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An Improved Chaotic Image Encryption Algorithm (Conference Paper)

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Abstract

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Chaotic -based image encryption algorithms are countless in number. Encryption techniques based on Chaos are among the most effectual algorithms for encryption of data image . In past works, chaos-based cryptosystems applied the chaotic dynamical system with the linkage to the harmonization of two chaotic systems and controls. Good performances have resulted but there were several downsides pertaining to the single rule usage by each, impacting security, privacy and dependability of the techniques mentioned. Serious problems were also documented in their usage in satellite imagery. As a possible solution, a novel chaos-based symmetric method of key cryptosystem is proposed in this paper. This method employs external secret key that Logistic, Henon and Gauss iterated maps have previously expanded. For creating the secret key matrix for image encryption , these maps are merged. Here, simple logical XOR and multiple key generation processes were applied. Assessment to the method is performed on the satellite images dataset, and security is evaluated through the experimental analysis. As evidenced, the chaos-based satellite image cryptosystem demonstrates appropriateness for satellite image encryption and decryption in the preservation of security and dependability of the storage and transmission process. © 2018 IEEE.

SciVal Topic Prominence

Topic: Cryptography | Chaotic systems | plain image

Prominence percentile: 98.854 

Author keywords

Chaotic dynamical system Encryption techniques Satellite image cryptosystem Symmetric key cryptosystem

Indexed keywords

Engineering controlled terms: Chaotic systems Digital storage Image enhancement Satellite imagery

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-
- 1 Zhu, Z.-L., Zhang, W., Wong, K.-W., Yu, H.
A chaos-based symmetric image encryption scheme using a bit-level permutation
(2011) *Information Sciences*, 181 (6), pp. 1171-1186. Cited 301 times.
doi: 10.1016/j.ins.2010.11.009
[View at Publisher](#)
-
- 2 Pareek, N.K., Patidar, V., Sud, K.K.
Image encryption using chaotic logistic map
(2006) *Image and Vision Computing*, 24 (9), pp. 926-934. Cited 659 times.
doi: 10.1016/j.imavis.2006.02.021
[View at Publisher](#)
-
- 3 Gao, T., Chen, Z.
A new image encryption algorithm based on hyper-chaos
(2008) *Physics Letters, Section A: General, Atomic and Solid State Physics*, 372 (4), pp. 394-400. Cited 395 times.
doi: 10.1016/j.physleta.2007.07.040
[View at Publisher](#)
-
- 4 Zhang, Q., Guo, L., Wei, X.
Image encryption using DNA addition combining with chaotic maps ([Open Access](#))
(2010) *Mathematical and Computer Modelling*, 52 (11-12), pp. 2028-2035. Cited 162 times.
doi: 10.1016/j.mcm.2010.06.005
[View at Publisher](#)
-
- 5 Liu, Z., Xu, L., Liu, T., Chen, H., Li, P., Lin, C., Liu, S.
Color image encryption by using Arnold transform and color-blend operation in discrete cosine transform domains
(2011) *Optics Communications*, 284 (1), pp. 123-128. Cited 140 times.
doi: 10.1016/j.optcom.2010.09.013
[View at Publisher](#)
-
- 6 Zhou, N., Wang, Y., Gong, L., He, H., Wu, J.
Novel single-channel color image encryption algorithm based on chaos and fractional Fourier transform
(2011) *Optics Communications*, 284 (12), pp. 2789-2796. Cited 92 times.
doi: 10.1016/j.optcom.2011.02.066
[View at Publisher](#)
-
- 7 Zhu, Y., Zhou, Z., Yang, H.
The 2nd IEEE international conference on advanced computer control
(2010) *IEEE Computer Society*, p. 217.
Shenyang
-

- 8 Nair, G.M.
Role of communications satellites in national development

(2008) *IETE Technical Review (Institution of Electronics and Telecommunication Engineers, India)*, 25 (1), pp. 3-8. Cited 4 times.
doi: 10.4103/02564602.2008.10876636

View at Publisher
-
- 9 Menezes, A.J., Van Oorschot, P.C., Vanstone, S.A.
Handbook of applied cryptography

(1996) *Handbook of Applied Cryptography*, pp. 1-780. Cited 6413 times.
<https://www.taylorfrancis.com/books/e/9781439821916>
ISBN: 978-143982191-6; 978-084938523-0
-
- 10 Stallings, W.
(1999) *Cryptography and Network Security: Principles and Practice*. Cited 3813 times.
Prentice-Hall, Upper Saddle River, NJ, USA
-
- 11 Stinson, D.R.
(2002) *Cryptography: Theory and Practice*. Cited 1908 times.
2nd ed., CRC, Boca Raton, USA
-
- 12 Yen, J.C., Guo, J.-I.
A new chaotic image encryption algorithm
(1998) *Proceeding of National Symposium on Telecommunications*, pp. 358-362. Cited 14 times.
-
- 13 Yen, J.C., Guo, J.-I.
A new chaotic mirror-like image encryption algorithm and its VLSI architecture
(2000) *Pattern Recognition and Image Analysis*, 10 (2), pp. 236-247. Cited 23 times.
-
- 14 Yen, J.-C., Guo, J.-I.
Efficient hierarchical chaotic image encryption algorithm and its VLSI realisation

(2000) *IEE Proceedings: Vision, Image and Signal Processing*, 147 (2), pp. 167-175. Cited 104 times.
doi: 10.1049/jip-vis:20000208

View at Publisher
-
- 15 Li, S., Mou, X., Cai, Y.
Improving security of a chaotic encryption approach

(2001) *Physics Letters, Section A: General, Atomic and Solid State Physics*, 290 (3-4), pp. 127-133. Cited 100 times.
doi: 10.1016/S0375-9601(01)00612-0

View at Publisher
-
- 16 Jiang, Z.-P.
A note on chaotic secure communication systems

(2002) *IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications*, 49 (1), pp. 92-96. Cited 78 times.
doi: 10.1109/81.974882

View at Publisher
-

- 17 Sarker, M.Z.H., Parvez, Md.S.
A cost effective symmetric key cryptographic algorithm for small amount of data

(2005) *2005 Pakistan Section Multitopic Conference, INMIC*, art. no. 4133450. Cited 17 times.
ISBN: 0780394291; 978-078039429-2
doi: 10.1109/INMIC.2005.334435

[View at Publisher](#)

- 18 Khan, M.K., Zhang, J., Tian, L.
Chaotic secure content-based hidden transmission of biometric templates

(2007) *Chaos, Solitons and Fractals*, 32 (5), pp. 1749-1759. Cited 50 times.
doi: 10.1016/j.chaos.2005.12.015

[View at Publisher](#)

- 19 Fridrich, J.
Symmetric ciphers based on two-dimensional chaotic maps

(1998) *International Journal of Bifurcation and Chaos in Applied Sciences and Engineering*, 8 (6), pp. 1259-1284. Cited 949 times.
<http://www.worldscientific.com>
doi: 10.1142/S021812749800098X

[View at Publisher](#)

- 20 Li, S., Mou, X., Cai, Y.
Improving security of a chaotic encryption approach

(2001) *Physics Letters, Section A: General, Atomic and Solid State Physics*, 290 (3-4), pp. 127-133. Cited 100 times.
doi: 10.1016/S0375-9601(01)00612-0

[View at Publisher](#)

- 21 Khan, M.K., Zhang, J., Wang, X.
Chaotic hash-based fingerprint biometric remote user authentication scheme on mobile devices

(2008) *Chaos, Solitons and Fractals*, 35 (3), pp. 519-524. Cited 108 times.
doi: 10.1016/j.chaos.2006.05.061

[View at Publisher](#)

- 22 Baptista, M.S.
Cryptography with chaos

(1998) *Physics Letters, Section A: General, Atomic and Solid State Physics*, 240 (1-2), pp. 50-54. Cited 591 times.
doi: 10.1016/S0375-9601(98)00086-3

[View at Publisher](#)

- 23 Kotulski, Z., Szczepanski, J.
Discrete chaotic cryptography (DCC): New method for secure communication
(1997) *Proceedings of NEEDS'97*. Cited 4 times.

- 24 Matthews, R.
On the derivation of a "chaotic" encryption algorithm

(1989) *Cryptologia*, 13 (1), pp. 29-42. Cited 474 times.
doi: 10.1080/0161-118991863745

[View at Publisher](#)

- 25 Xiang, T., Wong, K.-w., Liao, X.
An improved chaotic cryptosystem with external key
(2008) *Communications in Nonlinear Science and Numerical Simulation*, 13 (9), pp. 1879-1887. Cited 27 times.
doi: 10.1016/j.cnsns.2007.04.017
[View at Publisher](#)
-
- 26 Kotulski, Z., Szczepański, J., Górski, K., Paszkiewicz, A., Zugaj, A.
Application of discrete chaotic dynamical systems in cryptography - DCC method
(1999) *International Journal of Bifurcation and Chaos in Applied Sciences and Engineering*, 9 (6), pp. 1121-1135. Cited 41 times.
<http://www.worldscientific.com>
doi: 10.1142/S0218127499000778
[View at Publisher](#)
-
- 27 Alvarez, E., Fernández, A., Garcí, P., Jiménez, J., Marcano, A.
New approach to chaotic encryption
(1999) *Physics Letters, Section A: General, Atomic and Solid State Physics*, 263 (4-6), pp. 373-375. Cited 140 times.
doi: 10.1016/S0375-9601(99)00747-1
[View at Publisher](#)
-
- 28 Wong, W.-K., Lee, L.-P., Wong, K.-W.
A modified chaotic cryptographic method
(2001) *Computer Physics Communications*, 138 (3), pp. 234-236. Cited 106 times.
doi: 10.1016/S0010-4655(01)00220-X
[View at Publisher](#)
-
- 29 Wong, K.W.
A fast chaotic cryptographic scheme with dynamic look-up table
(2002) *Physics Letters, Section A: General, Atomic and Solid State Physics*, 298 (4), pp. 238-242. Cited 166 times.
doi: 10.1016/S0375-9601(02)00431-0
[View at Publisher](#)
-
- 30 Khan, M.K., Zhang, J.
Multimodal face and fingerprint biometrics authentication on space-limited tokens
(2008) *Neurocomputing*, 71 (13-15), pp. 3026-3031. Cited 31 times.
www.elsevier.com/locate/neucom
doi: 10.1016/j.neucom.2007.12.017
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-
- 31 Pareek, N.K., Patidar, V., Sud, K.K.
Discrete chaotic cryptography using external key
(2003) *Physics Letters, Section A: General, Atomic and Solid State Physics*, 309 (1-2), pp. 75-82. Cited 186 times.
doi: 10.1016/S0375-9601(03)00122-1
[View at Publisher](#)
-

32 Sankpal, P.R., Vijaya, P.A.

Image encryption using chaotic maps: A survey

(2014) *Proceedings - 2014 5th International Conference on Signal and Image Processing, ICSIP 2014*, art. no. 6754860, pp. 102-107. Cited 22 times.
doi: 10.1109/ICSIP.2014.80

[View at Publisher](#)

33 Ephin, M., Joy, J.A., Vasanthi, N.A.

Survey of Chaos based Image encryption and decryption techniques

(2013) *InAmrita International Conference of Women in Computing (AICWIC'13) Proceedings Published by International Journal of Computer Applications (IJCA)*

34 Akhshani, A., Behnia, S., Akhavan, A., Abu Hassan, H., Hassan, Z.

A novel scheme for image encryption based on 2D piecewise chaotic maps

(2010) *Optics Communications*, 283 (17), pp. 3259-3266. Cited 90 times.
doi: 10.1016/j.optcom.2010.04.056

[View at Publisher](#)

35 Yoon, J.W., Kim, H.

An image encryption scheme with a pseudorandom permutation based on chaotic maps

(2010) *Communications in Nonlinear Science and Numerical Simulation*, 15 (12), pp. 3998-4006. Cited 101 times.
doi: 10.1016/j.cnsns.2010.01.041

[View at Publisher](#)

36 Tang, Y., Wang, Z., Fang, J.-a.

Image encryption using chaotic coupled map lattices with time-varying delays

(2010) *Communications in Nonlinear Science and Numerical Simulation*, 15 (9), pp. 2456-2468. Cited 67 times.
doi: 10.1016/j.cnsns.2009.09.023

[View at Publisher](#)

37 Mao, Y., Chen, G., Lian, S.

A novel fast image encryption scheme based on 3D chaotic baker maps

(2004) *International Journal of Bifurcation and Chaos in Applied Sciences and Engineering*, 14 (10), pp. 3613-3624. Cited 376 times.

<http://www.worldscientific.com>

doi: 10.1142/S021812740401151X

[View at Publisher](#)

38 Akhavan, A., Samsudin, A., Akhshani, A.

Cryptanalysis of an image encryption algorithm based on DNA encoding

(2017) *Optics and Laser Technology*, 95, pp. 94-99. Cited 17 times.
doi: 10.1016/j.optlastec.2017.04.022

[View at Publisher](#)

39 Zhang, X., Wang, X.

Multiple-image encryption algorithm based on mixed image element and chaos

(2017) *Computers and Electrical Engineering*, 62, pp. 401-413. Cited 12 times.
doi: 10.1016/j.compeleceng.2016.12.025

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