Accepted Manuscript

Visible and Infrared image fusion using DTCWT and adaptive combined clustered dictionary

N. Aishwarya, C. Bennila Thangammal

PII: S1350-4495(18)30136-1
DOI: https://doi.org/10.1016/j.infrared.2018.08.013
Reference: INFPHY 2666

To appear in: *Infrared Physics & Technology*

Received Date: 2 March 2018
Revised Date: 22 July 2018
Accepted Date: 12 August 2018

Please cite this article as: N. Aishwarya, C. Bennila Thangammal, Visible and Infrared image fusion using DTCWT and adaptive combined clustered dictionary, *Infrared Physics & Technology* (2018), doi: https://doi.org/10.1016/j.infrared.2018.08.013

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.

ACCEPTED MANUSCRIPT

Visible and Infrared image fusion using DTCWT and adaptive combined clustered dictionary

N. Aishwarya*, C. Bennila Thangammal
R. M. D Enginnering College, Anna University, Chennai, India.

Abstract

Getting the daylight information and the hidden target information in a single image is an active research topic in the domain of computer vision and image processing. In this paper, an image fusion technique, named as DTCWT-ACCD is proposed for the fusion of visible and infrared images. Firstly, an adaptive dictionary is constructed by combining several sub-dictionaries, learned from the clustered patches of source images. Then, the source images are decomposed by DTCWT to obtain the low frequency sub bands and high frequency sub bands. The low frequency sub bands are merged using a novel sparse based fusion rule while high frequency sub bands are combined using the maximum absolute value of coefficients with consistency verification (CV) check. Finally, the fused image is reconstructed by applying inverse DTCWT. The DTCWT-ACCD approach is experimentally tested with both subjective and objective evaluations to verify its competency. The results indicate that the DTCWT-ACCD approach is superior to conventional MST based methods and state-of-the-art sparse representation (SR) based methods.

Key words: Image Fusion; DTCWT; Dictionary learning; Sparse Representation.

1. Preliminaries

As a class of multi-sensor fusion technology, visible and infrared image fusion produces a rich and detailed scene representation in a single image by taking full advantage of their complementary [1]. For instance, the visible sensor reflects the abundant texture details and the background information of the scene with high spatial resolution. On the contrary, infrared sensor detects the contours of abstruse targets under low illumination. Hence, fusion of visible and infrared images plays a vital role in object tracking [2], target identification [3] and regional change detection [4].

In recent years, researchers put forward a lot of fusion algorithms which are broadly classified into spatial domain and transform domain. Spatial domain fusion methods directly work on pixels, blocks or regions of source images to generate a fused image. Though these methods are simple and effective, they tend to lose some spatial details leading to undesirable effects in the resultant image. Transform domain fusion methods (TDF) use the transform coefficients as their main features to compose the fused image. Some of the TDF methods

Download English Version:

https://daneshyari.com/en/article/8145340

Download Persian Version:

https://daneshyari.com/article/8145340

Daneshyari.com