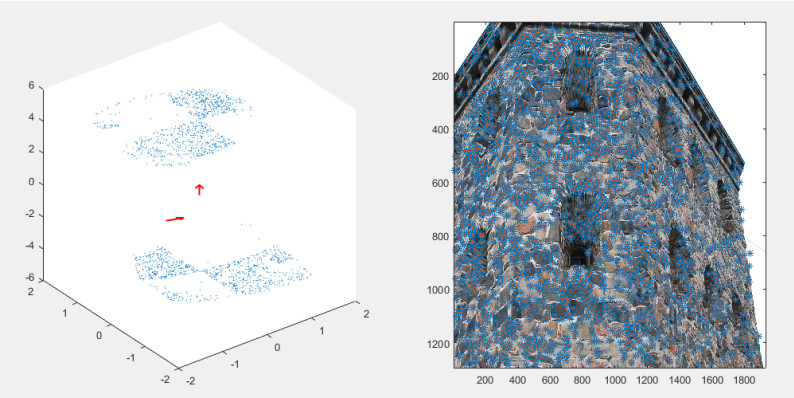

Figure 8: 3D points, cameras and projections for the third configuration of P2

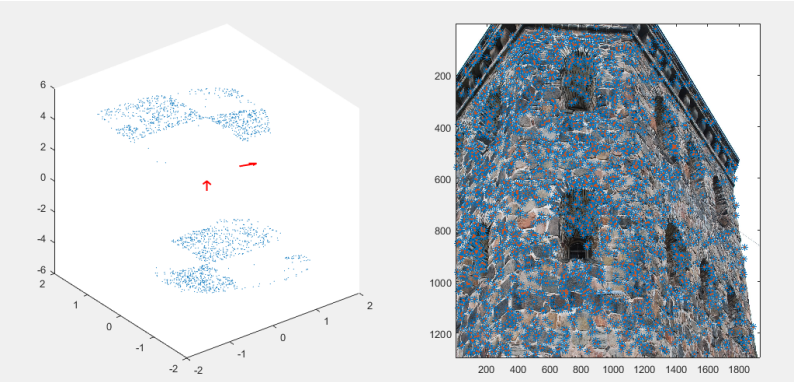

Figure 9: 3D points, cameras and projections for the fourth configuration of P2