

论文

一种小波系数模型在图像噪声参数估计中的应用

谢志成,张大力,徐文立

清华大学自动化系,北京,100084

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摘要

在小波图像处理中,通常利用HH子带来估计高斯白噪声方差,目前流行的估计方法是由Donoho和Johnstone提出的(简称DJ法),但是该方法给出的估计值通常都偏大。针对这一点,该文将他们的方法结合双随机小波系数模型,提出了一种新的、递归的方差估计方法。在已由Donoho的方法获得噪声方差估计的粗略估计的情况下,新方法利用统计学理论将HH子带中的信号滤除从而得到更接近于纯噪声的HH子带,然后利用这一新的HH子带来估计噪声的方差。结合EM参数估计方法,该方法还可以实现非高斯噪声参数的估计,实验表明新方法同Donoho法相比有很大的改善。

关键词 [系数模型](#) [EM算法](#) [小波变换](#)

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On the Usage of a Wavelet Coefficient Model in Noise Variance Estimation of Image

Xie Jie-cheng, Zhang Da-li, Xu Wen-li

Department of Automation Tsinghua University Beijing 100084 China

Abstract

During wavelet image processing, the variance of Gaussian white noise is usually estimated in the finest HH subband. A popular method, proposed by Donoho and Johnstone, is often found to provide too large an estimate. To tackle this problem, this paper presents a new method. The new method takes the rude estimate from Donoho's method as the starting point, and then a subband more dominated by noise is produced with the signal filtered out by a filter derived from statistics theory and a newly-proposed coefficient model, the doubly stochastic process. Thus a finer estimate is possible by using Donoho's method on the filtered HH subband. Through employing EM algorithm, the new method can be straightly extended to the case of non-Gaussian noise. Experimental results show that the new method can improve the estimate quite much when compared to Donoho's method.

Key words [Coefficient model](#) [EM algorithm](#) [Wavelet transformation](#)

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通讯作者

作者个人主页

谢志成;张大力;徐文立

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