

Accepted Manuscript

Detecting image seam carving with low scaling ratio using multi-scale spatial and spectral entropies

Dengyong Zhang, Ting Yin, Gaobo Yang, Ming Xia, Leida Li, Xingming Sun

PII: S1047-3203(17)30151-7
DOI: <http://dx.doi.org/10.1016/j.jvcir.2017.07.006>
Reference: YJVC I 2037

To appear in: *J. Vis. Commun. Image R.*

Received Date: 28 November 2016
Accepted Date: 16 July 2017

Please cite this article as: D. Zhang, T. Yin, G. Yang, M. Xia, L. Li, X. Sun, Detecting image seam carving with low scaling ratio using multi-scale spatial and spectral entropies, *J. Vis. Commun. Image R.* (2017), doi: <http://dx.doi.org/10.1016/j.jvcir.2017.07.006>

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.



Detecting image seam carving with low scaling ratio using multi-scale spatial and spectral entropies

Dengyong Zhang^{a,b}, Ting Yin^a, Gaobo Yang^{a,*}, Ming Xia^a, Leida Li^c, Xingming Sun^d

^a*School of Information Science and Engineering, Hunan University, Changsha, 410082, China*

^b*School of Computer and Communication Engineering, Changsha University of Science and Technology, Changsha, 410114, China*

^c*School of Information and Control Engineering, China University of Mining and Technology, Xuzhou, 221116, China*

^d*School of Computer and Software, Nanjing University of Information Science and Technology, Nanjing, 210044, China*

Abstract

Seam carving is the most popular content-aware image retargeting technique. However, it may also be used to correct poor photo composition in photography competition or to remove object from image for malicious purpose. A blind detection approach is presented for seam carved image with low scaling ratio (LSR). It exploits spatial and spectral entropies (SSE) on multi-scale images (candidate image and its down-sampled versions). We observe that when a few seams are deleted from an original image, its SSE distribution is greatly changed. Forty-two features are designed to unveil the statistical properties of SSE in terms of centralized tendency, dispersion tendency and distribution tendency. They are combined with the local binary pattern (LBP)-based energy features to form ninety-six features. Finally, support vector machine (SVM) is exploited as classifier to determine whether an image is original or suffered from seam carving. Experimental results show that the proposed approach achieves superior detection accuracy over the state-of-the-art works, especially for resized image by seam carving with LSRs. Moreover, it is robust against JPEG compression and seam insertion.

Keywords: image forensics, content-aware image retargeting, seam carving, low scaling ratios, spatial and frequency entropy, object removal

1. Introduction

With the popularity of powerful image editing tools, people without any knowledge about image processing can easily fake a photo in a visually plausible way. There is a growing number of tampered images flooding over televisions, magazines and Internet. This breaks our traditional concept of “seeing is believing” and brings serious crises to public confidence [1, 2]. Evaluating the authenticity of digital images has become a crucial issue in the community of image information security. In the past years, both active and passive methods have been developed for this purpose.

*Corresponding author. Tel:(86)0731-8882-3141; Fax:(86)0731-8882-1907
Email address: yanggaobo@hnu.edu.cn (Gaobo Yang)

Download English Version:

<https://daneshyari.com/en/article/4969294>

Download Persian Version:

<https://daneshyari.com/article/4969294>

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