Multi-exposure and Multi-focus Image Fusion in Gradient Domain

Version 1.0

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Introduction

In this toolbox, an algorithm for the fusion of multi-exposure and multi-focus images has been implemented.This toolbox may be used for the fusion of both single channel (gray scale) images, as well as multi-channel (RGB) images, and can handle the fusion of an arbitrary number of images (at least two).

The fusion of the images is done in the gradient domain, and then the reconstruction of the fused image from the gradient domain is done using a wavelet based method proposed in [2].

The details regarding the algorithm are detailed in [1]. This file will be completed with the full reference and a link to the paper as soon as it gets accepted for publication.

List of functions and files

Demo.m	This file is a short demo meant to familiarize the user with the setup required in order to use the toolbox and its functionsto fusea set of images. Executing this code illustrates the fusion of a setof multi-exposure imagesincluded in Matlabnamed “office”.
GradientFusion.m	This is the main function file usedfor the fusion of the images. This function takes as input a stack of images and outputs the fused image.
getGradientH.m	This function is to compute the gradient of the input images.
getFusedGradients.m	This function is used to generate the one channel (luminance channel) fusion of the gradients of the input images
ReconstructGradient.m	This function reconstructs the image from the gradient domain, using a wavelet based technique coupled with Poisson solver at each resolution to remove artifacts. Detailed code with description of this reconstruction method is available at [3]
ChannelNorm.m	This function uses a non-linear transformation to normalizing a single channel image from its input range to a required range.

References

[1] S. Paul, I.S. Sevcenco, P. Agathoklis, "Multi-exposure and Multi-focus image fusion in gradient domain", submitted for publication

[2] I.S. Sevcenco, P.J. Hampton, P. Agathoklis, "A wavelet based method for image reconstruction from gradient data with applications", Multidimensional Systems and Signal Processing, November 2013

[3] Matlab File Exchange, Link: http://www.mathworks.com/matlabcentral/fileexchange/48066-wavelet-based-image-reconstruction-from-gradient-data