Exercise for MA-INF 2201 Computer vision WS18/19
14.01.2019
Submission by 20.01.2019

1. **Epipolar Geometry:** Using the image pair *apt1.jpg* and *apt2.jpg* and the corresponding points listed in *apt_corresp.txt*, compute and print the Fundamental Matrix using the normalized corresponding points method. *(5 Points)*

2. Visualize the corresponding points and the resulting epipolar lines. *(3 Points)*

3. **Disparity Map:** Given the image pair *aloeX.jpg*, implement an efficient custom function to compute and display the disparity map. You may use the matchTemplate() of OpenCV. **Hint:** The given image pair is rectified. *(6 Points)*

4. **Image Rectification:** Perform image rectification on the image pair from *apt* series and show the result. If needed, you may use the fundamental matrix:

$$F = \begin{bmatrix} -1.78999 \times 10^{-7} & 5.70878 \times 10^{-6} & -0.00260653 \\ -5.71422 \times 10^{-6} & 1.63569 \times 10^{-7} & -0.0068799 \\ 0.00253316 & 0.00674493 & 0.191989 \end{bmatrix} \quad (1)$$

which satisfies

$$x_r F x_l = 0 \quad (2)$$

where x_l and x_r are the corresponding points from left and right images respectively. It is sufficient to compute result using the projective and similarity transforms as described in **C. Loop, Z. Zhang, Computing rectifying homographies for stereo vision**, Technical Report MSR-TR-99-21, MSR Redmond.
(6 Points)