Universität Stuttgart

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Computer Vision Exercise 2

Spatial Intersection and Resection

For an exemplary UAV image block the parameters of interior and exterior orientation as well as coordinates of signalized points are available.

1. Use parameters given in file R0020851.ori to compute the corresponding projection matrix P. Use this matrix to transform object point coordinates from file Signalized_Points.txt to pixel coordinates and plot the respective pixel coordinates to the corresponding image R0020851.jpg
2. Use the MATLAB-Progam imtool to measure the pixel coordinates of an object point in all available images
3. Compute the corresponding object coordinates from spatial intersection using the linear system derived from camera projection matrix P and homogenous coordinates.
4. Apply a back transformation of the determined object point into pixel coordinates to estimate the respective errors.
5. Use corresponding object- and pixel coordinates to alternatively compute the camera projection matrix P_{DLT} by Direct Linear Transformation.
6. Re-compute mapping and compute the difference
7. Reconstruct the camera parameters from P_{DLT} and compare them to the given parameters

To be delivered is MATLAB-code as well as documentation of the different processing steps including formulas as pdf-Document.

Assignement to be delivered till 14.01.2020

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