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RESEARCH ARTICLE

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DIGITAL IMAGE WITH LSB :STEGANOGRAPHY

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ABSTRACT

In objective measures of image quality metrics, some statistical data are calculated to indicate the reconstructed quality of image. The image quality metrics provide some measure of closeness between two digital images by exploiting the differences in the statistical distribution of pixel values.

Keywords: Image, Digital Image, LSB, SSIM, RMSE, SNR, PSNR.

I. INTRODUCTION

To a computer, an image is a collection of number that constitutes different light intensities in different areas of the images. Images are nothing but set of pixels, each pixel can be considered as a box holding the colours codes in a known sequence.

Digital Image

In our proposed method we are work on digital image because digital image are in binary language i.e. 0 and 1 form. Using LSB we are work on binary language. Images are a set of pixel and it support bit format.

If the text is displayed correctly, there should be no visual difference from ordinary text. In case of digital images the embedded information can be either visible or hidden from the user. In which binary format it is important to determine the window size. If the window is too small, the distribution of feature point is concentrated on text used areas. Otherwise, the feature becomes isolated.LSB modification is based on the substitution of LSB plane of the cover image with the given watermark.

Lsb insertion is a common, simple approach to embedding information in a cover image. The LSB of some or all of the bytes inside an image is changed to a bit of the secret message .LSB steganography has been used, he has no way of knowing which pixels to target without the secret key.

Modulating the LSB does not result in human perceptible difference because the amplitude of the change is small.

A large amount of data can be embedded by LSB without observable changes..In general, areas with high contrast and noise like region are selected for embedding to avoid distortion. Modification to low contrast regions will be perceptible to the human eye easily here we are uses low frequencies to represent the secret message.

It is very effective, easy to implement and takes very less space but it has low imperceptibility. The goal of the manipulation in image can be divided into three categories:

Image Processing: image in -> image out

Image Analysis: Image in -> measurement and

Image Understanding: Image in -> high level description

We will focus on fundamental of image processing. Correlation factor describes the degree of closeness of the images. Its value is unity when the cover and stego images are completely correlated and it is zero when both are completely uncorrelated.

Image Compression

When working with larger images of greater bit depth, the images tend to become too large to transmit over a standard internet connection .In order to display an image in a reasonable amount of time, techniques must be incorporated to reduce the images file size. These techniques make use of mathematical formulas to analyse and condense image data, resulting in smaller file sizes. This process is called compression.

In images there are two types of compression: Lossy and Lossless. Both, methods save storage space, but the procedures that they implement differ. Lossy Compression creates smaller files by discarding excess image data from the original image. It removes details that are too small for the human eye to differentiate, resulting in close approximations of the original image, although not an exact duplicate .An eg of an image format that uses this compression technique is JPEG.

Lossless Compression, on the other hand, never removes any information from the original images, but instead represents data in mathematical formulas. The original images integrity is maintained and the decompressed images output is bit-by-bit identical to the original image input. The most popular image formats that use lossless compression is GIF and 8-bit BMP.

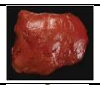
Compression plays a very important role in choosing which steganographic algorithm to use. Lossy compression technique techniques result in smaller images file sizes, but it increases the possibility that the embedded message may be partly lost due to the fact that excess image data will be removed. Lossless compression though, keeps the original digital image intact without the chance of lost, although is does not compress the image to such a small file size.

II. EXPERIMENTAL RESULTS AND DISCUSSION

Experiments are carried out on certain categories of medical images varying in size and bits per pixels. Standard results are taken using various medical images .To evaluate the data hiding capacity and medical image quality, the performance evaluation is measured by PSNR,MSE,SSIM,SNR,BER ,RMSE etc. We have presented an algorithm with lossless data hiding scheme. Our algorithm has shown a significant improvement on lossless scheme and output performs in terms of parameters which considered for evaluation.

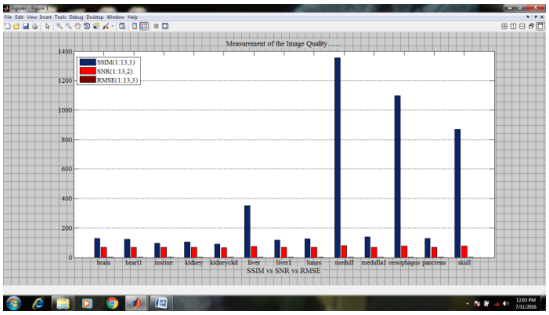
Measurement of the image quality using various parameters…..

Table 1: SSIM and RMSE and SNR values of different images.

S.No	Images	Images Name	SSIM	RMSE	SNR
1		brain.png	128.971	0.0880549	69.2357
2		heart1.png	124.455	0.0896385	69.0809
3		Instine.png	96.1154	0.102001	67.9587
4		kidney.png	104.302	0.0979159	68.3137
5		kidneyckd.png	91.0535	0.104798	67.7238
6		liver.png	351.75	0.0533191	73.5931
7		liver1.png	118.024	0.0920481	68.8505
8		lungs.png	125.162	0.0893848	69.1055
9		medull.png	1356.3	0.0271533	79.4544
10		medulla1.png	140.23	0.084446	69.5992
11		oesophagus.png	1097.42	0.0301866	78.5345
12		pancreas.png	129.728	0.0877976	69.2612

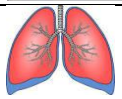
13		skull.png	870.267	0.033898	77.5273

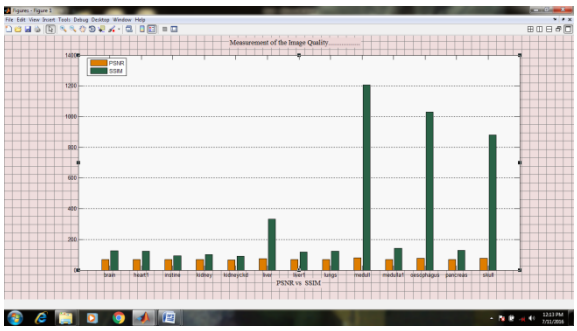
13		skull.png	321*244	321*244



Graph showing the SSIM vs SNR vs RMSE variation.

Table 2: Original Image Size and Stego-image size values of different images.

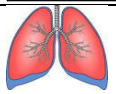
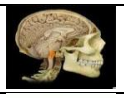
S.No	Images	Images Name	Size of Original Image	Size of Stego Image
1		brain.png	116*116	116*116
2		heart1.png	111*111	111*111
3		Instine.png	84*119	84*119
4		kidney.png	91*115	91*115
5		kidneyckd.png	75*121	75*121
6		liver.png	67*119	67*119
7		liver1.png	79*124	79*124
8		lungs.png	109*111	109*111
9		medull.png	137*132	137*132
10		medulla1.png	96*93	96*93
11		oesophagus.png	105*108	105*108
12		pancreas.png	74*142	74*142



Graph showing the PSNR vs SSIM variation.

Measurement of the image quality using various parameters…..

Table 3: SSIM and PSNR values of different images.

S.No	Images	Images Name	SSIM	PSNR
1		brain.png	128.971	69.2697
2		heart1.png	124.455	69.1149
3		Instine.png	96.1154	67.9927
4		kidney.png	104.302	68.3477
5		kidneyckd.png	91.0535	67.7578
6		liver.png	351.75	73.6271
7		liver1.png	118.024	68.8845
8		lungs.png	125.162	69.1395
9		medull.png	1356.3	79.4884
10		medulla1.png	140.23	69.6332
11		oesophagus.png	1097.42	78.5685
12		pancreas.png	129.728	69.2951

13		skull.png	870.267	77.5613

III. FUTURE SCOPE

As a future work, we will try to enhance the embedding capacity by modifying the proposed method to make it able to use each pixel in the cover image without degrading the stego-image quality (PSNR).

VI. CONCLUSION

Visual quality of stego image (i.e. image distortion) security and amount of data (compression) shared. So, compression, redundant bit and bit depth make digital image format stronger than other format .And these factor help in achieving high embedding capacity and visual quality.

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