CT Medical Images Denoising Based on New Wavelet Thresholding Compared with Curvelet and Contourlet

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Abstract : One of the most important challenging factors in medical images is nominated as noise.Image denoising refers to the improvement of a digital medical image that has been infected by Additive White Gaussian Noise (AWGN). The digital medical image or video can be affected by different types of noises. They are impulse noise, Poisson noise and AWGN. Computed tomography (CT) images are subjected to low quality due to the noise. The quality of CT images is dependent on the absorbed dose to patients directly in such a way that increase in absorbed radiation, consequently absorbed dose to patients (ADP), enhances the CT images quality. In this manner, noise reduction techniques on the purpose of images quality enhancement exposing no excess radiation to patients is one the challenging problems for CT images processing. In this work, noise reduction in CT images was performed using two different directional 2 dimensional (2D) transformations; i.e., Curvelet and Contourlet and Discrete wavelet transform(DWT) thresholding methods of BayesShrink and AdaptShrink, compared to each other and we proposed a new threshold in wavelet domain for not only noise reduction but also edge retaining, consequently the proposed method retains the modified coefficients significantly that result in good visual quality. Data evaluations were accomplished by using two criterions; namely, peak signal to noise ratio (PSNR) and Structure similarity (Ssim).