{tag} {/tag}
International Journal of Computer Applications

Volume 101 - Number 15

Year of Publication: 2014

Authors:
Nisha Sharma

Anjali Goyal

Y. S Brar

10.5120/17762-8873
{bibtex}pxc3898873.bib{/bibtex}

Abstract

This paper presents a robust and secure watermarking technique for digital image. To implement the technique, Discrete Wavelet Transform (DWT) is applied on cover image. Further on Low-Low (LL) sub-band of DWT, Discrete Cosine Transform (DCT) is applied which is followed by Singular Value Decomposition (SVD). To introduce the secure watermarking, watermark is secured using Arnold Transformation and embedded in the cover image. Parameters such as Peak Signal to Noise Ratio (PSNR) and Normalized Correlation (NC) are used for checking the reliability of the proposed technique. Different attacks like noise, filtering, rotation, cropping, flipping, and compression are applied on watermarked image to check the robustness of the proposed approach.

Refer ences

- Van Schyndel, R. G. , Tirkel A. Z. , and Osborne C. F. , 1994. "A digital watermark. " In Proceedings of IEEE International Conference in Image Processing, (ICIP-94) Vol.

2.

- Benoit, M. M, and Quisquater J. J. , 1995 "Cryptology for digital TV broadcasting. " Proceedings of the IEEE 83, No. 6
- Bender W, Gruhl D, Morimoto N, Lu A , 1996, "Techniques for data hiding. " IBM systems journal 35, No. 3. 4, pp: 313-336.
- Fridrich J, "Robust bit extraction from images. " IEEE International Conference on Multimedia Computing and Systems, 1999. Vol. 2. IEEE, 1999.
- Pitas I and Kaskalis T. H. , 1995, "Applying signatures on digital images. "Proceedings of IEEE International Conference on Nonlinear Signal and Image Processing. Pp 460-463.
- Wolfgang RB. , and Delp EJ. 1996, "A watermark for digital images. " Proceedings of International Conference on Image Processing, 1996. Vol. 3.
- Johnson NF. and Katzenbeisser S, 2000 "A survey of steganographic techniques. " Information hiding. Norwood, MA: Artech House.
- Cox I. J, Kilian J. , Leighton F. T. , and T. Shamoon T. ,1997, "Secure spread spectrum watermnarking for multimedia" in IEEE Transactions on Image Processing, vol. 6, no. 12, pp:1673 -1687
- Tao B. , Dickinson B. ,1997, "Adaptive Watermarking in DCT domain", in Proceedings of IEEE International Conference on Acoustics, Speech and signal Processing,(ICASSP '97), vol. 4, pp. 1985-2988
- Hsu CT, and Wu JL. ,1999 "Hidden digital watermarks in images. " , IEEE Transactions on Image Processing, Vol 8. 1,: pp: 58-68.
- Huang J, Shi YQ, and Shi Y, 2000,. "Embedding image watermarks in DC components. ", IEEE Transactions on Circuits and Systems for Video Technology, vol. 10. 6, pp: 974-979.
- Wong, P. H. , Au, O. C. , & Wong, J. W. 2000. "Data hiding and watermarking in JPEG-compressed domain by DC coefficient modification". In Proceedings of SPIE, Security and Watermarking of Multimedia Contents II, Vol 3971.
- Huang F, and Guan ZH. ,2004 "A hybrid SVD-DCT watermarking method based on LPSNR. " Pattern Recognition Letters by Elsevier, Vol 25, No. 15, pp: 1769-1775
- Zhao RM, Lian H, Pang HW and Hu B 2008, "A blind watermarking algorithm based on DCT. " IEEE Second International Symposium on Intelligent Information Technology Application, (IITA'08). 20-22, Vol. 3.
- Naik AK. , and Holambe RS. , 2010, "A blind DCT domain digital watermarking for biometric authentication. " International Journal of Computer Applications, vol . 1. 16 pp: 11-15.
- Foo SW. , and Dong Qi. ,2010, "A normalization-based robust image watermarking scheme using SVD and DCT. " World Academy of Science, Engineering and Technology Vol:4 Pg:205-210.
- Kundur, D, and Hatzinakos D, 1998, "Digital watermarking using multiresolution wavelet decomposition. " In Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing, Vol. 5.
- Kundur D, and Hatzinakos D. 2004, "Toward robust logo watermarking using multi resolution image fusion principles. " IEEE Transactions on Multimedia, Vol. 6. 1. pp: 185-198.
- Lu CS. , Liao HYM, Huang SK , 2000, "Cocktail watermarking on images. "

Information Hiding. Springer Berlin Heidelberg.

- Raval, M. S. , and Rege P. P. , 2003, "Discrete wavelet transform based multiple watermarking scheme. " TENCON 2003. In proceedings of IEEE Conference on Convergent Technologies for the Asia-Pacific Region. Vol. 3.
- Ganic E, and Eskicioglu AM. 2004 "Robust DWT-SVD domain image watermarking: embedding data in all frequencies. " Proceedings of the 2004 Workshop on Multimedia and Security. ACM.
- Song J, and Zhang Z. , 2011, "A digital watermark method based on SVD in wavelet domain. " International Journal of Advancements in Computing Technology (IJACT) Vol 3. 8 pp: 205-214.
- Laskar, R. H. , Choudhury M, Chakraborty K, 2011, "A Joint DWT-DCT Based Robust Digital Watermarking Algorithm for Ownership Verification of Digital Images. " Computer Networks and Intelligent Computing. Springer Berlin Heidelberg, pp: 482-491.
- Divecha NH. , and Jani NN. , 2012, "Image Watermarking Algorithm using Dct, Dwt and Svd. "In Proceedings of National Conference on Inovative Paradigm in Engineering and Technology (NCIPET-2012), International Journal of Computer Application Vol. 13CA.
- Khan, M. I. , Rahman, M. , Sarker, M. , & Hasan, I. , 2013. "Digital Watermarking for Image Authentication Based on Combined DCT, DWT and SVD Transformation". International Journal of Computer Science Issues, Vol. 10, Issue 3, No 1.
- Saxena, H, Saxena Praful, and Rastogi Shubham, 2014, "DWT-DCT-SVD based semi-blind reference image watermarking scheme using trignometric function. " International Journal of Conceptions on Computing and Information Technology Vol. 2, Issue 2.
- Singh, A. K. , Dave, M. , & Mohan, A. ,2014. Hybrid Technique for Robust and Imperceptible Image Watermarking in DWT–DCT–SVD Domain. Published in Springer, National Academy Science Letters 37, No. 4, pp 351-358.
- Naik, K. , & Pal, A. K. 2014. A Partial Image Cryptosystem Based on Discrete Cosine Transform and Arnold Transform. In Recent Advances in Information Technology pp. 65-73. Springer India.
- Zhang C, Wang J, and Wang W. , 2008, "Digital image watermarking algorithm with double encryption by Arnold transform and logistic. " In Proceedings of Fourth IEEE International Conference on. Networked Computing and Advanced Information Management (NCM'08). Vol. 1.
- Potdar, VM. , Han S, and Chang E. 2005, "A survey of digital image watermarking techniques. " In Proceedings of 3rd IEEE International Conference on Industrial Informatic,. (INDIN'05).
- Wang, B. , Ding, J. , Wen, Q. , Liao, X. , & Liu, C. , 2009. "An image watermarking algorithm based on DWT DCT and SVD. " In Proceedings of IEEE International Conference on Network Infrastructure and Digital Content, 2009. IC-NIDC 2009. pp. 1034-1038). IEEE.

Index Terms

Computer Science Security

Keywords

Watermarking DWT DCT SVD Arnold Transformation