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www.elsevier.com/locate/image

PII: S0923-5965(17)30074-7
DOI: http://dx.doi.org/10.1016/j.image.2017.04.008
Reference: IMAGE15215

To appear in: *Signal Processing : Image Communication*

Received date: 23 January 2017
Revised date: 18 April 2017
Accepted date: 19 April 2017

Cite this article as: Zhipeng Chen, Yao Zhao and Rongrong Ni, Detection o Operation Chain: JPEG-Resampling-JPEG, *Signal Processing : Imag Communication,* http://dx.doi.org/10.1016/j.image.2017.04.008

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Abstract

The goal of forensic investigators is to reveal the processing history of a digital image. Many forensic techniques are devoted to detecting the intrinsic traces left by image processing and tampering. However, existing forensic techniques are easily defeated in presence of pre- and post-processing. In real scenarios, images may be sequentially manipulated by a series of operations (the so called "operation chain"). This paper addresses the operation chain consisting of JPEG compression and resampling. The transformed block artifacts (TBAG) characterizing this operation chain are analysed at both the pixel and discrete cosine transforms (DCT) domain and are utilized to design the detection scheme. Both theoretical analysis and experimental results show the effectiveness of our proposed scheme on identifying the resampled JPEG images as well as the JPEG images undergone resampling and then JPEG recompression. Moreover, the proposed approach can be used to estimate the resampling factors for restoring the whole operation chain.

Keywords: `Digital forensics`, `operation chain detection`, `JPEG compression`, `resampling`

1. INTRODUCTION

With the wide spread of social networks and the rapid development of powerful image editing tools, users can easily access, manipulate and distribute digital images. Various aspects of our society, such as social activity, news media, law enforcement, and so forth, appreciate the convenience provided by digital techniques, but security problems connected to the use of digital images have become increasingly serious. Forged images may have an enormous impact on an individuals' public image, on the authenticity of news, even on the impartiality of justice. Digital image forensics is a valuable approach for

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