International Journal of Engineering Applied Sciences and Technology, 2016
Vol. 1, Issue 10, ISSN No. 2455-2143, Pages 81-83
Published Online August - September 2016 in IJEAST (http://www.ijeast.com)

A NEW STEGNOGRAPHY TECHNIQUE FOR DATA EMBEDDING AND EXTRACTION USING INTERPOLATION

Balkar Singh
Department of Computer Science
Guru Nanak College, Ferozepur Cantt.,
Punjab, India

***Abstract*— Steganography is the art and science of concealing information in unremarkable cover media so as not to stimulate an eavesdropper's suspicion. This is an application under information security field and focuses on capacity. In this paper we propose a new image steganography technique which embeds a secret image in high frequency domains resulted from Discrete Wavelet Transform. Embedding of image is controlled by amplification factor that is changed exponentially. Data is hiding after compression to reduce the size of image by simply drop some pixels. And data is reconstructed by interpolation; Performance of method is tested with different factors. Coefficients in the low frequency sub-band are unaltered to retain the image quality.**

Keywords— **Discrete Wavelet Transform; Security; Steganography; interpolation, compression.**

I. INTRODUCTION

In recent years, the accessing of multimedia data or digital data has become very easy because of the fast development of the Internet. In other words, this development makes unauthorized distribution of multimedia data. For the protection of multimedia data, a solution known as watermarking is used. After the approximate 20 years' research, different kinds of watermarking algorithm based on different theory concepts were introduced [1-3]. A digital watermark encodes the owner's license information and embeds it into data. Watermarking may be used to identify the image of owners' license information and to track illegal copies.

The rest of the paper is organized as follows. Proposed embedding and extraction algorithms are explained in section II. Experimental results are presented in section III. Concluding remarks are given in section IV.

II. PROPOSED ALGORITHM

A. Watermark embedding algorithm –

In case of two-dimensional image, after a DWT transform, the image is divided into four corners, upper left corner of the original image, lower left corner of the vertical details, upper right corner of the horizontal details, lower right corner of the component of the original image detail (high frequency). You can then continue to the low frequency components of the same upper left corner of the 2nd, 3rd inferior wavelet transform.

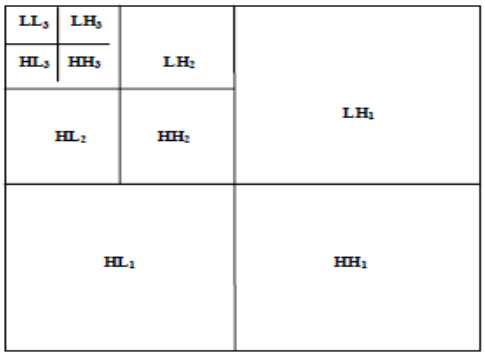


Fig. 1. DWT Decomposition model

On the basis of such considerations, the algorithm uses a different color image multiplied by the weighting coefficients of different ways to solve the visual distortion, and by embedding the watermark, wavelet coefficients of many ways, enhance the robustness of the watermark.

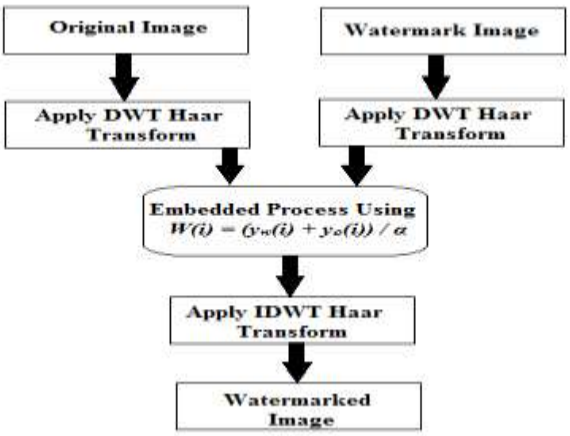


Fig. 2. Watermark embedding algorithm Block Diagram

International Journal of Engineering Applied Sciences and Technology, 2016
Vol. 1, Issue 10, ISSN No. 2455-2143, Pages 81-83
Published Online August - September 2016 in IJEAST (http://www.ijeast.com)

After that we select the ordered coefficient from 1 to N to get N coefficient. The formulae of watermark embedding are as follows.

$$C_w(i) = Y_o(i)+\alpha_1 w(i) \qquad (1)$$

Where the parameter α is called embedding intensity and their effect of validity of the algorithm directly is apply after this process, after that apply the inverse wavelet transform to the image for find out watermark image.

B. Watermark Extraction algorithm –

The extraction algorithm process is the inverse of the embedding process. It is assumed that the watermark as well as the see value is available at the receiver end to the authorized users.

The operation of channel separation is applied on the watermarked color image to generate its sub images, and then 2-level discrete wavelet transform is applied on the sub images to generate the approximate coefficients and detail coefficients.

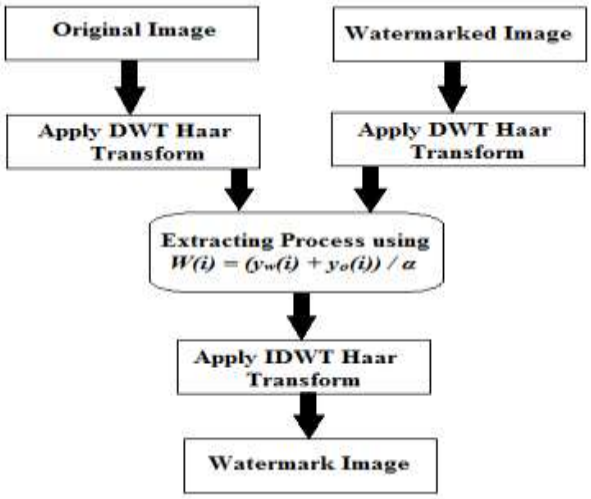


Fig. 3. Watermark Extraction algorithm Block Diagram

For this purpose the following formulae is use-

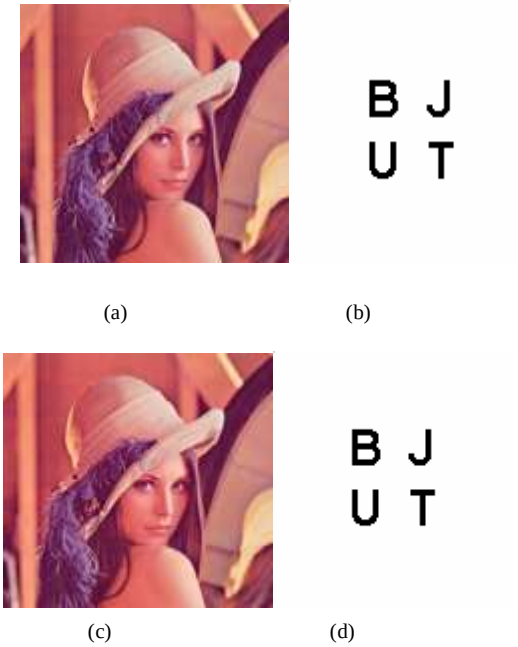
$$W(i) = (y_w(i) + y_o(i)) / \alpha \qquad (2)$$

After this Execution the Inverse 2-level discrete wavelet transform is applied on the watermark data to generate three watermark images extracted.

III. Experiment and Result

The test set for this evaluation experiment watermark image randomly selected from the internet. Matlab 7.0 software platform is use to perform the experiment. The PC for experiment is equipped with an Intel P4 2.4GHz Personal laptop and 2GB memory.

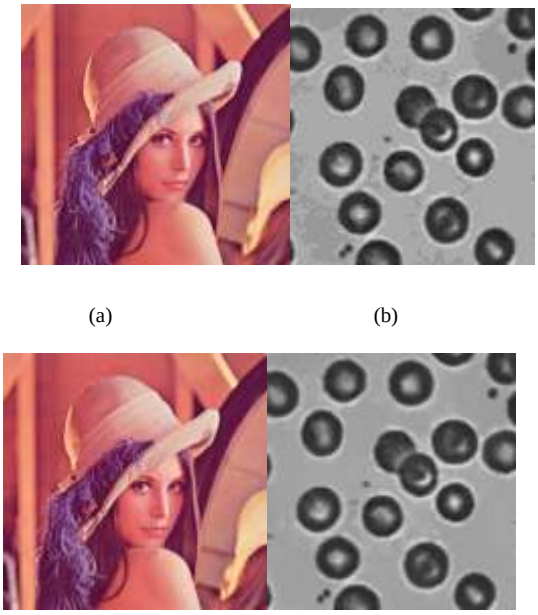
The proposed scheme is tested using ordinarily image processing. From the simulation of the experiment results, we can draw to the conclusion that this method is robust to many kinds of watermark images.



(a) (b)

(c) (d)

Fig. 4. (a) Original image (b) BJUT watermark Image (c) Watermarked image (d) Recovered watermark Image

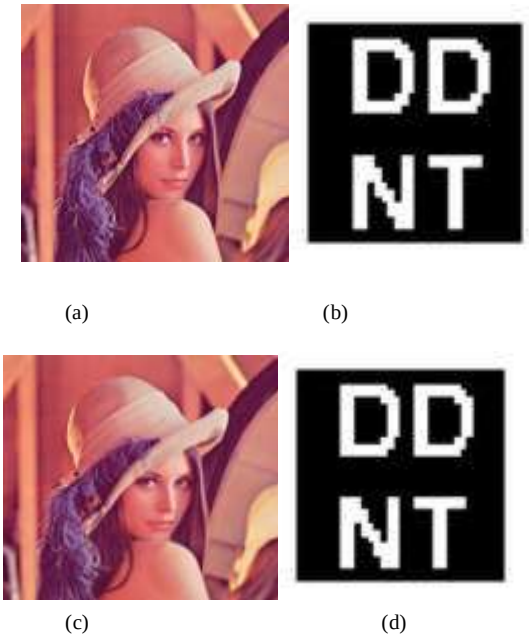


(a) (b)

(c) (d)

Fig. 5. (a) Original image (b) Bobbol watermark Image (c) Watermarked image (d) Recovered watermark Image

International Journal of Engineering Applied Sciences and Technology, 2016
Vol. 1, Issue 10, ISSN No. 2455-2143, Pages 81-83
Published Online August - September 2016 in IJEAST (http://www.ijeast.com)



(a) (b)

(c) (d)

Fig. 6. (a) Original image (b) DDNT watermark Image (c) Watermarked image (d) Recovered watermark Image

Table -1 Experiment Result

	Original Lena Image (PSNR)	Watermarked Lena Image (PSNR)
BJUT Watermark Image	**33.1224**	**41.9946**
Bobbol Watermark Image	**33.1224**	**47.5911**
DDNT Watermark Image	**33.1224**	**45.8103**

Table 1 show the peak signal to noise ratio of performance of our proposed method of watermarked image and original image with various watermark image, where our watermarked images peak signal to noise ratio has a better performance than others.

IV. CONCLUSION

In this paper we use Discrete Wavelet Transformation (DWT) technique for implementation. It is clear from the result that, the proposed method allows embedding of secrete image in the cover image with very little effect on visibility of stego image. Table 1 shows PSNR value is satisfactory. In future we can use two sub bands rather than one to hide the data of two different secrete images which will achieve the main motive of image stegnography. This approach can be applied for color image and audio steganography also because DWT is applicable for any digital signal.

V. REFERENCE

[1] B. Corona, M. Nakano, H. Pérez, "Adaptive Watermarking Algorithm for Binary Image Watermarks", *Lecture Notes in Computer Science, Springer, pp. 207-215, 2004.*

[2] A. A. Reddy and B. N. Chatterji, "A new wavelet based logo-watermarking scheme," Pattern Recognition Letters, vol. 26, pp. 1019-1027, 2005.

[3] P. S. Huang, C. S. Chiang, C. P. Chang, and T. M. Tu, "Robust spatial watermarking technique for colour images via direct saturation adjustment," Vision, Image and Signal Processing, IEE Proceedings -, vol. 152, pp. 561-574, 2005.

[4] F. Gonzalez and J. Hernandez, " A tutorial on Digital Watermarking ", In IEEE annual Carnahan conference on security technology, Spain, 1999.

[5] D. Kunder, "Multi-resolution Digital Watermarking Algorithms and Implications for Multimedia Signals", Ph.D. thesis, university of Toronto, Canada, 2001.

[6] J. Eggers, J. Su and B. Girod," Robustness of a Blind Image Watermarking Scheme", Proc. IEEE Int. Conf. on Image Proc., Vancouver, 2000.

[7] Barni M., Bartolini F., Piva A., Multichannel watermarking of color images, IEEE Transaction on Circuits and Systems of Video Technology 12(3) (2002) 142-156.

[8] Kundur D., Hatzinakos D., Towards robust logo watermarking using multiresolution image fusion, IEEE Transcations on Multimedia 6 (2004) 185-197.

[9] C.S. Lu, H.Y.M Liao, "Multipurpose watermarking for image authentication and protection," *IEEE Transaction on Image Processing*, vol. 10, pp. 1579-1592, Oct. 2001.

[10] L. Ghouti, A. Bouridane, M.K. Ibrahim, and S. Boussakta, "Digital image watermarking using balanced multiwavelets", *IEEE Trans. Signal Process*., 2006, Vol. 54, No. 4, pp. 1519-1536.

[11] P. Tay and J. Havlicek, "Image Watermarking Using Wavelets", in *Proceedings of the 2002 IEEE*, pp. II.258 – II.261, 2002.

[12] P. Kumswat, Ki. Attakitmongcol and A. Striaew, "A New Approach for Optimization in Image Watermarking by Using Genetic Algorithms", *IEEE Transactions on Signal Processing*, Vol. 53, No. 12, pp. 4707-4719, December, 2005.

[13] H. Daren, L. Jifuen,H. Jiwu, and L. Hongmei, "A DWT-Based Image Watermarking Algorithm", in *Proceedings of the IEEE International Conference on Multimedia and Expo*, pp. 429-432, 2001.

[14] C. Hsu and J. Wu, "Multi-resolution Watermarking for Digital Images", *IEEE Transactions on Circuits and Systems- II*, Vol. 45, No. 8, pp. 1097-1101, August 1998.

[15] R. Mehul, "Discrete Wavelet Transform Based Multiple Watermarking Scheme", in *Proceedings of the 2003 IEEE TENCON*, pp. 935-938, 2003.