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An Efficient Encryption Scheme Using DWT and Arnold Transforms

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Abstract : Data security needed in data transmission, storage, and communication to ensure the security. The color image is decomposed into red, green, and blue channels. The blue and green channels are compressed using 3-levels discrete wavelet transform. The Arnold transform uses to changes the locations of red image channel pixels as image scrambling process. Then all these channels are encrypted separately using a key image that has same original size and is generating using private keys and modulo operations. Performing the X-OR and modulo operations between the encrypted channels images for image pixel values change purpose. The extracted contours of color image recovery can be obtained with accepted level of distortion using Canny edge detector. Experiments have demonstrated that proposed algorithm can fully encrypt 2D color image and completely reconstructed without any distortion. It has shown that the color image can be protected with a higher security level. The presented method has easy hardware implementation and suitable for multimedia protection in real time applications such as wireless networks and mobile phone services.

Keywords : color image, wavelet transform, edge detector, Arnold transform, lossy image encryption
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