عنوان مقاله:

Speckle Noise Reduction for the Enhancement of Retinal Layers in Optical Coherence Tomography Images

محل انتشار:

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خلاصه مقاله:

Introduction One of the most important pre-processing steps in optical coherence tomography (OCT) is reducing speckle noise, resulting from multiple scattering of tissues, which degrades the quality of OCT images. Materials and Methods The present study focused on speckle noise reduction and edge detection techniques. Statistical filters with different masks and noise variances were applied on OCT and test images. Objective evaluation of both types of images was performed, using various image metrics such as peak signal-to-noise ratio (PSNR), root mean square error, correlation coefficient and elapsed time. For the purpose of recovery, Kuan filter was used as an input for edge enhancement. Also, a spatial filter was applied to improve image quality. Results The obtained results were presented as statistical tables and images. Based on statistical measures and visual quality of OCT images, Enhanced Lee filter (3×3) with a PSNR value of 43.6735 in low noise variance and Kuan filter (3×3) with a PSNR value of 37.2850 in high noise variance showed superior performance over other filters. Conclusion Based on the obtained results, by using speckle reduction filters such as Enhanced Lee and Kuan filters on OCT images, the number of compounded images, required to achieve a given image quality, could be reduced. Moreover, use of Kuan filters for promoting the edges allowed smoothing of speckle regions, while preserving image tissue texture.

کلمات کلیدی:

Pre-Processing, Speckle, Recovery, Enhancement, Evaluation