

基于改进的引导滤波算法的多曝光图像融合

郭剑桥¹, 白雪飞¹, 杨灿美²

(1 中国科学技术大学 信息科学技术学院, 安徽 合肥 230027;

2 中国科学技术大学 先进技术研究院, 安徽 合肥 230027)

摘要: 在原有引导滤波的基础上, 提出了一种边缘特性得到改善的多曝光图像融合算法。该方法首先根据图像的对比度、饱和度信息获取初步融合权重, 再在引导滤波算法中引入内容感知因子, 对原融合权重进行修正, 得到最后的融合权重。实验结果表明, 该方法得到的融合图像边缘保持效果较好, 图像清晰度得到显著提高, 尤其在融合过渡区域表现了更多的细节信息。与其他算法相比, 有更优的主观视觉融合效果和客观性能指标。

关键词: 多曝光图像融合; 内容感知因子; 边缘保持; 引导滤波

Multi-exposure Image Fusion Based on Improved

Guided Filter Algorithm

GUO Jian-qiao¹, BAI Xue-fei¹, YANG Can-mei²

(1 School of Information Science and Technology, University of Science and Technology of China, Hefei 230027, China; 2 Institute of Advanced Technology, University of Science and Technology

of China, Hefei 230027, China)

Abstract: Based on guided filter, a new multi-exposure image fusion algorithm which can improve edge characteristics is proposed. Firstly, preliminary fusion weights are obtained according to the contrast and saturation of the images; secondly, the content-aware factor is introduced to the guided filter algorithm; and lastly, the original fusion weights are modified in order to get the final fusion weights. Experimental results show that fusion images using this method can preserve edge sharpness better, increase resolution of the images extraordinarily and have more details especially in the transition regions. Compared with other algorithms, this method has better subjective visual fusion effects and objective performance indicators.

Key words: multi-exposure image fusion; content-aware factor; edge preservation; guided filter
作者简介:

郭剑桥 男, (1994-), 硕士研究生. 研究方向为多曝光图像融合算法、硬件实现.

白雪飞 (通信作者) 男, (1977-), 博士, 讲师. 研究方向为集成电路设计. E-mail: cbguo@mail.ustc.edu.cn.

杨灿美 男, (1965-), 博士, 研究员. 研究方向为信号处理、低功耗与高密度 SoC 架构与设计.