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基于局部方差和互信息的融合图像质量评价

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Fusion image assessment based on local variance and singular value decomposition

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摘要　　　　　图/表　　　　参考文献(0)　　相关文章 (15)

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摘要

图像融合不仅涉及信息的量化传递, 还要考虑传递信息的类型是否符合人眼视觉特性。为了能够正确评价融合图像中人眼敏感信息的增量, 本文设计了一种基于局部方差和奇异值分解的融合图像客观评价方法。将局部方差用于表示图像的结构信息; 考虑到局部方差对于图像的细节信息过于敏感, 用奇异值分解的方法来得到能够表示局部方差分布的能量矩阵; 用互信息的方法度量源图像与融合图像能量矩阵的结构差异。最后, 将比较结果作为融合图像算法的质量评价结果。实验结果表明, 该方法对融合图像的质量评价结果与人眼视觉特性的一致程度以及算法的稳定性都要高于传统方法, 两组典型实验中对于小波和金字塔等性能较优的融合方法的评价结果为2.8790和1.9225以及2.6298和1.9103, 均优于传统融合评价算法。

关键词 ： 图像融合, 质量评价, 局部方差, 奇异值分解

Abstract :

Image fusion is not only relative to the transfer of quantized information, but also should take if the information transfer can be accepted by human vision into account. Therefore, this paper designs a fusion image objective assessment method based on local variance and singular value decomposition to combine various human visual system sensitive information into an image. In order to assess the improvement of information, the local variance was used to describe the structure information of the image. As the local variance was sensitive to image details greatly, the singular value decomposition was used to obtain a energy matrix to display the local variance distribution. Then the mutual information was taken to measure the structure difference of source image and fusion image. Finally, the comparison above mentioned was taken as the assessment results. Experiment results show that the proposed method gives the best performance for the wavelet and pyramid methods, and the assessment results are 2.8790,1.9225 and 2.6298,1.9103,respectively, which has better consistency as compared with those of traditional human visual systems.

Key words : image fusion　　quality assessment　　local variance　　singular value decomposition

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