User guide of Dark sectioning

Ruijie Cao, Peng Xi

1. System requirements

Our software is developed on Windows 10 / Windows 11 with MATLAB (Mathworks^R). MATLAB of R2018a or a later version is preferred.

2. Installation guide

The installation of Dark sectioning (MATLAB) follows the next steps:

A. Open the source file "Dark sectioning_MATLAB_v1.0" (which can be downloaded from the release (tags) in Github: https://github.com/Cao-ruijie/Dark-sectioning).

B. Put the test data (in "test_data.rar" file) under the "input" directory.

C. Run "Dark.m" for the demo.

3. Instruction

The following steps should be performed for Dark sectioning:

A. Put the raw images in the "input" folder. The name should follow the format as: *.tif.

B. Open "Dark.m" in the MATLAB Editor Panel and change the file name and the required parameters.

C. Change the parameters according to the system and requirements.

D. Run "Dark.m".

E. The image processed by Dark sectioning (Dark.tif) will be automatically saved under the "output" folder.

4. Parameters instruction

Input: the input image

PXsize: pixel size in the *xoy* plane

Factor: resolution scale factor

Emwave: emission wavelength

NA: numerical aperture of objective

Divide: boundary to divide high/low frequency part

EL1/2: boundary to divide extremely low frequency part in first/second iterative time

Dep1/2: Scale to quantify the background

HL1/2: Ratio of high/low frequency part

Threshold: threshold to divide information and background

Padsize: size of padding to do edge tapering

If severe: If to do the second iterative removal of background

If denoise: If to do the gaussian denoise

5. Copyright

Ruijie Cao and Prof. Peng Xi in Peking University finished this code. We claim an Apache license for Dark sectioning.

6. More data to test

More samples (raw data, parameters, and comparisons) can be downloaded from Figshare ().

References

A. Kai. He, Jian Sun, Xiaoou T, "Single image haze removal using dark channel prior," 2009 IEEE Conference on Computer Vision and Pattern Recognition, Miami, FL, 2009, pp. 1956-1963, https://doi.org/10.1109/CVPR.2009.5206515.

B. Lim. D, Chu. K, Mertz J. Wide-field fluorescence sectioning with hybrid speckle and uniform-illumination microscopy. Opt. Lett. 33, 1819–1821, https://doi.org/10.1364/ol.33.001819 (2008)

If you have any questions, please contact caoruijie@stu.pku.edu.cn or xipeng@pku.edu.cn for help.