# Guided Wavelet Shrinkage for Edge-Aware Smoothing


## Abstract:

Edge-aware smoothing has been extensively studied due to its wide range of applications in computer vision and graphics. Most published works have been focused on formulating the smoothing problem in the spatial domain. In this paper, we propose a new edge-aware smoothing framework called guided wavelet shrinkage (GWS), which is formulated in the wavelet domain as a maximum a posterior estimation problem. We impose a number of desirable properties on the statistical models and the associated parameters in order to derive an effective and computationally efficient algorithm. We compare the proposed GWS with classical image denoising in the wavelet domain. We have also compared different wavelet representations and found that the double-density dual-tree wavelet transform is the best choice. We show that the GWS can be configured as either self-guidance or external guidance. It can also be configured to operate in an iterative or non-iterative way. Experimental results and comparison with many state-of-the-algorithms demonstrate that the GWS-based algorithm can produce competitive results with O(N) computational complexity.