Image Denoising based on MAP Estimation using Dual Tree Complex Wavelet Transform

Abstract

Wavelet shrinkage is a standard technique for image denoising. Using the good directionality and shift invariance properties of dual tree complex wavelet transform, a new algorithm for image denoising is proposed. In this algorithm, the decomposed coefficients combined with the bivariate shrinkage model for the estimation of coefficients in high frequency sub bands and Bayesian shrinkage method is applied in order to remove the noise in highest frequency sub-band coefficients. The experimental results are compared with the existing shrinkage methods Visu and Bayes shrinkage methods in terms of peak signal-to-noise ratio (PSNR) and structural similarity index (SSIM).

References

- Survey of Image Denoising Techniques by Mukesh C. Motwani, Mukesh C. Gadiya, Rakhi C. Motwani, Frederick C. Harris, Jr.
Image Denoising based on MAP Estimation using Dual Tree Complex Wavelet Transform

- Complex wavelet transforms and their applications, M. Phill thesis by Panchamkumar D Shukla.

Index Terms

Computer Science

Image Processing
Keywords

Dual Tree Complex wavelet transform (DTCWT)  Bivariate shrinkage  Bayes shrinkage  
Peak signal to noise ratio (PSNR)  
Structural similarity index (SSIM)