
Robust and Reversible Image Watermarking Scheme Using Combined DCT-DWT-SVD Transforms

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Abstract

We present a secure and robust image watermarking scheme that uses combined reversible DWT-DCT-SVD transformations to increase integrity, authentication, and confidentiality. The proposed scheme uses two different kinds of watermarking images: a reversible watermark, W_1 , which is used for verification (ensuring integrity and authentication aspects); and a second one, W_2 , which is defined by a logo image that provides confidentiality. Our proposed scheme is shown to be robust, while its performances are evaluated with respect to the peak signal-to-noise ratio (PSNR), signal-to-noise ratio (SNR), normalized cross-correlation (NCC), and running time. The robustness of the scheme is also evaluated against different attacks, including a compression attack and Salt & Pepper attack.

Keywords

Image Security, Image Watermarking, Reversible DWT-DCT-SVD Transform

1. Introduction

In current applications, network technologies have been highly improved so that users can gain easier access to remote facilities and send, receive, or share different types of digital data via the Internet. However, while the Internet is a useful public environment, it is not always secure for personal data transmission and exchange. Thus, important information must be manipulated to be concealed when provided via the Internet so that only the authorized receiver can get full access to it. For such reasons, several security methods have been developed in order to ensure several security aspects of digital data. These methods include encrypting, secretly sharing, and secretly hiding messages in data content to ensure several security properties, including authentication, confidentiality, and integrity.

Digital watermarking, which is the act of hiding a signal (watermark) into an image, is one of these proposed techniques that is used to protect the rights of owners. While the tremendous growth in computer networks, coupled with the exponential increase of computer performance, has facilitated the distribution of multimedia data such as images; publishers, artists, and photographers may be unwilling to distribute pictures over the Internet due to a lack of security since any images can be easily duplicated and distributed without the owner's consent. Digital watermarks have been proposed as a way to tackle this tough issue. The use of a digital signature could discourage copyright violations and may help

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