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Halftone Image Watermarking based on Visual Cryptography

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Abstract

The advancement of digital image emphasizes the need for copyright protection. Digital watermarking is one of the most popular techniques and a very active research area for copyright protection of documents and media.

In this thesis, we propose a watermark technique for halftone image based on visual cryptography. The proposed method is simple and efficient.

The core idea of this thesis is to combine watermarking, halftoning and visual cryptography; we introduce error diffusion techniques for halftoning; three most known filters of error were used: Floyd and Steinberg, Jarvis and Judice and Ninke and Stucki methods to convert the gray level image into binary image.

The system security is guaranteed by using a visual cryptography approach to generate two random shares of a watermark; public watermark and secret watermark.

We propose two algorithms to embed the watermark: the first algorithm is to insert the public watermark into the host halftone image, while the owner holds the secret watermark. The second algorithm is to create a secret key (secret watermark) according to the host image. Without the secret watermark it is impossible to extract the watermark even if the embedding algorithm is published for the two algorithms; the first and second schemes are with the halftone image. In the first scheme, we utilize the

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concept of the visual cryptography to generate two shares; one public and another secret watermark before embedding the public watermark into the host halftone image. In the second scheme, the main idea is to create a secret key (secret watermark) to augment the security.

Various experiments are presented to demonstrate the capacity, imperceptibility and robustness measures of the proposed algorithms, such as JPEG compression, sharpening, blurring, cropping and addition noise.

Key words: Watermarking, Halftoning, Error diffusion, Visual Secret Sharing, network security

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