Abstract

Wavelet based image denoising is an important technique in the area of image noise reduction. In this paper, a new adaptive wavelet based image denoising algorithm in the presence of Gaussian noise is developed. In the existing wavelet thresholding methods, the final noise reduced image has limited improvement. It is due to keeping the approximate wavelet coefficients unchanged. Since noise affects both approximate as well as detail coefficients, the proposed technique incorporates methods to eliminate noise in both types of coefficients. The propose technique is applied in two phases. In the first phase, an adaptive data driven threshold for image denoising via wavelet soft-thresholding is applied on detail coefficients. In the second phase of the proposed algorithm, anisotropic diffusion is applied on approximate coefficients. In this context, a weighted diffusivity function is proposed which incorporates contextual discontinuities in the image. The diffusivity function derived is applied depending on local image features and hence improve the capability of feature preservation along with noise removal. The proposed technique was applied on standard noisy image and the results obtained show the superiority of the method over other wavelet based denoising techniques.


**Index Terms**

Computer Science  Image Processing

**Keywords**

Wavelet thresholding  BayesShrink  anisotropic diffusion  weighted diffusivity
function  denoising
wavelet coefficients.