

博士论坛

基于数据融合及小波变换的医学超声图像去噪方法

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摘要 医学超声图像固有的斑纹噪声, 极大地降低了超声图像的质量, 严重影响了对病灶的识别。经典的去噪方法在抑制斑纹噪声时丢失了图像中大量的细节和微弱的边缘信息。本文提出一种基于数据融合的小波变换去噪算法, 首先对医学超声图像进行对数变换, 将乘性噪声变成加性噪声, 然后对同一原始信号含噪声的两幅同源图像分别进行小波分解, 对两幅图像中小波系数的低频分量作加权融合; 对水平、垂直与对角方向高频分量取两幅图像中各尺度下对应小波系数绝对值较大者各自分别融合, 使高频分量中信号得以最大限度地保留, 最后, 经小波逆变换和指数变换得到去噪后图像。该方法在去除噪声同时能够有效保持边缘信息, 较好地改善去噪后图像的视觉效果, 取得了良好的效果。

关键词 [医学超声图像去噪](#), [小波变换](#), [数据融合](#)

分类号

A Method of Medical Ultrasound Image Denoising Based on Data Fusion and Wavelet Transform

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Abstract

There are inherent speckle noises in the medical ultrasound image. They degradation image quality and affect doctor's diagnosis. Classical speckle suppression method can restrain them with the loss of many image edge details. In this paper, a speckle suppression method for medical ultrasound image based on data fusion and wavelet transform was presented. Firstly, logarithmic transform was carried out to the medical ultrasound image. Multiplicative noises were transformed into additive ones. Secondly, two original images from the same source with different noises were decomposed each by wavelet transform. For low frequency image, the new approximation coefficients were obtained by the weighted mean value of the approximation coefficients in two original images. For high frequency sub-band images, the new coefficients were selected by those coefficients with bigger absolute values in two original images. The details in high frequency image were reserved furthest. Finally, the denoised image was reconstructed by the inverse wavelet transform using the new wavelet coefficients and the exponential transform was processed. The results show speckle noises in the original images are removed efficiently and the image edge details are reserved.

Key words [medical ultrasound image denoising](#) [wavelet transform](#) [data fusion](#)

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