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Steganography Secret Message based on Image Sharpening Using 2D Haar Wavelet Transform

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Abstract- The data hiding is very significance in the present-day time, and the spread internet and communications across networks, website and stations, it needs to secure data. This research offers a new algorithm for hiding a secret message inside image blurring and sharpening using embedded and extraction algorithms to hide secret message in four stages. First stage: is remove noise from original image and summation two images. Second stage: is applied sharpen filter on summation two images . Third stage: is hide the binary secret message inside image sharpening using a secret key is curve equation: $2n^2+3$ to find location hide one bit from secret message. Fourth stage: is compression stego-sharpening using 2D Haar Wavelet Transform in level two (L2), and level three (L3).

The outcomes of the new algorithm is good in execution, speed, efficient, transparency, robustness, and high security . when send stego-sharpening through networks internet without sensitive the attackers.

keywords: Image Sharpening, Steganography Secret Message, Image compression, 2D
Haar Wavelet Transform (2DHWT), Secret Key.

1- Introduction

The public digital picture treatment system may be split into three components: the input instrument ((digitizer)), the digital processor, and the output instrument ((picture show)). 1) The digitizer transform a continuous-pitch and spatially continuous shine distribution F(x, y) to an separated array ((digital picture)) Fq (n, m), where n, m, and Fq are integers. 2) The digital processor runs on the digital picture fq (n, m) to breed fresh digital image Gq (k, c), where k, c, and Gq are integers. The output image may be represented in a different coordinate system, uses of various pointer k and c. 3) The picture show transform the digital output picture Gq (k, c) back into a continuous pitch and spatially continuous picture G (x, y) for display. [1].

picture filtering produce probable, several helpful tasks in picture treatment. A filter can be applied to minimize the amount of undesirable noise in special picture such as shown in Figure (1). other kind of filter can be applied to inveres the impact of mistiness on a special picture [2].

Figure (1): Image filter (a) Image noise, (b) Remove noise.

The picture degradation is a deterministic operation, which can happen because several reasons, such as atmospheric distortions movement, visual deflection, movement, etc.

When actual scenery is pictured by a camera, several of points are at focus while anther not, so causing outside-of-focus degradation. Outside-of-focus degradation is area-invariant at status, s whereas the picture is parallel of surface of flat. In addition to picture degradation is also because by fuss through picture recording [3].

Steganography is the art of hiding a letter, picture or file inside other letter, picture or file. Steganography is used to secret letter, one of the main demands of datum hiding is that the hideaway datum must be imperceptible [4], [5]. It uses of Steganography has numerous characteristic and are very helpful in digital picture operations which makes them appropriate for a large diversity of enforcements. [6].

2- Image Sharpening

picture stain is generic artifacts at digital picture operation and it is harsh to avert. picture enhancement is needfull to minimize distortion amount from the picture [7].

The distortion of picture can be sample such as stain task and additional noise. picture systems may insert the degradation , which will seriously effect the enforcement of the picture [8].

Sharpening methods get better the explicitness of digital pictures by enhancement the marker of the objects which are existent in the scenery. This get better their boundary and details, giving to the pictures maximal cleanness and depthness. In generic, the strategy of sharpening is added to the main matrix a part of its slope [9], [10]. Filters in the Sharpening set are

designed to enhancement the aspect, of pictures, mostly by sharpening "edges, corners, and line detail"[11], [12], As shown in Figure (2).

Figure (2): Applied filters on original image, (a) Original image, (b) Sharpen image.

3- 2-D Haar Wavelet Transform

he Haar Wavelet Transform (HWT) is one of the easy and principle transformations from the space field to a local frequency domain. A (HWT) decomposes each indicative into two compounds, one is called medium, (approximated) or direction and the another is known such as vary (detail) or variation,. A accurate form for the values of first medium subsignal, $a^1 = \{a_1, a_2, ..., a_{N/2}\}$, "at one level for a signal of length *N* i.e. is $f = \{f_1, f_2, ..., f_N\}$ is equation 1":

"$a_n = \frac{f_{2n-1} + f_{2n}}{\sqrt{2}}$, n = 1, 2, 3, ..., N /2", ...(1)

"and the first detail subsignal, $d^1 = \{d_1, d_2, ..., d_{N/2}\}$, at the same level is given as":

"$d_n = \frac{f_{2n-1} - f_{2n}}{\sqrt{2}}$, n = 1, 2, 3,...., N/2" .....(2)

In order that giving notion of its applied into picture compression, the transaction of its implementation may be demonstrate with the assistance of a easy example as shown below. implementation 2D HWT to the following limited 2D signal [13].

4- Previous Work

In 2013, Michael W. Tao Michael W. Tao and et. al., proposed a new technique that uses help, like but vary, sharp picture provided via the servant (multiple images of the self same topic in vary status hold uses a burst of photographs). Our first contribution is in theory analyzes the mistake, in three sources datum a little sharpened main insert picture that is called the base, single picture deconvolution together a attacker inverse filter, and distort, help picture registered uses visual flux. As shown that these three sources have vary mistake characteristics, relay on image location and frequency band [14].

In 2014, A. Gupta, S. Shantaiya, proposed vary filters and algorithm similar reveres filter, wiener filter and an afflicted Lucy-Richardson deconvolution algorithm. Before deconvolution step, our split up the stain picture into sleek partition. through insert vary noises and picture become corrupted parameter

scale and extent, the stain picture are then used for picture deblurring. The outcome on filter compare supply the vary parameter which established the picture goodness and better outcome [15].

In 2015, S. Mohammad Ali Sanipour, and I. Ahadi Akhlaghi, proposed a new technique, That is called Enhanced Rotational De-convolution Conjugate Gradient (ERD-CG), first we enhanced the RD technique for the stain picture, and then we join the ERD technique together the CG technique (which is the rebuilding of refined, technique). The empirical results are hopeful and display that the suggest technique outperforms both RD and CG, significantly [16].

* In this paper using summation two original image and applied sharpening filter in section 2, and using 2D Haar Wavelet Transform in section 3. The proposed system, test of result, and conclusion in section 5, 6, and 7 respectively.

5- Proposed Implementation System

The flowchart explain general features for hide secret message inside blurring- sharpening of image, using embedded and extraction algorithms. After hiding secret message uses compression for the stego-sharpening in two levels L2 and L3, as shown in Figure (3).

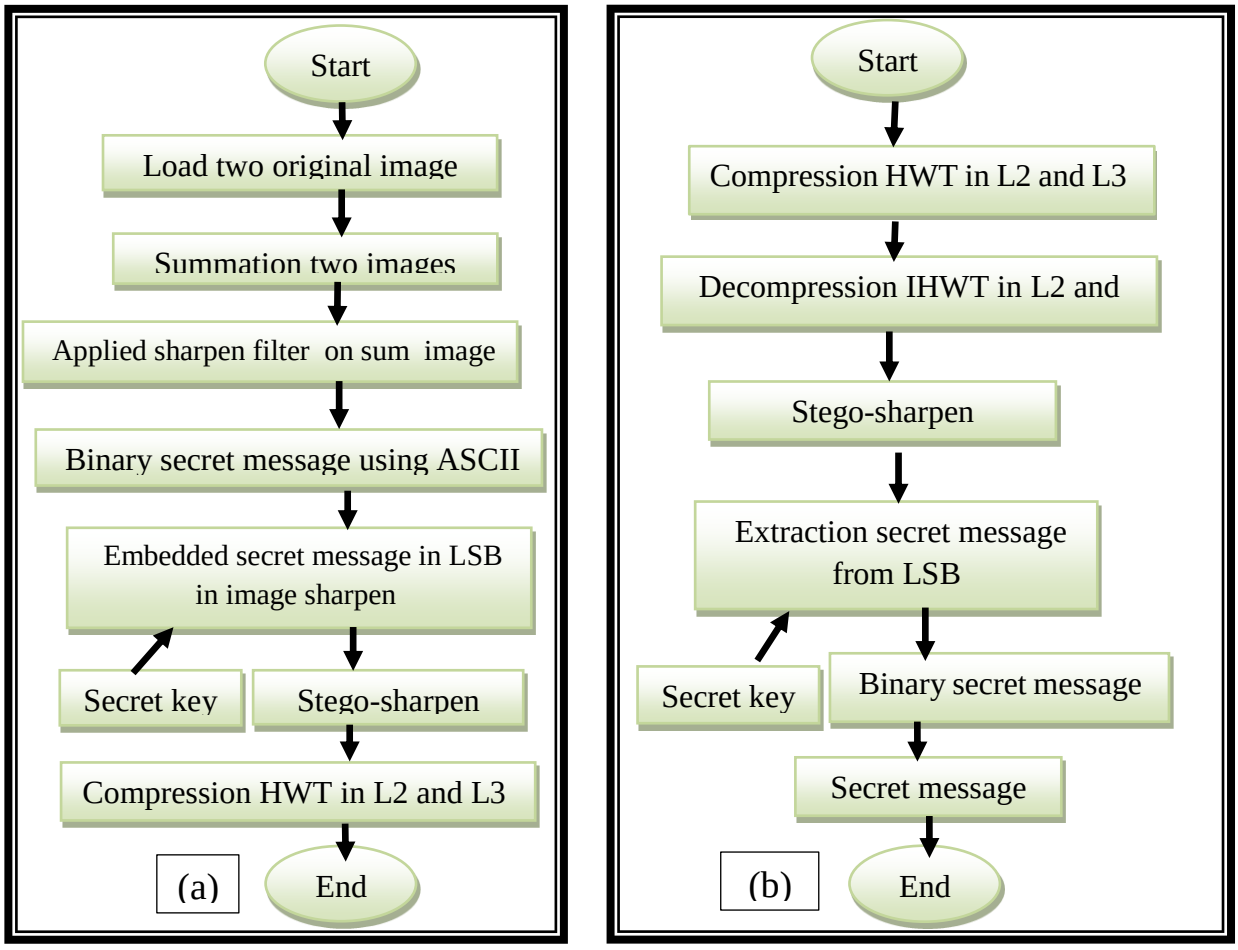


Figure (3): The flow chart of proposed implementation system, (a) The embedded algorithm, (b) The Extraction algorithm.

* This system consists of major four stages to embedded secret message.

First stage: (Summation two original images)

Load two original images in fixed size in the system, and remove noise from each image, the result of sum two images in the same size and format. The system include any size and format of image such as bmp, jpg, png, tif., as shown in Figure (4).

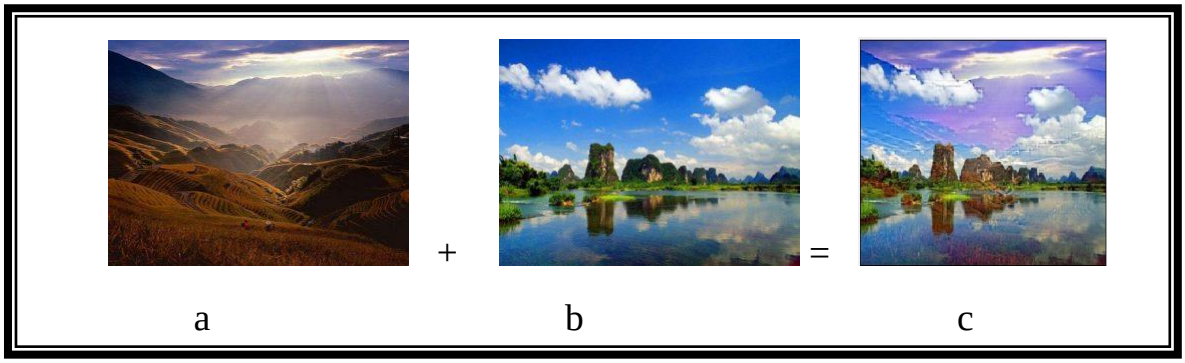


Figure (4): (a) Original image1, (b) Original image 2, (c) Sum images.

Second stage:(Applied sharpen filter)

Load sum of two original images and applied sharpen filter on image also in the same size and format, as shown in Figure (5).

Figure (5): (a) Summation images, (b) Applied sharpen filter on image.

Third Stage:(Stego-sharpen)

Hide the secret message using a secret key depended on curve equation ($2n^2+3$), where **n** is the number of location. This curve equation is find a location to hide one bit from message into image sharpen in LSB two obtain stego-
sharpen. *Stego-sharpen=cover sharpen(C)+ message(M)+ secret key(K)*, as shown in Figure (6).

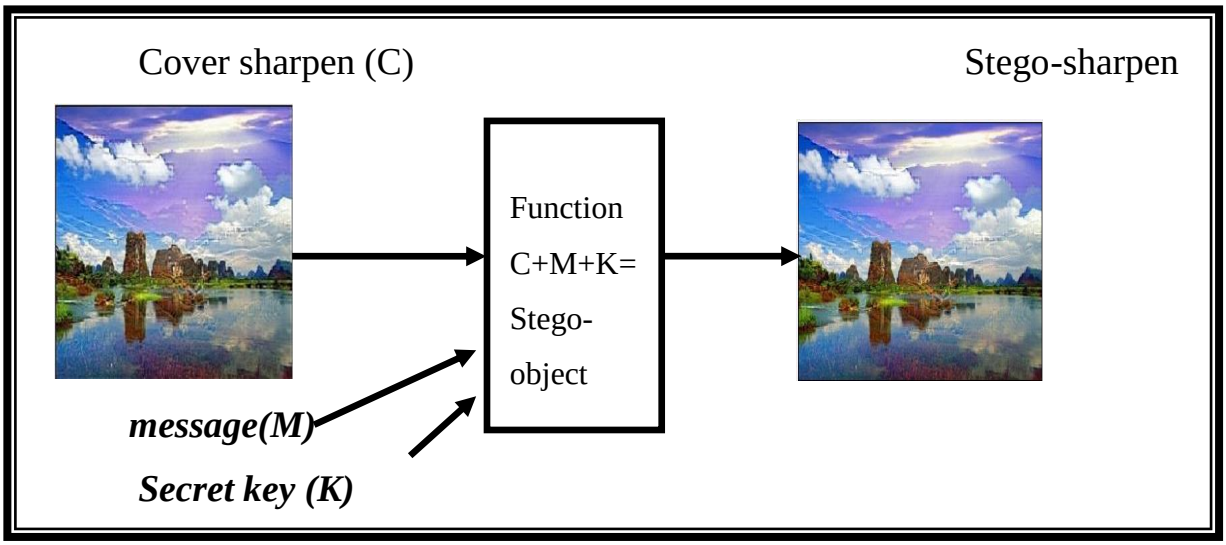


Figure (6): Stego-sharpen in system.

Fourth Stage: (Compression stego-sharpn in 2DHWT)

Compression stego-sharpen after stego stage uses 2D-Haar Wavelet Transform (2DHWT) in level two L2 and level three L3. This method is increases of security for secret message and cann't be detect secret message through transmitted across network internet, as shown in Figure (7). When reception extract secret message, find the location from secret message hide and applied the same curve equation after applied decompression 2D IHWT stego sharpen.

Figure (7): Explain compression stego-sharpen in implementation system in L2 and L3.

Embedded Process

Embedded Algorithm
Process:
Input: Original image, blurring filter, sharpen filter.
Output: Stego-blurring-sharpen.
Initial:
A = Load two original image.
B = Summation two images
C = Load sharpen filter.

D = Load secret key.
E = Load stego- sharpen.
F = Load compression stego- sharpen in L2 and L3.
G = Put the result stego-sharpen in L2 and L3.
Step 1: Load two original image in A.
Step 2: summation two images in B.
Step 3: Applied sharpen filter in C.
Step 4: Find location in image sharpen
Step 5: select location from curve equation $2n^2+3$ (secret key) in D.
Step 6: Embedded message in image sharpen in LSB using secret key to obtain Stego-sharpen in E.
Step 7: Compression stego-sharpen 2DHWT in L2 and L3 In F.
Step 8: Result (put the result of compression stego-sharpen in L2 and L3) in G.
Step 10: End.

Extraction Process

Extraction Algorithm
Process:
Input: Compression stego-sharpen in L2 and L3
Output: Secret message.
Initial:
A = Load compression stego-sharpen in L2 and L3.
B = Decompression stego-sharpen in L2 and L3.
C = Extraction stego-sharpen.
D = Load secret key curve equation $2n^2+3$.
E = Extraction binary secret message from LSB from stego-sharpen.
F = convert binary secret message.
G = Extraction secret message.
Step 1: Load compression stego-sharpen in L2 and L3 in A.
Step 2: Applied IHWT to decompression stego-sharpen in L2 and L3 in B.
Step 3: Extraction stego-sharpen in C.
Step 4: Find location from secret key curve equation in D.
Step 5: Extraction secret message from LSB in E.
Step 6: convert binary secret message uses ASCII in F.
Step 7: Result (put the result secret message) in G.
Step 8: End.

6- Test of Result

This section explain test of result of proposed implementation system in four stages, sum two original image, Sharpen image, Stego-sharpen, and compression stego-sharpen in level two L2 and level three L3. And difference between them and compute measure of PSNR, and MSE, as shown Table (1) and Table (2).

Table (1): Implementation system of compression stego-sharpen image in L2 and L3.

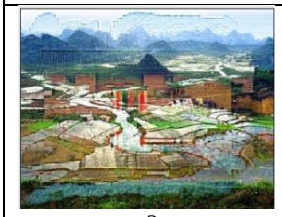
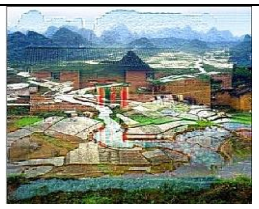
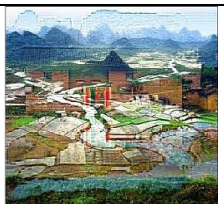
Sum original images	Sharpening image	Stego-sharpen	Compression stego-sharpen L2	Compression stego-sharpen L3
 1				
 2				
 3				

Table (2): Compute measurement of PSNR and MSE of Implementation system.

No	Sum original images	Sharpening image	Stego-sharpen	Compression stego-sharpen L2	Compression stego-sharpen L3
1	PSNR=1.05421 MSE=22597.8879	PSNR=1.03059 MSE=23088.323	PSNR=1.14623 MSE=15276.397	PSNR=1.25997 MSE=18814.9981	PSNR=1.51754 MSE=15097.7362
2	PSNR= 1.35157 MSE=17378.5218	PSNR=1.28622 MSE=18389.1285	PSNR=1.49721 MSE=10987.6531	PSNR=1.89546 MSE=11121.0629	PSNR=1.85738 MSE=11458.8236
3	PSNR=1.170549 MSE=20357.4280	PSNR=1.08919 MSE=21894.45772	PSNR=1.21576 MSE=15897.6513	PSNR=1.33358 MSE=17649.7994	PSNR=1.247590 MSE=**19019.98**75

7- Conclusion

The implementation system uses hide secret message into image sharpen, and compression using 2DHWT after embedded. This system is good, efficient, transparency, robustness, and high security. Because, uses compression stego-sharpen in 2DHWT in L2 and L3 is robust and transparency without sensitive by attacker's. the intrusion existence networks and internet can't be change this secret message from image, the system is very interested not detected message through from image, because uses two original images to color of images overlapped, became very complex from

recognition color of image when hide messages. it will be test outcome by set of measurement to evaluated such as PSNR and MES, the PSNR is decremented in sum original image and sharpen image whereas increased in stego and compression in L2 and L3, the MSE is increased in sum original image and sharpen image whereas decrement in stego and compression in L2 and L3.
This indicates to robust system in field of information hiding.

References

1- L. Roger, and Jr. Easton, "Fundamentals of Digital Image Processing", 2010.
2- R. Chandel, and G. Gupta, "Image Filtering Algorithms and Techniques: A Review",
International Journal of Advanced Research in Computer Science and Software
Engineering, Vol. 3, No. 10, October 2013.
3- P. C. Hansen, and J. G. Nagy and D. P. O'Leary, "Deblurring Images. Matrices, Spectra and Filtering", SIAM, Philadelphia, 2006.
4- S. Sharda, and S. Budhiraja, " Image Steganography: A Review", International Journal of Emerging Technology and Advanced Engineering, Vol. 3, No.1, January 2013.
5- Rajani, and M. Tauheed Khan, "Data Hiding In Digital Image Processing Using
Steganography: A Review", International Journal of Engineering Development and
Research (IJEDR), Volume 2, No. 3, 2014.
6- M. M. Emam, Abdelmgeid A. Aly, and F. A. Omara, "An Improved Image
Steganography Method Based on LSB Technique with Random Pixel Selection",
(IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 7, No. 3, 2016.
7- F. Vankawala , A. Ganatra, and A. Patel, "A Survey on different Image Deblurring
Techniques", International Journal of Computer Applications, Vol. 116, No. 13,
April 2015.
8- Marapareddy. R, "Restoration Of Blurred Images Using Wiener Filtering",
International Journal Of Electrical, Electronics And Data Communication, Vol. 5, No. 8, Aug.-2017.
9- C. Grillenzoni, " Statistics for Image Sharpening", Statistica Neerlandica, 2006.

10- "Raster & Image Processing Sharpening Filters", MicroImages, Inc., 2014.
Available at: www. microimages.com
11- J.-Jian Liaw, S.-Bin Lian, Y.-Fa Huang, R.-Ching Chen, " Using Sharpness Image with Haar Function for Urban Atmospheric Visibility Measurement", Aerosol and Air Quality Research, 2010. DOI: 10.4209/aaqr.2009.11.0074
12- Scott Eumbaugh, "Digital Image Processing And Analysis: Human and Computer Vision Applications with CVIPtools", Scond edition, Tayolar and Francis, 2010.
13- A. Bhardwaj, and R. Ali, " Image Compression Using Modified Fast Haar Wavelet Transform", World Applied Sciences Journal Vol. (7) No. (5), 2009.
14- M. W. Tao, J. Malik, and R. Ramamoorthi, "Sharpening Out of Focus Images using High-Frequency Transfer", Eurogrphics / I. Navazo, P. Poulin, Vol. 32, No. 2, 2013.
15- A. Gupta, and S. Shantaiya, "Reduction of Image Blurring With Digital Filters", Journal of Engineering Research and Applications, Vol. 4, No.1, 2014, pp.139-143.
16- S. Mohammad Ali Sanipour, and I. Ahadi Akhlaghi, " A New Method for liminating blur Caused by the Rotational Motion of the Images", 2015.
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