

## AN IMAGE WATERMARKING SCHEME WITH TAMPER DETECTION AND RECOVERY

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*ABSTRACT.* In the issues of image tamper detection and recovery, the feature information is embedded in the host image for recovery. When a host image is tampered, the feature information can then be used to restore the original image. However, it does not have the ability to verify the ownership of the copyright. In this article, therefore, an image watermarking scheme with tamper detection and recovery is proposed. The main goal is to detect and recover the tampered region accurately. In addition, the proposed method has robustness to resist the attacks of JPEG compression and cropping. This is a novel scheme because it has the capability of tamper detection and recovery, while having the main characteristics of robust watermarking. Experimental results demonstrate that our proposed technique is an effective and efficient method to verify the ownership and recover the tampered region.

**Keywords:** Tamper detection and recovery, Ownership, Image watermarking, JPEG compression

**1. Introduction.** With the fast development of Internet technologies, the information and digital age is coming. Copy and exchange of digital multimedia over the Internet have become quite convenient nowadays. There exist some hazards for delivering the digital media on a public network. That is, people can imperceptibly copy or tamper with the media using a lot of image processing tools and lead to large unauthorized distribution in digital form. In other words, we are not sure if the media we receive from the Internet is authentic. As a result, the prevailing usage of networks and the huge amount of multimedia data have incurred hot issues on copyright protection and authentication. The integrity and authenticity of digital media can be protected by using digital watermarking which is a technique to embed a digital signature into an image. A digital signature can be either perceptible or imperceptible. Perceptible watermark is usually an institution's logo or message which can be recognized together with a host image. Imperceptible watermark, however, is information hidden in an image. It could