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Image Watermarking Using Spatial Domain

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Abstract

Watermarking is the most imperative innovation for installing (Adding) concealed picture into the information picture with the assistance of different calculations. Due to this feature of watermarking now days it is gaining lot of attraction. Now a day for preventing duplication an image is embedded in the information. In various applications such as Digital audio, video, and images a hidden copyright images is inserted into the original data. In this paper for inserting computerized watermark into the objective picture an anchored procedure is proposed. The proposed calculation will perform imperceptible watermarking of picture in spatial space. The Key is embedded in the original image and it will transfer to the receiver. At the receiver end the key is extracted using proposed algorithm. Various observationsare done on the image like peak signal to mean noise ratio (PSNR).PSNR is comes out to bethe Peak-SNR value is 20.4082, The Signal to Noise ratio (SNR) value is 14.8358 for the Gaussian noise for zero mean and 0.01 variance.

The Peak-SNR value is 18.9910, The SNR value is 13.4185 for the salt and pepperfor0.04 correlation coefficient.

Keywords:*Spatial domain, PSNR, Salt and pepper, Gaussian, Key*

INTRODUCTION

Watermarking is the technology in which information is embedded into an image so that Image seems unchanged and watermark can be extracted even after processing. In this technology removing watermark should destroy theimage.In the digital watermark method asecret information is clandestinely passes to the receiver with the help of secrete key using some algorithm [1]. This technology is used for protecting various digital media like video, audio. This technique is very useful for authentication of very imperative data and it will protect copyright [2]. It is conceivable that the proposed method may convey a few watermarks in the meantime. The Least Significant Bit (LSB) adjustment strategy changes the LSB of picked pixels in the picture; it is additionally conceivable to utilize all the more such LSB bits of the picture similarly. Additionally, it makes conceivable to implant the watermark picture in the base picture on numerous occasions which makes it so that if an assault expels the greater part of the watermarks, a staying single can likewise demonstrate enough. Image watermarking should posses some desirable properties such as Visually Imperceptible, Statistically Imperceptible, robust to attack like Cropping, resizing, compression, rotation, noise, rescaling, and collision. It should posse's high capacity, speed of embedding as well as detection.

TYPES OF WATERMARKING

There are two different types of Image watermarking I. Spatial domain

watermarking II. Frequency domain watermarking. In Spatial domainit ismaybe possible that watermark image information can be overlapped on original information. It is very difficult to separate out the overlapped information in spatial domain (Figure 1).

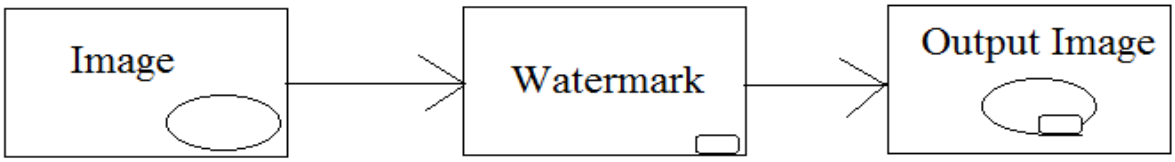

Figure 1:*Spatial Domain Watermarking Disadvantage.*

In this paper the spatial domain watermarking with least significant bit modification method isproposed.This method will modify the least significant bit of the target pixel in the input image.
In an image most significant information of the image is stored in Most Significant Bit (M.S.B.) whereas the least information is stored in the L.S.B. of an image. In this method watermark image can be embedded n number of times within the flake of image. The spatial domain watermarking is very robust to the attack. But the main advantage is it is very simple to design. In the recurrence space, data is cover up in the recurrence band. The watermark picture is installed into the coefficients of change area, for usage of recurrence space distinctive strategies are utilized like DCT, DWT and DFT. From heartiness and indistinctness perspective, change area methods are superior to spatial space strategies [3,4].
The objective of digital watermarking is the creation/development of an image which looks similar to the original image, but through detection phase, gives the watermark back. For achieving the objective, a basic embedding algorithm is studied (Figure 2-4) [5,6].

Insertion/Embedding

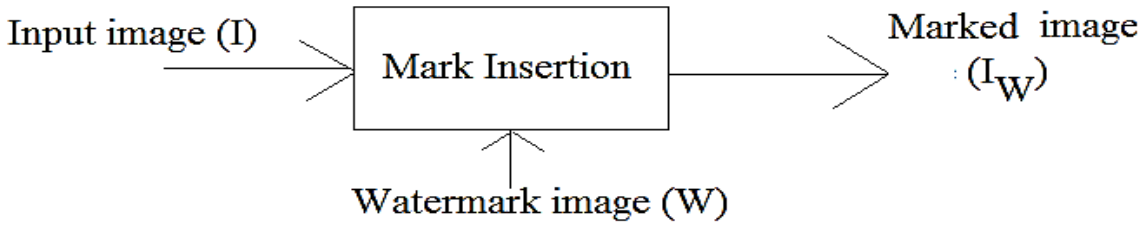

Figure 2:*Embedding Process.*

Detection

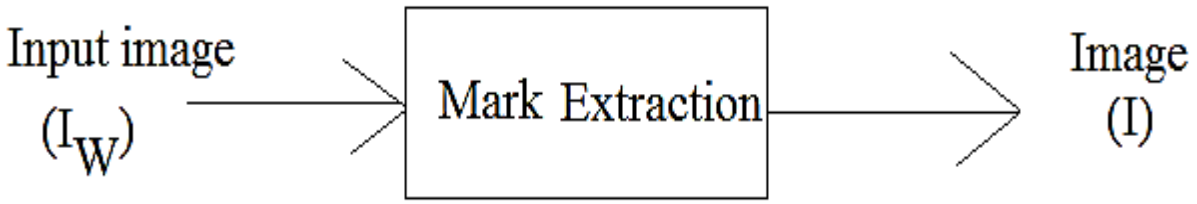

Figure 3:*Detection Process.*

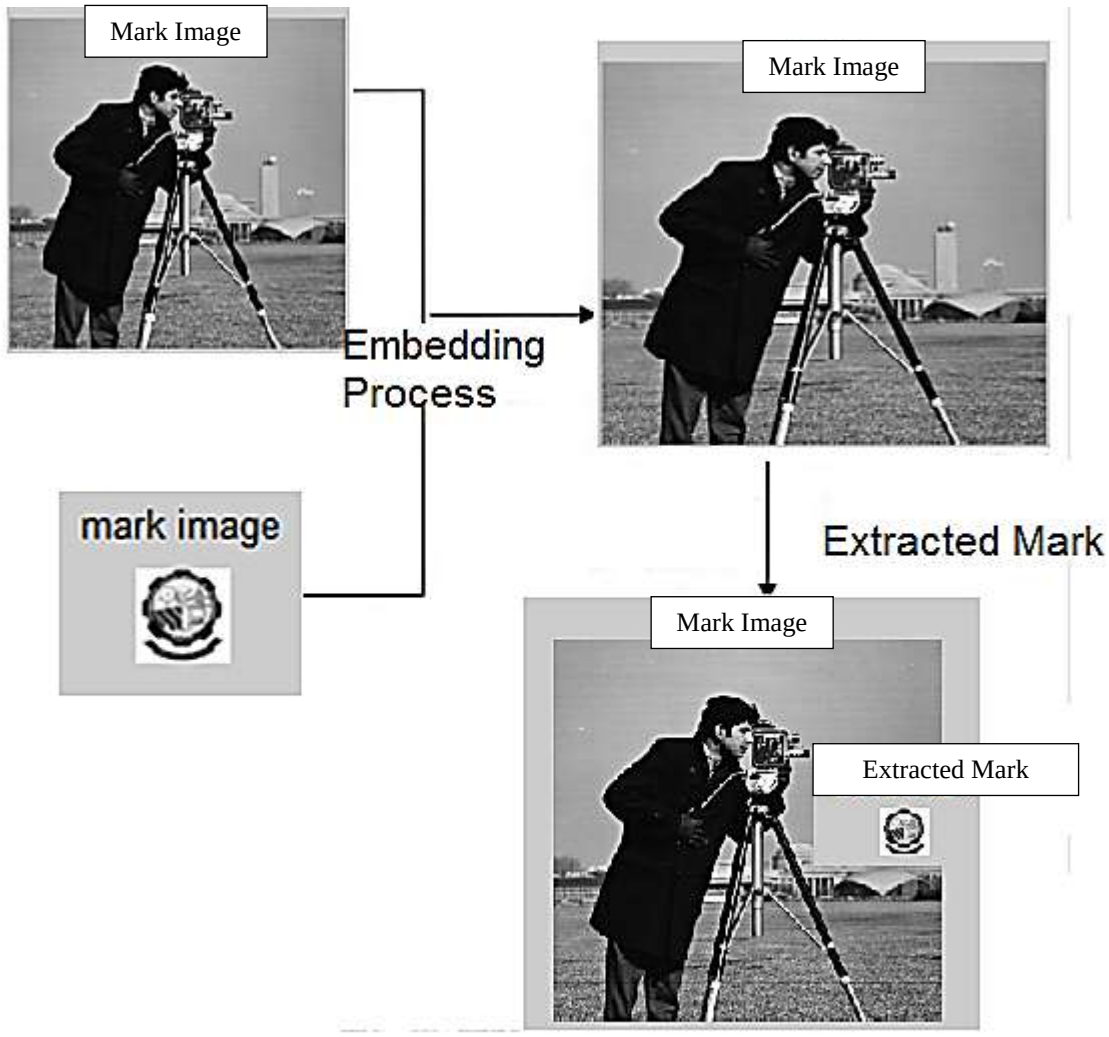

Figure 4:*Implemented Watermark System.*

PARAMETERS AFFECTING IMAGE QUALITY

Collusion attack: This kind of assault is finished by programmers they will discover the watermark picture implanted in a picture. Programmers will endeavor to expel the watermark utilizing different method.

Noise attack: In this type of attack the noise such as additive noise, Gaussian noise and salt & pepper noise etc will try to degrade the quality of image.

Interference attack: In the transmitted image various noises can be added to the 4. The original image using bitwise original image interference attack is adding additional noise to the watermarked image.

IMPLEMENTATION

1. In this paper Image watermarking using spatial domain is proposed. The algorithm works in following mention steps.
2. The M.S.B. of the watermark image is extracted using bitwise operator. The L.S.B. bits of the given image are set to zero. The L.S.B. of the original image is set to zero using same operator.
3. The watermark image is inserted into operator.

5. Same process has been performed at the receiver end for getting original image and watermark image.
6. The Image is attacked by salt and pepper noise with the correlation coefficient 0.04
7. PSNR is calculated for the given image.

SIMULATION RESULT

The Image of cameraman is used as an input image for the algorithm; it is shown in Figure 5.

Figure 5:*Original Image*

The logo of YCCE is used as a watermark image for this algorithm (Figure 6)

Figure 6:*Watermark image*

The Figure 7 shows the output at the transmitter end, it will transfer to the communication medium such as internet toward the receiver.

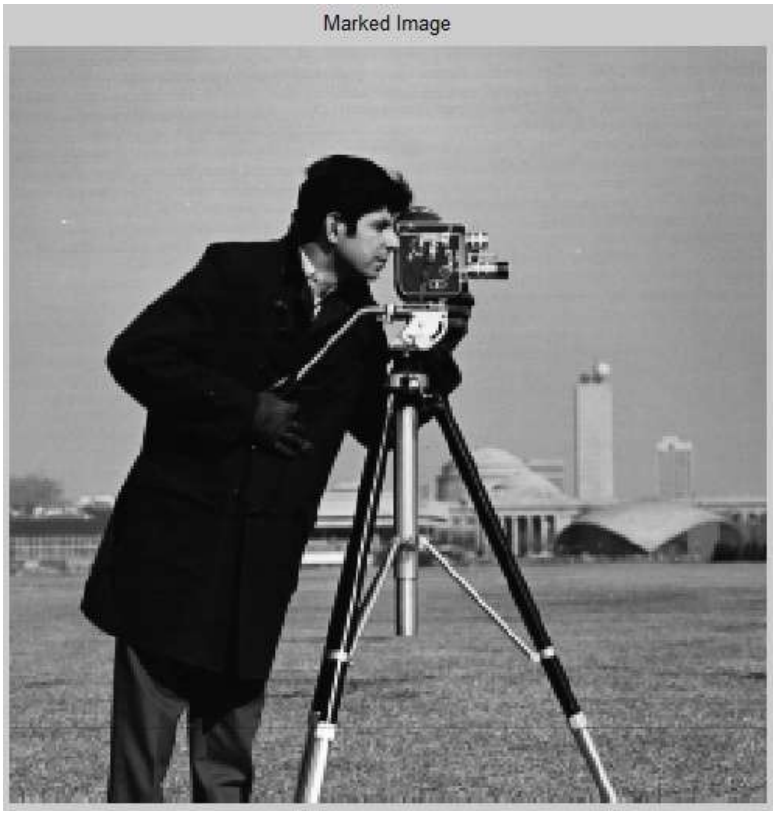

Figure 7:*Watermark Image Embedded in Original Image.*

At the receiver end after applying decryption algorithm the original image and watermark image will separate out (Figure 8).

Figure 8:*Output Image at the Receiver.*

Table 1:*Table Shows PSNR & SNR Values for Different Noises.*

Method	**Existing**		**Proposed**		
Type of noise	**PSNR**	**SNR**	**PSNR**	**SNR**	**Correlation Coefficient**
Salt and pepper	15.28	12.01	19.05	13.47	0.04
Gaussian	14.90	12.20	20.29	14.72	0.01
speckle	17.69	10.89	19.59	14.02	0.04

Table 1 shows the peak signal to noise ratio for the salt and pepper noise is calculated for the given image and it will results Peak signal to noise ratio 19.05 and Signal to noise ratio 13.47 (Figure 9).

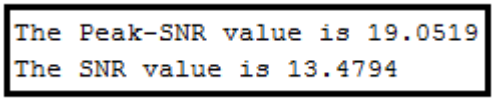

Figure 9:*PSNR Calculation of Image using Salt and Pepper Noise.*

CONCLUSION

In this paper spatial area usage of picture watermarking is performed. The principle weakness of this strategy is it having moderate PSNR. In the event that Frequency area approach like DCT, DWT is utilized it might give better outcome contrasted with the spatial space. In this paper the watermark picture utilized is separated with no impact of commotion. For Speed concern we may utilize pipelined idea.

REFERENCES

1. TyagiSonam, Singh Harsh Vikram, AgarwalRaghav&GangwarSandeep Kumar. Digital Watermarking Techniques for Security Applications.*International Conference on Emerging Trends in Electrical, Electronics and Sustainable Energy Systems (ICETEESES–16).*
2. PardhuThottempudi, PerliBhaskaraRao. Digital Image Watermarking in Frequency Domain.*International Conference on Communication and Signal Processing*. April 6-8, 2016, India.
3. XuehuaJiang. Digital Watermarking and Its Application in Image Copyright Protection.*International Conference on Intelligent Computation Technology and Automation*, 2010.
4. Potdar V. M., Han S. &Chang E.A Survey of Digital Image Watermarking Techniques.*3rd IEEE International Conference on Industrial Informatics (INDIN)*, 2005.
5. Christine I. Podilchuk& Edward J. Delp. Digital watermarking: Algorithms and applications.*IEEE Signal processing Magazine*, July 2001.
6. SchyndelR.G., TirkelA., & Osborne C.F. A Digital Watermark.*Proceedings of IEEE International conference on Image Processing, ICIP-1994*. 1994; pp. 86-90.

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