

联合4方向特征的全局优化图像补全

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Image completion with global optimization based on four-direction features

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摘要 图/表 参考文献 相关文章 (2)

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摘要 为更好地保持修复后图像的结构连贯性及与邻域信息的连续一致性, 提出了联合4方向特征的全局优化图像补全算法。该方法利用Curvelet变换提取图像的水平, 垂直, 正对角及反对角4个方向的特征。在构造数据项和平滑项能量时, 利用4方向特征与颜色信息共同衡量样本块间的相似性, 以此构造符合人眼视觉要求的全局能量约束方程; 同时自适应确定计算数据项和平滑项能量的样本块尺寸。最后利用图割算法求取全局能量的极小值, 获得修复图像。实验显示: 与现有算法相比, 提出算法可以获得更优的修复结果, 其峰值信噪比(PSNR)平均值比现有算法至少高出2 dB, 验证了提出算法的有效性; 结果也表明: 提出的算法可以更好地保持图像结构的连贯性及修复区域内的连续一致性, 能满足人眼视觉需求。

关键词 : 图像补全, 目标移除, 全局优化, 4方向特征

Abstract : To better maintain the structure coherence and neighborhood consistence of inpainted images, this paper proposes an image completion algorithm by using global optimization based on four-direction features. In the algorithm, the Curvelet transform was adopted to extract the features in horizontal, vertical, positive diagonal and antidiagonal directions. When the data term and smooth term energy were constructed, the four-direction features were combined with color information to measure the similarity between patches and to construct a global energy constraint equation to satisfy human eye visual requirement. Meanwhile, the sizes of patches used to compute data term and smooth term energy were adaptively determined. Finally, the graph cut algorithm was applied to calculation of the minimum value of global energy to obtain the inpainted image. The experimental results show that the proposed algorithm achieves better inpainted results. Moreover, the Peak Signal to Noise Ratio(PSNR) values of the proposed method are much larger than that of the existing methods, and the PSNR on average is higher 2 dB than that of the existing methods. The objective and subjective evaluations both show the validity of the proposed method. It concludes that the proposed algorithm has better maintained the structure coherence and neighborhood consistence, which makes the repaired images meet the human eye visual requirements.

Key words : image completion object removal global optimization four-direction feature

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