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Adaptive Image Denoising with Applications to MRI

In many regression problems discontinuities of the regression function play an important role. This is especially the case when analyzing data in form of two and three dimensional images. Such images arise in several fields, e. g. from satellite imaging, radar, x-rays, ultrasound or magnetic resonance imaging (MRI).

We propose a new iterative procedure for image denoising. The procedure is data adaptive, edge preserving and allows for a maximal smoothing in homogeneous regions.

We illustrate our algorithms using simulation results and examples from MRI. We show how generalizations of this approach can be applied to signal detection in functional MRI and classification in dynamic MRI.