一种结合稀疏表示和投影正则化的图像分解方法

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摘要

结合稀疏表示和投影正则化方法，提出了一种将图像分解为纹理和结构部分的新方法．该方法的基本思想是用两个适当的字典：一个用来描述纹理部分——对偶树复小波变换，另一个用来描述结构部分——基于投影正则化方法的二代曲线波变换，其中投影正则化方法可以很好地指引分解过程，减少伪吉布斯现象．这两个字典本身是互不相关的，只对它们所描述的部分得到稀疏表示，对另外一部分得不到稀疏表示．实验结果表明，该算法即节省了运算时间，又很好地将图像的纹理和结构分开，特别是当图像含有噪声时，它可以很好地将纹理和噪声分开．

关键词　曲线波　对偶树复小波变换　全变分　纹理　基跟踪
分类号　TN911

Image decomposition based on sparse representations and a projected regularization method

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Abstract

A novel method is presented for separating images into texture and cartoon parts based on sparse representations and a projected regularization scheme. The basic idea presented in this paper is the use of two appropriate dictionaries, one for the representation of texture parts-the dual tree complex wavelet transform and the other for the cartoon parts-the second generation of curvelet transform followed by a projected regularization method which is employed to better direct the separation process and reduce the pseudo-Gibbs oscillations. Both dictionaries are chosen such that they lead to sparse representations over one type of image-content and several experimental results show that the algorithm's performance is validated.

Key words　curvelet　dual tree complex wavelet transform　total variation　texture　basis pursuit

通讯作者