

Accepted Manuscript

Joint De-blurring and Nonuniformity Correction Method for Infrared Microscopy Imaging

Anselmo Jara, Sergio Torres, Guillermo Machuca, Wagner Ramírez, Pablo A. Gutiérrez, Laura A. Viafora, Sebastián E. Godoy, Esteban Vera

PII: S1350-4495(17)30625-4
DOI: <https://doi.org/10.1016/j.infrared.2018.03.011>
Reference: INFPHY 2514

To appear in: *Infrared Physics & Technology*

Received Date: 3 October 2017

Accepted Date: 17 March 2018

Please cite this article as: A. Jara, S. Torres, G. Machuca, W. Ramírez, P.A. Gutiérrez, L.A. Viafora, S.E. Godoy, E. Vera, Joint De-blurring and Nonuniformity Correction Method for Infrared Microscopy Imaging, *Infrared Physics & Technology* (2018), doi: <https://doi.org/10.1016/j.infrared.2018.03.011>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final 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.



Joint De-blurring and Nonuniformity Correction Method for Infrared Microscopy Imaging

Anselmo Jara^{a,*}, Sergio Torres^a, Guillermo Machuca^a, Wagner Ramírez^a,
Pablo A. Gutiérrez^a, Laura A. Viafora^a, Sebastián E. Godoy^a, Esteban Vera^b

^a*Departamento de Ingeniería Eléctrica Universidad de Concepción, Casilla 160-C,
Concepción, Chile.*

^b*Escuela de Ingeniería Eléctrica, Pontificia Universidad Católica de Valparaíso, Avenida
Brasil 2147, Valparaíso 23-62804, Chile.*

Abstract

In this work, we present a new technique to simultaneously reduce two major degradation artifacts found in mid-wavelength infrared microscopy imagery, namely the inherent focal-plane array nonuniformity noise and the scene defocus presented due to the point spread function of the infrared microscope. We correct both nuisances using a novel, recursive method that combines the constant range nonuniformity correction algorithm with a frame-by-frame deconvolution approach. The ability of the method to jointly compensate for both nonuniformity noise and blur is demonstrated using two different real mid-wavelength infrared microscopic video sequences, which were captured from two microscopic living organisms using a Janos-Sofradir mid-wavelength infrared microscopy setup. The performance of the proposed method is assessed on real and simulated infrared data by computing the root mean-square error and the roughness-laplacian pattern index, which was specifically developed for the present work.

Keywords: Infrared focal plane array, Image reconstruction-restoration, Nonuniformity correction, Deconvolution, Microscopy

*Corresponding author

Email address: `anselmo.jara@eyestron.cl` (Anselmo Jara)

Download English Version:

<https://daneshyari.com/en/article/8145863>

Download Persian Version:

<https://daneshyari.com/article/8145863>

[Daneshyari.com](https://daneshyari.com)