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An effective image-denoising method with the integration of thresholding and optimized bilateral filtering

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Abstract
In medical image processing, noise reduction is a particularly difficult problem to solve. Denoising can aid doctors in making a diagnosis of sickness. Due to statistical uncertainty in all physical measurements used in computed tomography, noise is unavoidably injected into CT images. To improve the quality of CT images, edge-preserving denoising methods and noise reduction techniques are needed. If the noise in low-draught CT pictures can be reduced or eliminated, then it should be able to boost its effectiveness without raising the draught. As a result, the extraction method used in this research is known as the optimized bilateral filter, and wavelet-based packet thresholding. Levy based rat prey catching optimization (LRPSO) is proposed to optimize the weight function of bilateral filtering. The denoising technique is employed to safeguard the edges and get rid of the noise. The proposed methodology's results are analyzed and contrasted using certain established methods. According to the differentiated outcome analysis, the Proposed Methodology's execution is finer and more acceptable to the existing procedures in terms of optical standard PSNR, SSIM, and Entropy Difference (ED). The PSNR of the projected model for 25 images, under CT1, CT2, CT3 and CT4 database is 27.92, 26.02, 26.46 and 26.78, respectively.

Keywords Computer tomography · Entropy difference · Thresholding · Denoising · Generative adversarial network

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