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Gradient domain image denoising

Xiaobo Zhang

Xianyang Normal University, China

Image denoising is one of the oldest topics in image processing and has been widely studied. The main aim of an image denoising algorithm is then to reduce the noise level, while preserving the image features (such as edges, textures, etc.). A good denoising algorithm should achieve high quality results with low computation load. Recently, image denoising methods based on gradient domain have shown superior performance in this respect. This presentation aims to establish a universal framework for image denoising algorithms from local scheme to nonlocal one by gradient domain. Firstly, the gradient domain local adaptive layered Wiener filter is presented by researching the statistical property of gradient coefficients. Secondly, the multi-direction gradient domain scheme is proposed by researching the classical nonlocal means method. Finally, the multi-direction gradient domain scheme is extended to wavelet domain because of the statistical characteristic of wavelet coefficients. At this time, the multiple-step local Wiener filter method in the wavelet domain is produced. Experimental results and comparisons with the related state-of-the-art methods show that the proposed techniques achieve the good performance with high efficiency.

Biography

Xiaobo Zhang received his PhD degree in Department of Mathematics from XiDian University, Xi'an, China, in March 2014. He is currently an Associate Professor with Xianyang Normal University, Xianyang, China. His research interests include Wavelet, Partial Differential Equation and Statistical Theory for Image Processing. He has published more than 14 papers in reputed journals and conferences as first author and corresponding author. He is the reviewer of *Computers and Electrical Engineering*.

zhangxiaobo9876@163.com

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