

Installation and Test Procedure

1. Download BLS-GSM Image Denoising Toolbox (BLS-GSM_Denoising.zip, version 1.03) from <http://decsai.ugr.es/~javier/denoise/software/index.htm>
2. Unzip all files of , which creates a folder “denoise” with several subfolders
3. Download matlabPyrTools (matlabPyrTools.tar.gz) from <http://www.cns.nyu.edu/~eero/software.php>
4. Unzip all files of matlabPyrTools.tar.gz inside the denoise folder, which creates a subfolder “matlabPyrTools”.
5. In the subfolder “Added_PyrTools”, disable mirdwt.dll and mrdwt.dll by renaming into something else like mirdwt_bak.dll and mrdwt_bak.dll
6. In the subfolder “denoising_subprograms”, disable denoi_GLS_GSM.m by renaming into something else like denoi_GLS_GSM_bak.m
7. Unzip all files of BLS-GSMmod.zip into the same folder where BLS-GSM_Denoising.zip was unzipped in step 1, which should add the file denoise.m and several other files to the denoise folder. The location of file extraction is very important.
8. Add the following folders in the exact order to MABTAL path:
denoise\denoising_subprograms (at the top)
denoise\matlabPyrTools\MEX
denoise\matlabPyrTools
denoise\Simoncelli_PyrTools
denoise\Added_PyrTools
9. Set denoise as the current folder
10. Test denoise.m

Calculating Noise Parameters

1. Prepare a sample of faint uniform intensity, e.g. a thin layer of fluorescent dyes at a very low concentration.
2. Take a dark image—without illumination, at the same exposure time as what was used for the target image to be denoised.
3. Take a series of images with different intensities of illumination but the same exposure, covering the range of intensities as seen in the target image.
4. Measure the average intensity and the standard deviation of intensities of each image, enter into the spreadsheet noise.xls columns A and B. Values from the dark image should be entered in Row 2.
5. Fix the data range in cell B21 and B22.
6. Values in B21 (A), B23 (DV), B24 (B) should be entered into the denoise.m program lines 8-10. The name of the raw image is entered in line 13.

Please cite the following papers (attached)

1. Portilla, J., Strela, V., Wainwright, M.J. & Simoncelli, E.P. (2003) Image denoising using scale mixtures of Gaussians in the wavelet domain. *IEEE Trans. Image Process.* **12**, 1338–1351.
2. Wang, Y.-L. (2007) Noise-induced systematic errors in ratio imaging: serious artefacts and correction with multi-resolution denoising. *J. Microscopy* **228**, 123-131.