Digital Image Steganography with Multilayer Security

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Abstract : In this paper, a new method is developed for hiding image in a digital image with multilayer security. In the proposed method, the secret image is encrypted in the first instance using a flexible matrix based symmetric key to add first layer of security. Then another layer of security is added to the secret data by encrypting the ciphered data using Pythagorean Theorem method. The ciphered data bits (4 bits) produced after double encryption are then embedded within digital image in the spatial domain using Least Significant Bits (LSBs) substitution. To improve the image quality of the stego-image, an improved form of pixel adjustment process is proposed. To evaluate the effectiveness of the proposed method, image quality metrics including Peak Signal-to-Noise Ratio (PSNR), Mean Square Error (MSE), entropy, correlation, mean value and Universal Image Quality Index (UIQI) are measured. It has been found experimentally that the proposed method provides higher security as well as robustness. In fact, the results of this study are quite promising.

Keywords : Pythagorean theorem, pixel adjustment, ciphered data, image hiding, least significant bit, flexible matrix

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