

论文与报告

## 基于反对称双正交小波重构的图像增强方法

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摘要

详细给出了基于反对称双正交小波重构的多尺度边缘检测方法的相关理论基础, 即推导了反对称双正交小波变换所具有的卷积运算性质; 分析了反对称双正交小波变换的微分算子功能; 提出了一种针对图像多尺度边缘提取的小波重构算法. 在此基础上, 提出了基于反对称双正交小波重构的图像锐化增强方法. 首先对图像进行多尺度小波分解; 然后在小波重构中, 计算模值图和相角图, 提取各尺度边缘图像, 并根据边缘图像, 增强半重构图像的对应边缘点; 最后继续逐级重构, 实现图像增强. 该方法在小波塔式分解数据的重构过程中有针对性地实现对图像边缘的锐化增强, 对图像增强和图像滤噪增强提供了一种新的解决问题的思路. 实验结果验证了该方法的有效性.

关键词 [图像增强](#) [双正交小波](#) [多尺度分解](#) [小波重构](#) [边缘检测](#) [滤噪](#)

分类号

## Image Enhancement Based on Anti-symmetrical Biorthogonal Wavelet Reconstruction

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Abstract

In this paper, image multi-scale edge detection based on anti-symmetrical biorthogonal wavelet reconstruction is given detailedly in theory, namely convolution operation property of the anti-symmetrical biorthogonal wavelet transform, is deduced and its differential operator function is analyzed. Then, an algorithm of wavelet decomposition in which multi-scale edge can be detected is put forward. Based on the above, a novel approach of image enhancement based on anti-symmetrical biorthogonal wavelet reconstruction is presented. Firstly, multi-scale decomposition of wavelet of image is done. Then, module value and phasic angle image are achieved through half-reconstruction, by which edge images of different scales are extracted. And pixels of half-reconstruction image corresponding to edge image are enhanced. Finally, reconstruction is done and image is enhanced. In the approach presented, image edges are enhanced in the process of reconstruction of wavelet tower data. This method gives a new idea for image denoising and enhancement. Experimental results show the validity of the approach.

Key words [Image enhancement](#) [biorthogonal wavelet](#) [multi-scale decomposition](#) [wavelet reconstruction](#) [edge detection](#) [noise removing](#)

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