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A Blind Reversible Watermarking For Grayscale Images

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Abstract: *In image processing the watermarking technique has great importance. It has much significance like security, authenticity, etc. There are many watermarking techniques were introduced in previous years. The previous techniques like comparison based reversible watermarking in which we need to embed or store additional data for recovery of data while the quantization based reversible watermarking is fragile in nature. Expansion based watermarking is computationally less intensive. In this we use the histogram shifting, fractional Fourier transform and reversible watermarking also. By using this histogram shifting we can insert secret data into host image while fractional Fourier transform used for maintaining the gaps or intervals in the image while generation of histogram shifting*

Keywords: *Histogram repositioning, Fourier rework, PSNR.*

1. INTRODUCTION

Watermarking is nothing but the hiding of secret data or image in host image. It is used for authenticity and identity of owner. The watermarking of two types: visible and invisible.

In Visible watermarking the watermarked information is visible. These types of watermarks are in the form of logo or text. While in invisible watermarking, watermarked information is not visible or perceivable [1][2].

2. LITERATURE LAYOUT

During the previous development there are various techniques developed and those are having their own advantages and disadvantages. Let's take a look of them:

- Comparison based reversible watermarking:

For recovery of data we have to store additional information with watermark. In reversible watermarking additional data should be embedded. Reversible watermarking technic using companding function on integer wavelet coefficient.

This function is used for compressing the coefficient values greater than certain threshold. This helps in increasing embedding capacity [3].

- Histogram modification based reversible watermarking:

In this approach image is divided in number of blocks of neighboring pixels and using this histogram calculated. To increase the embedding capacity of histogram modification based reversible watermarking technique, different algorithms are reported. This technique reduces the size of auxiliary data and it is semi-fragile [3].

- Quantization based reversible watermarking:

This technique is fragile in nature. When applied to point to point graph it gives high embedding capacity under weighted quantization method. The conventional quantization index modulation based watermarking is not reversible because of the irreversible distortions caused in watermarked image [3][4].

- Expansion based reversible watermarking:

It gave a new direction for reversible watermarking. It has high embedding capacity and low computational complexity. In this prediction error expansion based scheme focuses on maximizing the prediction accuracy and minimizes the embedding distortion and others are i.e. interpolation based and contrasts based are focuses on high embedding capacity.

3. WATERMARKING AND MEDICAL IMAGES

Now a day in medical field watermarking mostly used for enhancement of security and authentication of medical data. From last few decades due to increase in use of internet, the most data transformations are take place in medical field also. Due to this there is easier access, manipulation and distribution of data have been established. Advanced electronic and digital equipment's in health care services increased. So many physicians prefer the output (X-ray, MRI) of that equipment's for the diagnosis. The conclusion of this is the generation of large digital data in medical field.

In medical applications the confidentiality, security and integrity maintained. On the basis of this the critical judgment

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is taken on that result and the patient is diagnosed with correct treatment. For the diagnosis the physician should have to extract the correct watermarked data is must if there is failure occurs the physician should have to take the precaution of not making diagnosis on that image.

4. NEW PROPOSED SCHEME

Initially host image is taken as input in which the secret data i.e. image or texts to be embed. Then that host image is passed to the histogram generator. The generator generates the histogram. The generated histogram then pass to histogram shifting modulator which will detect the pixels whose histogram is possibly shifted to add secret data. At the same time the histogram also operated by image analyzer for further image analysis which done on the basis of PSNR value and embedding capacity of image. The second input is secret image which is directly passing to FrFT to generate transformed watermark image to which we will work as the watermark version during various further processes.

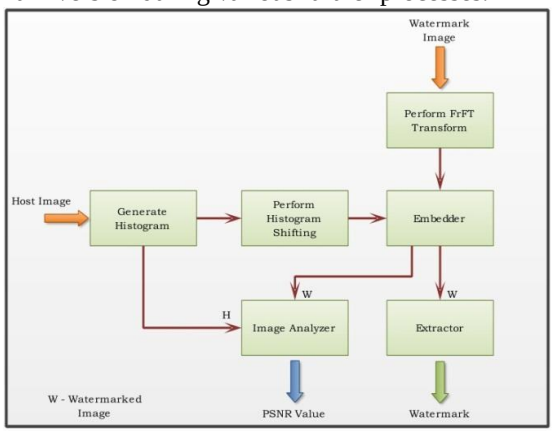

Figure 1: Architecture of Proposed System

After that these two inputs are passing to embedder. In this operation the data inserted and concatenated with the watermark is embedded in host image.

At the stage of extraction the watermark image and the text is extracted from host image. This process is carried out exactly opposite to the process of embedding.

In the third and last stage of the system the result analysis is performed and for that purpose PSNR calculation along with the Image Comparator is used. Another analysis is carried out on the basis of embedding capacity of host image. This is explained in the analysis section.

5. ANALYSIS

5.1 PSNR values:

PSNR is nothing but Peak signal to noise ratio, is associated engineering term for the magnitude relation between the maximum possible power of a signal and also the power of corrupting noise that affects the fidelity of its representation. As a result of several signals have a very wide dynamic range. PSNR is usually expressed in terms of the logarithmic decibel scale or exponent sound unit scale [1][5][6].

5.2 Embedding capacity:

Embedding capacity is the capacity of image to embed some external data. In the technic devised in this paper the secrete data and the text data is to be add in the host image and hence its necessary to improve capacity of embedding so that more amount of data can be added to the host image without adding any distortion. This capacity is calculated using number of bits per pixel added to the host image.

6. SUMMARY AND CONCLUSION

In this Paper, newly proposed a new reversible watermarking scheme which originality stands in identifying parts of the image that are watermarked using HS modulations, Fractional Fourier Transform and Expansion Evolution Modulation. The latter modulation is another original contribution of this work. Proposed scheme offers a very good compromise in terms of capacity and image quality preservation for both medical and natural images.

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