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Multiple Additive Data in Medical Images Using Histogram Rework

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Abstract— The watermarking is one of the important techniques in the image processing area. The basic need of the reversible watermarking is that after extracting the secret data we should get the original form of that from image. The watermarking purpose is authenticity, security, copyright control, etc. The previous techniques like conventional wavelet transform not applicable to reversible watermarking. In this technique there is no guarantee of reversibility. While in integer wavelet transform the small addition of watermark in sub band can cause the misrepresentation of data or the image. In this the histogram repositioning technique by which we can insert the watermark and also Fourier transform for removing discontinuities.

Keywords— Watermark, PSNR, Histogram Rework, Embedding of Images.

I. INTRODUCTION

The technique of reversible watermarking is the data hiding technique which is useful when application needs no loss data. The blind reversible watermarking is used when secret data is completely hide from the user. Only the person who inserted that watermark is aware of that so that the copyright protection can be maintained in this technique and also authenticity is preserved. The watermarking is blind, non-blind and semi-blind.

In non-blind watermarking the watermark is semi-transparent data which overlays at some position original image. In semi-blind of watermark some extra information is used with watermark. So there is no need to exact watermark for checking authenticity of data. Blind watermarking uses an invisible watermark which is embedded with original image and which can't be perceived with human eyes. [1][5]

II. LITERATURE REVIEW

In recent years there are many various technics are developed for reversible watermarking. There is need of data protection and during transfer it from source to destination.

1. In compression based reversible watermarking there is need to add some additional information to recover the original data and requires lots up space as compared to traditional process.
2. Another method is by quantization, quantization based watermarking is more robust but still it is so fragile in nature.
3. After that in the expansion based watermarking embedding capacity is high is increased and computational complexity is reduced.

To deal with images having more dark regions another technic is introduced which uses histogram rework. By using this technic image are embedded more precisely.

III. WATERMARKING AND GRAYSCALE MEDICAL IMAGES

Nowadays there is use of internet is rapidly increased in many fields. So the availability of digital data to public is common. In many applications internet is used .Such as online-banking, online-shopping, telemedicine, etc. In healthcare services the internet used by physicians to transfer and receive data of patient. And also they used different techniques for maintaining the privacy of the patient. Due to this the new e-diagnosis comes forward and traditional ways of diagnosis are replaced by it.

In most of hospitals the physicians diagnose their patients on the provided electronic and digital data (X-ray, MRI, etc.). Today's world the medical images are directly accessed by patients as well as they are stored for future purpose also. So while transmission of that images the authenticity maintenance is necessary for that watermarking technique is used. If there is any misrepresentation of the image present the physician should have to diagnose the patient carefully on the basis of that faulty image or no diagnose. [1][3][5]

IV. NEW PROPOSED SCHEME

Basically this system is developed into account to make a invisible data hiding of data into a host image. The previous system is doing the same thing but only for textual data like digital signature of some kind of text data. The proposed system is being implemented for images as well as text data. The same system will helps to add watermark image and text data to the host image. Using different methods the work flow is carried out. Initially image data-set is

browsed for providing input images to the Blind Reversible Watermarking. Then after pre-processing is applied on the input images which include histogram generation, histogram is shifting modulation and FrFT transformation.

V. ARCHITECTURE

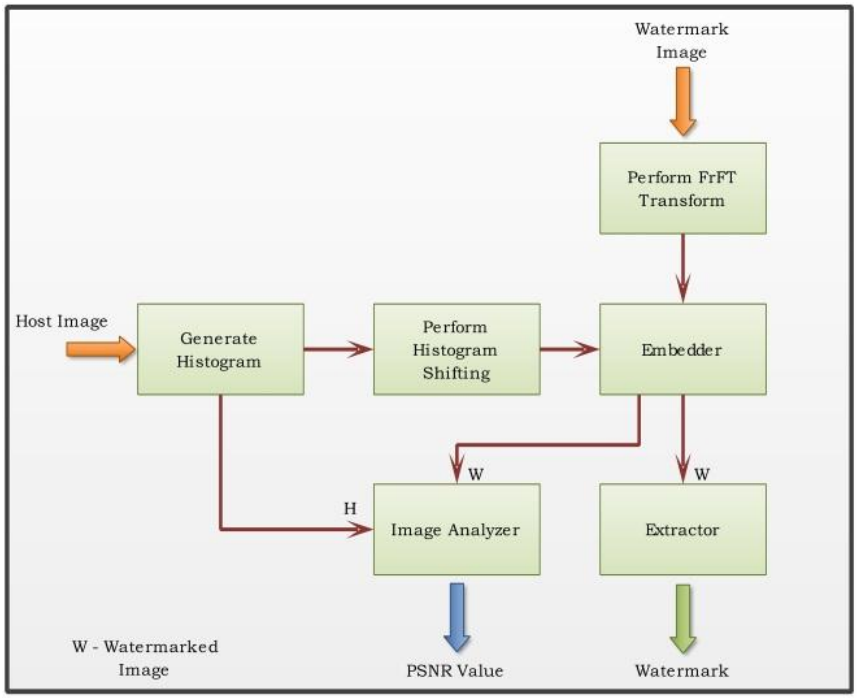

Fig 1: Proposed System

During the histogram generation the histogram of host image is generated and provided to the to the shifting module. Then histogram shifting modulator process the host image (HI) and histogram generated to perform shifting and generate the new image after balancing the histogram. Once the preprocessing is done on the input images they are forwarded to the embedding system which recursively get the carrier bytes as well as payload bytes and perform encoding of data. At the extraction phase previously encoded image (watermarked image) is then provided as input to the extractor which will extract the watermark from encoded image. At last image analyzer takes inputs as host image and encoded watermarked image and calculate the PSNR values. On the basis of that value the analysis carried out. And also analysis is carried out on the basis of embedding capacity of original image. This is elaborated in next section.

VI. ANALYSIS

The analysis is carried out by using two factors. Such as Peak Signal to Noise Ratio(PSNR) and Embedding Capacity of Host image. They are as follows:

A. PSNR values

The PSNR computes the peak signal-to-noise ratio between two images. The value is in decibels. This used for comparison of the host image and watermarked image. The ratio should be higher for better watermarked image. PSNR is associate approximation to human perception of reconstruction quality. Though a better PSNR typically indicates that there construction is of upper quality, in some cases it should not.

To compute the PSNR, the block first calculates the mean-squared error using the following equation:

$$MSE = \sum_{i,j=1,1}^{N,M} (I(i,j) - Iw(i,j))^2$$

In the previous equation, *M* and *N* are the number of rows and columns in the input images, respectively. Then the block computes the PSNR using the following equation:

$$PSNR = 10log_{10}(\frac{(2^a - 1)^2}{MSE})$$

In the previous equation, *R* is the maximum fluctuation in the input image data type. [4][9][10]

B. Embedding Capacity:

The capable size of original image to carry external or secret data is defined as the embedding capacity. Due to the reversible watermarking schemes having to embed the recovery information and watermark information into the original image. The embedding capacity should not be extremely low to aspect the accuracy of the retrieved watermark and the recovered image. The image authentication schemes also require embedding some information into the protected image, and also has to keep the imperceptibility between the pre-process image and processed image.

The formula for the embedding capacity is:

$$Embedding\ Capacity = \frac{Number\ of\ available\ spaces\ in\ original\ images}{Number\ of\ bytes\ to\ payload}$$

VII. SUMMARY AND CONCLUSION

In this paper, the proposed system is concern with making the watermark blind with the help of Histogram Shifting Modulation, Fractional Fourier Transform and Expansion Evolution Modulation. With the proposed system, peak signal to noise ratio and embedding capacity has been used to analyse variety of test images. This method is fragile as any modifications will not impact the watermark. Even though some solutions have already been proposed. The results obtained in this system are as showed better quality aspect after watermarking.

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