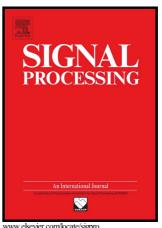
Author's Accepted Manuscript

A Fusion-based Enhancing Method for Weakly Illuminated Images

Xueyang Fu, Delu Zeng, Yue Huang, Yinghao Liao, Xinghao Ding, John Paisley



www.elsevier.com/locate/sigpro

PII: S0165-1684(16)30094-9

DOI: http://dx.doi.org/10.1016/j.sigpro.2016.05.031

SIGPRO6154 Reference:

To appear in: Signal Processing

Received date: 1 September 2015 Revised date: 22 December 2015 Accepted date: 30 May 2016

Cite this article as: Xueyang Fu, Delu Zeng, Yue Huang, Yinghao Liao, Xinghac Ding and John Paisley, A Fusion-based Enhancing Method for Weakly Images, Signal Illuminated **Processing** http://dx.doi.org/10.1016/j.sigpro.2016.05.031

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

ACCEPTED MANUSCRIPT

A Fusion-based Enhancing Method for Weakly Illuminated Images

Xueyang Fu, Delu Zeng, Yue Huang, Yinghao Liao, Xinghao Ding* and John Paislev[†]

Fujian Key Laboratory of Sensing and Computing for Smart City, School of Information Science and Engineering, Xiamen University, Xiamen, Fujian, China.

[†]Department of Electrical Engineering, Columbia University, New York, NY, USA.

*Corresponding author: dxh@xmu.edu.cn

Abstract

We propose a straightforward and efficient fusion-based method for enhancing weakly illumination images that uses several mature image processing techniques. First, we employ an illumination estimating algorithm based on morphological closing to decompose an observed image into a reflectance image and an illumination image. We then derive two inputs that represent luminance-improved and contrast-enhanced versions of the first decomposed illumination using the sigmoid function and adaptive histogram equalization. Designing two weights based on these inputs, we produce an adjusted illumination by fusing the derived inputs with the corresponding weights in a multi-scale fashion. Through a proper weighting and fusion strategy, we blend the advantages of different techniques to produce the adjusted illumination. The final enhanced image is obtained by compensating the adjusted illumination back to the reflectance. Through this synthesis, the enhanced image represents a trade-off among detail enhancement, local contrast improvement and preserving the natural feel of the image. In the proposed fusion-based framework, images under different weak illumination conditions such as backlighting, non-uniform illumination and nighttime can be enhanced.

Keywords: image enhancement, multi-scale fusion, weakly illumination, weights, illumination adjustment.

Download English Version:

https://daneshyari.com/en/article/6958217

Download Persian Version:

https://daneshyari.com/article/6958217

<u>Daneshyari.com</u>