Abstract

This paper presents two fragile watermarking schemes for digital image authentication with tamper detection and localization. We combine a proposed chaos-based encryption algorithm with the two schemes in order to improve the security, tamper detection sensitivity and tamper localization accuracy of the two schemes. The first proposed fragile watermarking scheme can be classified as a block-based scheme that divides the cover image into non-overlapping 4x4 blocks. We generate an 8-bit authentication watermark for each cover image block based on the block contents and then we use the proposed chaos-based encryption algorithm to encrypt this watermark. These encrypted 8-bit watermark are then embedded into the least significant bits (LSBs) of the highest intensity eight pixels of the block. On the other hand, the second proposed watermarking scheme can be classified as a wavelet-based scheme which uses an external secret watermark. This watermark is encrypted using the proposed chaos-based encryption algorithm. We decompose the cover image using Discrete Wavelet Transform (DWT) and then we use the encrypted watermark to update the approximation coefficients (LL sub-band) of the
image. Various experimental tests are carried out to evaluate the performance of the two schemes. Experimental results demonstrate that the two proposed schemes can detect and localize tampering attacks accurately. The two schemes also achieve high degree of imperceptibility performance. Compared to some fragile watermarking schemes, our proposed schemes are more secure and efficient.

References


Index Terms

Computer Science Security

Keywords

Fragile Watermarking, Tamper detection, Image Authentication, Discrete Wavelet Transform (DWT).