

{tag}

{/tag}

International Journal of Computer Applications
© 2010 by IJCA Journal

Number 20 - Article 7

Year of Publication: 2010

Authors:

R.Amirtharajan

R.John Bosco Balaguru

10.5120/426-629

{bibtex}pxc387629.bib{/bibtex}

Abstract

Digital Crime is the latest terrorist who can intrude into any domain by breaking any type of firewall or secret code without frittering even a single drop of blood. To fight this terror, a cryptic army was evolved but not good enough to succeed. As a consequence, an effective commando namely steganography has been evolved who can combat any type of destructive intrusion. In this paper, Space Filling Curve (SFC) and RGB colour compound stego action against the threat of digital crime has been proposed. The proposed stego system scans the colour image pixel by pixel along a complex path, not row by row, and hides the variable k bit of the secret data in each pixel visited in the order defined by a Space-Filling Curve (SFC) such as the Hilbert curve and the Moore curve traversing paths. Such curves visit each pixel in the color image which is split into Red, Green and Blue components. The effectiveness of the proposed stego system has been estimated by computing bit error rate (BER), Mean square error(MSE), Peak Signal to Noise Ratio (PSNR) and Mean Structural Similarity index(MSSIM). This paper also illustrates how security has been enhanced using this algorithm.

Reference

- [1]. W. Bender, D. Gruhl, N. Morimoto, A. Lu, Techniques for data hiding, IBM Syst. J. 35

(3&4) (1996) 313-336.

[2]. Bruce Schneier, Applied Cryptography Protocols, Algorithm and Source Code in C. Second edition. Wiley India edition 2007

[3]. C.K. Chan, L.M. Chen, Hiding data in images by simple LSB substitution, Pattern Recognition 37 (3) (2004) 469-474.

[4]. Chin-Chen Chang, Chia-Chen Lin, Chun-Sen Tseng and Wei-Liang Tai, "Reversible hiding in DCT-based compressed images," Information Sciences, Vol. 177, Issue 13, (2007) 2768-2786.

[5]. [Chin-Chen Chang, Chih-Yang Lin, Yi-Hsuan Fan, Lossless data hiding for color images based on block truncation coding , Pattern Recognition 41 (7) 2008 2347-2357.

[6]. W. Diffie and M. E. Hellman, "Exhaustive Cryptanalysis of the NBS Data Encryption Standard," IEEE Computer, Vol. 10, 1977, pp. 74-84.

[7]. Hans Sagan, Space-Filling Curves, Springer-Verlag, New York, (1994). ISBN: 0-387-94265-3.

[8]. S. Katzenbeisser, F.A.P. Petitcolas, Information Hiding Techniques for Steganography and Digital Watermarking, Artech House, Norwood, MA, 2000.

[9]. L.M. Marvel, C.G. Boncelet Jr., C.T. Retter, Spread spectrum image steganography, IEEE Trans. Image Process. 8 (8) (1999) 1075-1083.

[10]. F.A.P. Petitcolas, R.J. Anderson, M.G. Kuhn, Information hiding-a survey, Proc. IEEE 87 (7) (1999) 1062-1078.

[11]. Po-Yueh Chen, Hung-Ju Lin, A DWT Based Approach for Image Steganography, International Journal of Applied Science and Engineering 4(3) (2006) 275-290.

[12]. Provos, N., Honeyman, P, Hide and seek: An introduction to steganography, IEEE Security & Privacy Magazine 1 (2003) 32-44.

[13]. R. L. Rivest, A. Shamir, and L. Adleman, "A method for obtaining digital signatures and public-key cryptosystems," Communications of the ACM, vol. 21, no. 2, pp. 120-126, 1978.

[14]. C.C. Thien, J.C. Lin, A simple and high-hiding capacity method for hiding digit-by-digit data in images based on modulus function, Pattern Recognition 36 (11) (2003) 2875-2881.

[15]. Tuomas Aura, Practical invisibility in digital communication, in proceedings of the Workshop on Information Hiding, LNCS 1174 (1996) 265-278.

[16]. R.Z. Wang, C.F. Lin, J.C. Lin, Image hiding by optimal LSB substitution and genetic algorithm, Pattern Recognition 34 (3) (2000) 671-683.

[17]. C.M. Wang, N.I. Wu, C.S. Tsai, M.S. Hwang, A high quality steganography method with pixel-value differencing and modulus function, J. Syst. Software 81 (1) (2008) 150-158.

[18]. Westfeld Space filling curves in steganalysis in E.J Delp III & P.W. Wong(Eds), Security, steganography and watermarking of multimedia contents VII SPIE 5681, (2005) 28-37

[19]. Young-Ran Park, Hyun-Ho Kang, Sang-Uk Shin, and Ki-Ryong Kwon, An Image Steganography Using Pixel Characteristics Y. Hao et al. (Eds.): CIS 2005, Part II, Springer-Verlag Berlin Heidelberg LNAI 3802, (2005) 581- 588.

[20]. Yuan-Hui Yu , Chin-Chen Chang, luon-Chang Lin, A new steganographic method for color and grayscale image hiding Computer Vision and Image Understanding 107 (2007) 183-194

[21]. Zhou Wang, Alan Conrad Bovik, Hamid Rahim Sheikh, Eero P. Simoncelli, Image Quality Assessment: From Error Visibility to Structural Similarity, IEEE Transactions on Image Processing, 13(4) (2004) 600-612.

Index Terms

Computer Science

Security

Key words

Information hiding
LSB steganography
space filling curves steganography