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DCT-DOMAIN GLOBAL FEATURE AND DWT-DOMAIN LEAST-SQUARES LINE FITTING BASED LOCAL FEATURE FOR ROBUST IMAGE HASHING

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Abstract. *In this paper, we propose a novel robust image hashing scheme for image authentication based on the Discrete Cosine Transform (DCT) and least-squares line (LSL) fitting of Discrete Wavelet Transform (DWT) coefficients. Firstly, the global feature is extracted from the DC and first nine low-frequency coefficients in every 8×8-sized DCT block of the input image, obtaining the strong robustness to common acceptable manipulations. And then we extract the local feature by fitting DWT coefficients of the image based on the least-squares method (LSM). The proposed local feature can locate the maliciously modified positions. Lastly, the above two kinds of features are combined together to generate the final hash for image authentication. To enforce security, feature extraction is key-dependent in this paper. Experimental results show that the proposed algorithm can resist almost all content-preserving operations such as JPEG compression, filtering, adding noises, and contrast enhancement, while being high sensitive to content tampering.*

Keywords: Image authentication, Robust image hashing, Discrete cosine transform, Discrete wavelet transform, Least-squares line

1. **Introduction.** The rapid development of multimedia processing techniques, together with the rapid growth of digital network communications, has created a pressing demand for the techniques that can verify the authenticity and integrity of multimedia data. In the past, traditional cryptographic systems were used for copyright protection. But once the encrypted data are decrypted, it is difficult to assure the rightful ownership. In addition, cryptographic methods to authenticate multimedia data will result in an unacceptable system, because it is sensitive to a single bit change in the original data while multimedia authentication systems need to be mainly content sensitive. Over the last decade, digital watermarking and perceptual hashing have been presented to complement cryptographic