COMPARISON STUDY FOR PARAMETERS TO QUANTIFY THE IMAGE DISTORTION BETWEEN COVER AND STEGO IMAGE

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ABSTRACT

Communication is very important technology in the contemporary world. Information should be communicated easily from one place to anywhere else. The information should be communicated in secure manner. Steganography is one of the techniques which provide an effective way to achieve the secure communication. This comparison study discusses about different parameters that are used to quantify the performance of the embedded details in the cover image. In this paper the parameters like Mean Square Error (MSE), Signal-to-Noise Ratio (SNR), Peak- Signal-to-Noise Ratio (PSNR), Average Absolute Difference (AAD) and Correlation Quality (CQ) is compared with cover image and stego image.

Keyword: - *Steganography, encryption, comparison, image parameters, stego image.*

1. INTRODUCTION:

Steganography is the technique to hide [1] the data in some sources. The source/data can be text, image, video or audio. Images are mainly used as a source to hide the data. The data or message to be secure is hided in the cover image. To increase the security, the data can be encrypted by using any of cryptographic algorithms [1, 3] before embedding into the image. Mostly Least Significant Bit (LSB) substitution [6,7] method is used to embed the details in the cover image.

Number of authors proposed various procedures to convert the original data into secure data. The data to be hided is stretched [4] after dividing the value by some constant and use the reminder and quotient value for hiding. The reverse steps will be applied for decoding the data.

This stretching approach provides more security than embedding the data directly. Various image processing techniques [2] can be used to identify the quality between cover image and stego image. Several modified LSB substitution [7] method also proposed to achieve more security in data communication.

2. RESULTS & DISCUSSION

Number of sample images [5] has been experimented with LSB substitution embedding method. Each sample image is tested with various text size and compared with its corresponding stego image. Sample cover image and its corresponding stego images are shown in Fig. 1. The stego image is obtained after embedding 1421 characters in the cover image.

Title	Cover Image	Stego Image
Image1		
Image2		
Image3		

Fig -1: Sample result

Table 1 shows the result of various performance parameters for a sample image. MSE and AAD should be low and other values should be high is desirable i.e the cover image and stego image may not have much difference.

Table -1 : Parameter values for Image1

Embedded Text Size (No. of Chars)	93	186	461	1421
MSE	0.0011	0.0022	0.0039	0.009
SNR	123.198	116.4261	110.8594	102.5058
PSNR	178.6431	171.8712	166.3045	157.9509
AAD	920	1828	3313	7765
CQ	235.3174	235.3173	235.3172	235.3166

Chart -1 show the MSE comparison for three sample images with 93,186, 461 and 1421 characters embedded in the cover image.
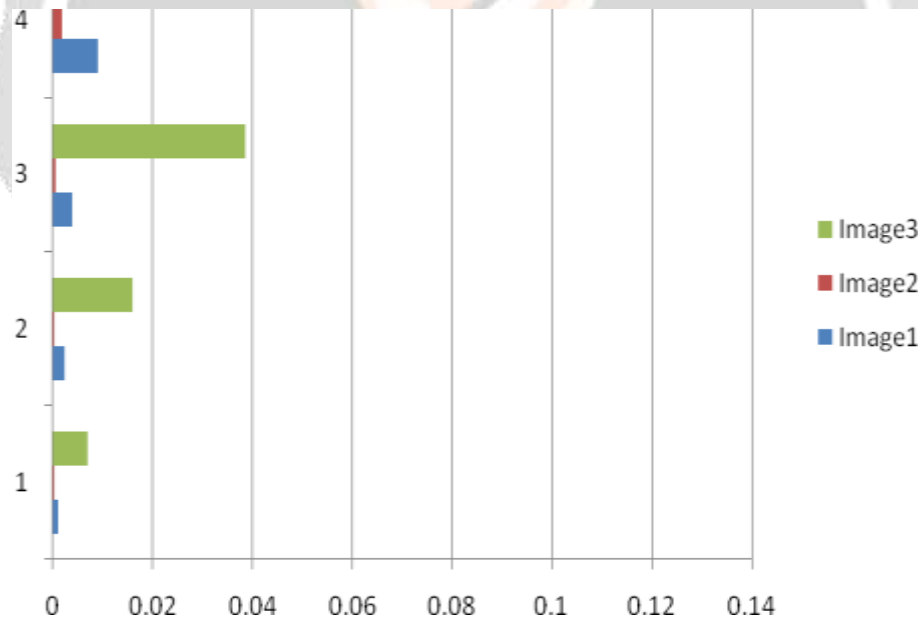

Chart -1: MSE comparison for different text size

3. CONCLUSION

In this paper various parameters to quantify the amount of image distortion between the images of before and after embedding data are discussed. If the difference of MSE values between the images is low then the changes can't be visible to human eye. If the number of characters to be embedded is high then there is more chance to note the difference. Steganography objective is embedding as much as possible data with less MSE.

4. REFERENCES

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