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Zero Watermarking and Data Authentication

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Abstract

Information Technology and Networked Multimedia are undergoing rapid development which requires the proliferation of digital media. This has increased the use of digital data and the need for protecting multimedia information from piracy. As a result, copyright holders need to safeguard their data against all forms of unauthorized use and access. Considering the problems of misuse of data and attacks, there is a need for efficient security mechanisms. The development of watermarking in digital images is one of the mechanisms to protect multimedia data. In this chapter, an effective approach to digital watermarking is proposed and analyzed. The suggested watermarking technique involves dividing the source image into segments, followed by applying discrete cosine transform to each of these segmented images. Then, discrete wavelet transform is applied to get different bands LL, LH, HH, and HL. Further decomposition is carried out on the low-frequency band. The processed image is analyzed with and without attacks for effectiveness. The proposed watermarking technique is subjected to various attacks such as Gaussian, salt and pepper, median filtering, and mean filtering, in order to assess its efficacy. Hamming distance, a metric measuring the dissimilarity between code words, is used for evaluation. The experimental results demonstrate the resilience of the proposed method, maintaining high image quality and robustness against diverse attacks and harnessing the power of wavelet analysis and XOR operations. The proposed approach offers a strong defense against unauthorized reproduction and content theft in the realm of digital multimedia.

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