

ROTATION INVARIANT IMAGE COPY DETECTION USING DCT DOMAIN

LI LI¹, HEHUAN XU¹ AND CHIN-CHEN CHANG²

¹Institute of Computer Graphics and Image Processing
Hangzhou Dianzi University
2nd Ave., Xiasha Higher Education Zone, Hangzhou 310018, P. R. China
lili2008@hdu.edu.cn

²Department of Information Engineering and Computer Science
Feng Chia University
No. 100, Wenhwa Road, Seatwen, Taichung 40724, Taiwan
ccc@cs.ccu.edu.tw

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ABSTRACT. *Most of the existing image copy detection methods with better performance are robust for conventional image manipulations, however, sensitive to geometric distortions, such as rotation. Wu and Zou proposed image copy detection methods based on elliptical track division and circle division to conquer the problem, respectively. Nevertheless, their methods can only deal with rotations having central cropping, which are cropped to the original image size, but cannot handle common rotation. For the above problem, this paper utilizes image normalization technology and proposes an image copy detection method in the DCT domain with a common rotation tolerance. It uses the signs of the DCT coefficients of the significant region extracted from a normalized image as feature information, by computing and comparing correlation coefficients to decide whether or not an image is a copy. Experimental results show that the proposed method successfully solves the common rotation problem.*

Keywords: Copy detection, Discrete cosine transform, Image normalization, Rotation

1. Introduction. The widespread use of the computer and the development of the Internet have made it much easier to acquire, replicate, tamper with and illegally distribute digital resources. On the one hand, the online security is essential for providers to protect their resources [1-4]; on the other hand, the copyright protection of these resources must take more care. As one of the most commonly used digital media, digital images are often subject to various attacks and manipulations. Therefore, the copyright protection of digital media, especially digital images, has become a crucial issue.

Currently, image copy detection schemes can be classified into two categories: watermarking [5,6] and content-based copy detection [7].

Watermarking technology requires embedding a watermark into the original image before distribution, so that all copies of the marked images contain the watermark, which can be extracted when necessary to prove ownership. However, if these images fail to pre-embed the watermark for some reasons, the technology will be powerless.

Generally, an image contains enough unique information that can be used for detecting copies, especially illegally distributed copies [8]. With this concept, if the owner of an image suspects that his image is being illegally transmitted over the Internet, he can raise a query to the copy detection system and, by comparing the correlation coefficients, discover the copies. Compared with watermarking, content-based copy detection schemes