

Abstract

Mohamed S El-Mahallawy

Robust Secure and Blind Watermarking Based on DWT DCT Partial Multi Map Chaotic Encryption

In this paper, a novel Commutative Watermarking and Partial Encryption (CWPE) algorithm based on Discrete Wavelet Transform and Discrete Cosine Transform (DWT-DCT) for watermarking and Multi-Map Wavelet Chaotic Encryption (MMW-CE) is proposed. The original host image is first decomposed into four sub-bands using (DWT), each sub-band coefficients are relocated using Arnold transform to create a noiselike version, then apply partial encryption scheme using chaotic scrambled random number pattern bitwise XOR with the scrambled horizontal coefficients only and the shuffled approximation coefficients are divided into non-overlapping and equal sized blocks. Watermark embedding process is based on extracting the (DCT) middle frequencies of the encrypted approximation coefficients blocks. Comparison based threshold of the extracted DCT mid-band coefficients, watermark bits are embedded in the coefficients of the corresponding DCT middle frequencies. The experimental results show that the proposed algorithm is robust against common signal processing attacks. The proposed algorithm is able to reduce encryption to one quarter of the image information. Statistical and differential analyses are performed to estimate the security strength of the proposed algorithm. The results of the security analysis show that the proposed algorithm provides a high security level for real time application.