

Multi-Scaled Non-Local Means Filter for Medical Images Denoising: Empirical Mode Decomposition vs. Wavelet Transform

Authors : Hana Rabbouch

Abstract : In recent years, there has been considerable growth of denoising techniques mainly devoted to medical imaging. This important evolution is not only due to the progress of computing techniques, but also to the emergence of multi-resolution analysis (MRA) on both mathematical and algorithmic bases. In this paper, a comparative study is conducted between the two best-known MRA-based decomposition techniques: the Empirical Mode Decomposition (EMD) and the Discrete Wavelet Transform (DWT). The comparison is carried out in a framework of multi-scale denoising, where a Non-Local Means (NLM) filter is performed scale-by-scale to a sample of benchmark medical images. The results prove the effectiveness of the multiscaled denoising, especially when the NLM filtering is coupled with the EMD.

Keywords : medical imaging, non local means, denoising, multiscaled analysis, empirical mode decomposition, wavelets

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