Hybrid Ciphering System of Images based on Fractional Fourier Transform and Two Chaotic Maps

Abstract

This paper presents a new implementation of a hybrid ciphering system of images in Fourier domain based on two chaotic maps. The first map is the Bakermap, which is used to scramble the image pixels in three modes of operation (CBC, CFB and OFB). The second map is the logistic map, whose secret key depends on the plain text. In the key generation step of the logistic map, the chaotic stream is generated with plain text and hence the relation between the key and the plain text is established. We use Fractional Fourier Transform (FrFT) before the encryption to achieve a large degree of randomization. We examine the proposed algorithm and compare the results with the RC6 algorithm. The performance and security analysis prove that this hybrid ciphering system is efficient, reliable, and can effectively resist different attacks.

References

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1977.
- Hossam M. Kasem; Mohamed E. Nasr; Elsayed A. Sallamand F. E. Abd El-Samie Efficient transmission of 1D and 2D chaotic map encrypted images with orthogonal frequency division multiplexing, Proc. SPIE 8285, International Conference on Graphic and Image Processing (ICGIP 2011), 82850D (September 30, 2011)
- C. Zhu and K. Sun, Chaotic image encryption algorithm by correlating keys with plaintext, China Communications, vol. 9, no. 1, pp. 73–79, 2012.

Index Terms
Keywords

Baker map  Fourier transform  Logistic map  Modes of operation  and Security analysis.