iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 2 **Issue:** VIII **Month of publication:** August 2014

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

INTERNATIONAL JOURNAL FOR RESEARCH IN APPLIED SCIENCE AND ENGINEERING TECHNOLOGY (IJRASET)

Evaluation of LSB Based Digital Watermarking Algorithm Using Various Parameters

[1]Shefali Manchanda [2]Er.Ravinder Bisht, [3]Deepika Chaudhary

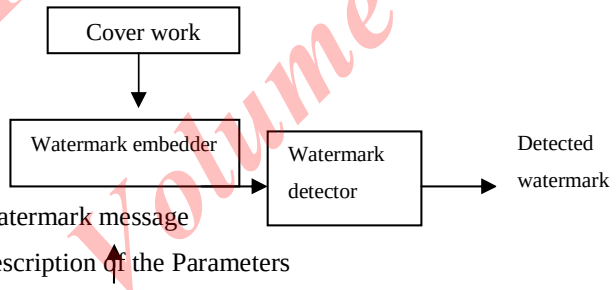
[1,2]*Department of Electronics & Communication Engg RPIIT Technical Campus, Karnal*
[3]*Department of Electronics & Communication Engg, DVIET, Karnal*

Abstract: Digital Image watermarking is the process of trouncing the digital data in the image, by inclusion of digital mark into the image. The research presents digital watermarking algorithm using least significant bit (LSB). LSB is used because of its reserved effect on the image. In this an invisible and a visible watermarking technique is implemented.. Various attacks are also performed on watermarked image and their impact on quality of image is also studied using various parameters like Mean Square Error (MSE), Peak Signal to Noise Ratio (PSNR), Signal to Noise Ratio (SNR), Signal Mean Square Error (S_MSE) and the effect of rotation on watermarked image is also observed. The work has been implemented through MATLAB.

Keywords - Watermarking, Least Significant Bit (LSB), Mean Square Error (MSE) Peak Signal to Noise Ratio (PSNR), Signal to noise ratio(SNR),and Signal to Mean Square Error(S_MSE).

I. INTRODUCTION

The digital watermarking process embeds a signal into the media without significantly degrading its visual quality. Digital watermarking is a process to embed some information called watermark into altered kind of media called cover work .Digital watermarking involves embedding a structure in a host signal to mark it rights.



MSE:

The mean squared error (MSE) for our practical purposes allows us to compare the "true" pixel values of our original image to our degraded image. The MSE represents the average of the squares of the errors between the actual and the noisy image. The error is the amount by which the values of the original image differ from the degraded image.

PSNR:

(PSNR) is a term for the ratio between the maximum possible value (power) of a signal and the power of distorting noise that affects the quality of its representation. PSNR is expressed in terms of the decibel scale (db). It is wanted that higher the PSNR, the better tainted image has

been reconstructed to match the original image and the better the reconstructive algorithm.

SNR:

Signal to noise ratio may be defined as the ratio of the desired signal (meaningful information) to the background noise i.e. unwanted signal. SNR is typically articulated in decibels (dB). An attempt is made maximize the SNR ratio.

Results Analysis:

Host Image

Watermarked Image

Watermarked Images:

WM image (bit 1)

WM image (bit 2)

WM image (bit 3)

WM image (bit 4)

WM image (bit 5)

WM image (bit 6)

WM image (bit 7)

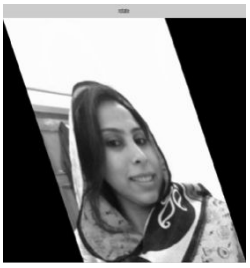
WM image (bit 8)

Noise at Least significant bit '1'

Gaussian Noise

Poisson Noise

Salt & Pepper Noise



Rotation

Noise at intermediate bit '4'

Vol. 2 Issue VIII, August 2014
ISSN: 2321-9653


Gaussian Noise


Poisson Noise


Salt & Pepper Noise


Rotation

Noise at Most significant bit '8'


Gaussian Noise


Poisson Noise


Salt & Pepper Noise


Rotation

Evaluation of Various Attacks on Watermarked Image

Table1. For watermarked image

Bit value	MSE	PSNR	SNR	S_MSE
1	89.1881	28.6617	16.0378	4.5595
2	88.1029	28.7149	16.1409	4.6127
3	96.0423	28.3402	16.2709	4.238
4	105.7461	27.9222	16.4729	3.8199
5	126.161	27.1555	16.8721	3.0533
6	162.6044	26.0535	16.6582	1.9513
7	186.347	25.4616	13.5588	1.3594
8	185.2631	25.4869	8.1825	1.3847

Table2. For watermarked image with Gaussian Noise

Bit value	MSE	PSNR	SNR	S_MSE
1	54.7043	30.7846	23.1948	6.6824
2	54.6892	30.7858	23.3486	6.6836
3	65.8617	29.9785	23.6158	5.8762
4	83.7878	28.9333	23.7917	4.8308
5	124.1223	27.2263	23.0014	3.1241
6	175.4487	25.7233	19.827	1.6211
7	173.4957	25.7719	14.522	1.6697
8	165.8621	25.9673	8.2168	1.8651

Table3.For watermarked image with Poisson Noise

Table4. For watermarked image with Salt & Pepper noise

Bit value	MSE	PSNR	SNR	S_MSE
1	6.9427	39.7495	10.6911	15.6473
2	7.1931	39.5956	10.5763	15.4934
3	16.1297	36.0885	10.8812	11.9863
4	45.6713	31.5684	10.8181	7.4661
5	163.1726	26.0383	10.8025	1.9361
6	168.4937	25.899	10.7456	1.7967
7	157.4057	26.1946	10.0895	2.0924
8	150.7682	26.3817	7.3697	2.2795

Table5. For watermarked image with Rotation

Bit value	MSE	PSNR	S_MSE
1	132.6715	26.937	2.8348
2	132.5388	26.9414	2.8391
3	136.7012	26.8071	2.7049
4	149.2971	26.4243	2.3221
5	198.0776	25.1964	1.0942
6	201.8445	25.1146	1.0124
7	208.9469	24.9644	0.86222
8	213.0814	24.8793	0.77712

II. CONCLUSION

Digital watermarking is an important step towards management of copyrighted and tenable documents. Information hiding is possible with the help of watermarking which is the need of today's seclusion or illegal use of images. Users expect that robust solutions will ensure copyright protection and also guarantee the authenticity of multimedia documents but in today's world of research, it is difficult to assert which watermarking approach seems most suitable to ensure a veracity service adapted to images and more general way to multimedia document. Thus the result of our proposed work calculating MSE PSNR, SNR, S_MSE of image size 256pixels shows that the varioattack of noise or rotation doesn't degrade our final obtained image to great exposure, thus is vigorous to illegal attacks.

REFERENCES

[1] Vaibhav Joshi and Milind Rane "Digital Water marking Using LSB Replacement with Secret Key Insertion Technique" Association of Computer Electronics and Electrical Engineers, 2014 Electronics and Electrical Engineers, 2014

[2] Rajni Verma and Archana Tiwari "Copyright Protection for Watermark Image Using LSB Algorithm in Colored Image" Advance in Electronic and Electric Engineering. ISSN 2231-1297, Volume 4, Number 5 (2014), pp. 499-506

[3] Gurpreet Kaur and Kamaljeet Kaur "Image Watermarking Using LSB (Least Significant Bit)" International Journal of Advanced Research in Computer Science and Software Engineering. ISSN: 2277 128X, Volume 3, Issue 4, April 2013 , pp.858-861.

[4] Deepshikha Chopra, Preeti Gupta, Gaur Sanjay B.C. and Anil Gupta"LSB Based Digital Image Watermarking For Gray Scale Image" IOSR Journal of Computer Engineering (IOSRJCE) ISSN: 2278-0661, ISBN: 2278-8727 Volume 6, Issue 1 (Sep-Oct. 2012), pp. 36-41

[5]Puneet Kr Sharma and Rajni "Analysis of Image Watermarking Using Least Significant Bit Algorithm" International Journal of Information Sciences and Technique (IJIST) Vol.2, No.4, July 2012, pp. 95-101

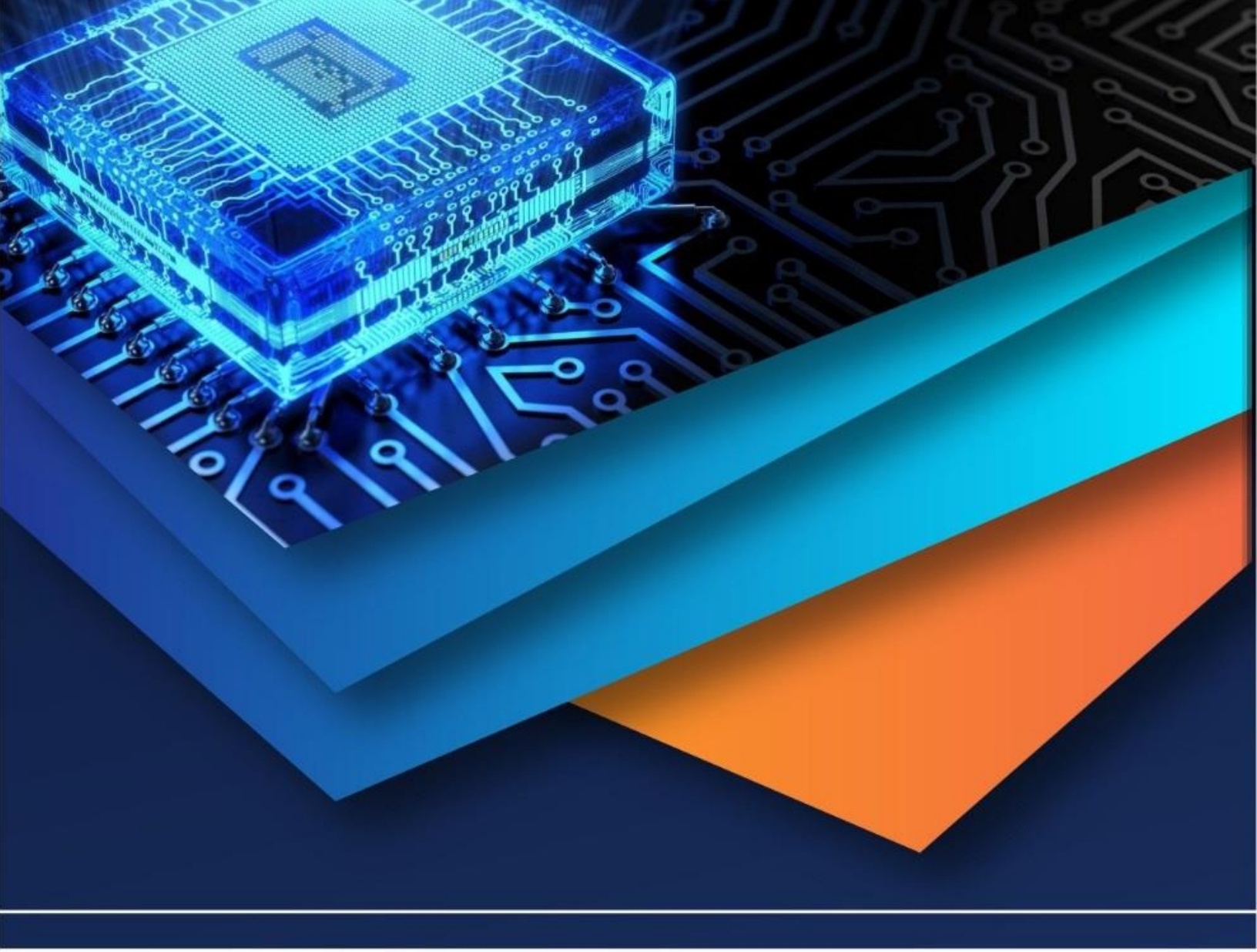
[6] ZhiYuan An and Haiyan Liu "Research on digital watermark technology based on LSB algorithm " 2012 IEEE , pp.207-210

[7] Mehmet Utku Celik, Gaurav Sharma, Ahmet Murat Tekalp and Eli Sabe "Lossless Generalized-LSB Data Embedding"

IEEE Transaction on Image Processing, Vol. 14, NO. 2, February 2005 , pp.253-266.

[9] Vidyasagar M. Potdar, Song Han and Elizabeth Chang "A Survey of Digital Image Watermarking Techniques" 2005 IEEE, pp.709-716.

[10] Minewa M. Yeung and Fred Mintzer "An Invisible Watermarking Technique For Image Verification" IEEE, 1997, pp.680-683.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY