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Hidden Copyright Mark in Digital Images using Watermarking Technique: A Review

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Abstract - This paper presents a hybrid image watermarking technique for data hiding on high entropy areas of an image. The basic idea of proposed technique is based on embedding of watermark in original image using hybrid DWT SVD watermarking algorithm to produce watermarked image. Then performance of proposed algorithm will be analyzed and compared with existing DWT SVD technique which has been applied to entire image. The proposed algorithm will give best result as embedding watermark on high entropy areas only rather than on entire image. The image watermarking technique on high entropy area is more robust than using entire image. The results will prove that proposed technique improve both capacity and quality of embedded information.

Keywords: Digital Watermarking, Data hiding, DWT (Discrete Wavelet Transformation), SVD (Singular Value Decomposition), entropy based watermarking.

I. Introduction

Digital Watermarking is a process of embedding a hidden stream of bits in a file i.e. Image, video, text and audio. Today, digital watermarking has many applications like ownership proof, transaction tracking, reconstruction of files, device control. Host file is called "asset" and the bit stream is called the "message". There are basic three type of specifications in watermarking system which are Imperceptibility, Robustness and Capacity. The watermarking technique consists of three steps (1) Embedding is an algorithm accepts the host and the data to be embedded, and produces a watermarked signal. Then, the watermarked digital signal is transmitted to another person or stored. (2) Attack is unauthorized person try to make modifications. (3) Extraction is an algorithm which is applied to the attacked signal to attempt to extract the watermark from it. If the signal was unmodified during transmission, then the watermark still is present and it may be extracted.

There are three types of algorithms in watermarking technique which are Watermarking in Spatial Domain., Watermarking in Spectral Domain, Watermarking in Hybrid Domain. There are various types of domains which are used in watermarking such as DCT (Discrete Cosine Transformations), DWT (Discrete Wavelet Transformations), DFT (Discrete Fourier Transformations), Hadamard transformations. When we embed the watermark in low frequency domain, the gain of robustness is up while transparency is down.

In last few years, several algorithms has been used to embed watermark in digital images to provide copyright protection. But problem arises is that as the capacity of embedded information increases, the quality and robustness are decreased. Hence, there is a need for developing a robust hybrid image watermarking algorithm with ability to embed watermark only on high entropy areas rather than on entire image , so that the quality of original image can be increased.

Hybrid DWT-SVD technique has many benefits over spatial domain such as hybrid DWT-SVD increases the (1) Degradation in smooth regions of an image which are more noticeable to Human Visual Degradation(HVS), and (2) becomes a prime target for lossy compression.

A great demand for digital media transmission and distribution has copyright Protection of multimedia content to be a big concern. Because the encryption system is an approach to content became protection in communications, the development of digital technology tattoo has once contents are decrypted. The most important performance of the digital watermarking is imperceptibility and robustness. Original content not need to have a quality distortion when the watermark is embedded. In other words the watermark should be transparent to a viewer and when the content is prepared for watermark transmission and distribution, it may be faced with many common processes such as compression, more noise filtering and provided that certain malicious attacks. All changes the watermark content need not to lead to the change of watermark, so that it can be detected and extract if necessary. This means that the watermark be robust. However, the perceptual transparency and robustness are two contradictory factors. And compromise them is a particular challenge for tattoo researchers. The watermarking system beginning the least significant based Bit (LSB) is relatively simple. These pieces do little influence on the perception of the original image but the limited the bit may be used to watermark leads to the low capacity and watermark robustness. Thereafter , many systems on the basis of

watermark transform domain such as DCT , DWT , DFT and Hadamard transformation obtain better performance in a transparent and robustness to which on the basis of special field .

II. Related Work

In this paper , 2012 Zhang Y. et al. "A Universal Entropy Masking Model in Digital Watermarking System " proposed that essence of information transmission in digital watermarking system and the dissymmetric digital watermarking framework lived on media content communication. Current experiments prove that DWT domain entropy masking model show high PSNR value. It was concluded that different domain of entropy calculation will result in different watermarking performance. A universal entropy masking model for watermarking embedding algorithm to keep the balance between watermarks imperceptibility and its robustness.

2013 Ezz El-Din Hemdan1 et al. [8] "Hybrid image watermarking technique for data hiding over Internet " In this paper, performance is evaluated and a comparative study is done between the hybrid DWT-SVD and SVD watermarking algorithm for single and multiple watermarks. The experimental results verify and prove that the wavelet fusion is an efficient algorithm for fusing multiple watermarks.

2011 Zhou Y et al.[13] "A Novel Image Zero Watermarking Scheme Based on DWT-SVD" this paper presents a novel copyright protection zero watermarking scheme that combines the discrete wavelet transform (DWT) and the singular value decomposition (SVD) is proposed. Instead of modifying the original image data, which inevitably causes some permanent quality degradation, to embed a watermarking, the proposed scheme constructs a watermarking from the image features which extracts from the original image by applying the DWT and the SVD.

2011 Franklin V et al.[19] " Entropy based Robust watermarking Scheme using Hadamard Transformation technique" this paper presents novel watermarking algorithm is required to protect copy rights of digital data entropy based robust watermarking scheme using Hadamard transformation technique is proposed in this paper. The proposed technique can hide an entire image or pattern as a watermark directly into the original image. As the quality of the image is to be preserved the entire image is not altered for embedding, instead few blocks are used based on the size of the watermark and information content of an image block.

2011 Mitchell D. Swanson, et al. [2] "TRANSPARENT ROBUST IMAGE WATERMARKING " proposed a watermarking scheme to hide copyright information in an image. The scheme employs visual masking to guarantee that the embedded watermark is invisible and to maximize the robustness of the hidden data. The noise-like watermark is statistically invisible to deter unauthorized removal. Experimental results show that the watermark is robust to several distortions including white and colored noises.

2009 Ying Yang et al. [7] "A Contrast-Sensitive Reversible visible Image Watermarking Technique" this paper proposed that discrete cosine transform domain (DCT domain) watermarking technique for copyright protection of still digital images is analyzed. The DCT is applied in blocks of 8 × 8 pixels as in the JPEG algorithm. The watermark can encode information to track illegal misuses.

2008 Shijun Xiang et al. [6] "Invariant Image Watermarking Based on Statistical Features in the Low-Frequency Domain" This paper proposed image watermarking scheme by the use of two statistical features (the histogram shape and the mean) in the Gaussian filtered low-frequency component of images. As a result, the watermarking system provides a satisfactory performance for those content-preserving geometric deformations and image processing operations, including JPEG compression, low-pass filtering and cropping.

2002 Moulin P., et al. [11] "A Framework for Evaluating the Data-Hiding Capacity of Image Sources" this paper proposed an information-theoretic model for image watermarking and data hiding is used. Recent theoretical results are used to characterize the fundamental capacity limits of image watermarking and data-hiding systems. We consider autoregressive, block-DCT, and wavelet statistical models for images and compute data-hiding capacity for compressed and uncompressed host-image sources. Closed-form expressions are obtained under sparse-model approximations.

2001 *Sviatoslav Voloshynovskiy* et al. [5] "Multibit Digital Water marking robust against Local Non linear geometrical Distortions" This paper presents an efficient method for the estimation and recovering from nonlinear or local geometrical distortions, such as the random bending attack and restricted projective transforms. The distortions are modeled as a set of local affine transforms, the watermark being repeatedly allocated into small blocks in order to ensure its locality.

III. Need and Significance

A. Spatial domains do not allow for the exploitation of subsequent processing in order to increase the robustness of watermark.
B. Embedding watermark in entire image decreases the quality of an image.

IV. Present Work and Methodology

The objectives of my work are to provide Copyright Protection in by embedding watermark only in high entropy areas of an image. Forming robust digital watermark. Comparison of results with existing techniques. The steps of methodology are following:

1. Calculate entropy of entire image.
2. Select high entropy areas of that image by using thresholding value.
3. Watermark embedding in high entropy areas of image.

4. Watermarking encoding and decoding is done in image where watermark is extracted and detected.
5. Use hybrid DWT SVD technique on selected pixels of image.
6. Comparison of results with existing techniques.

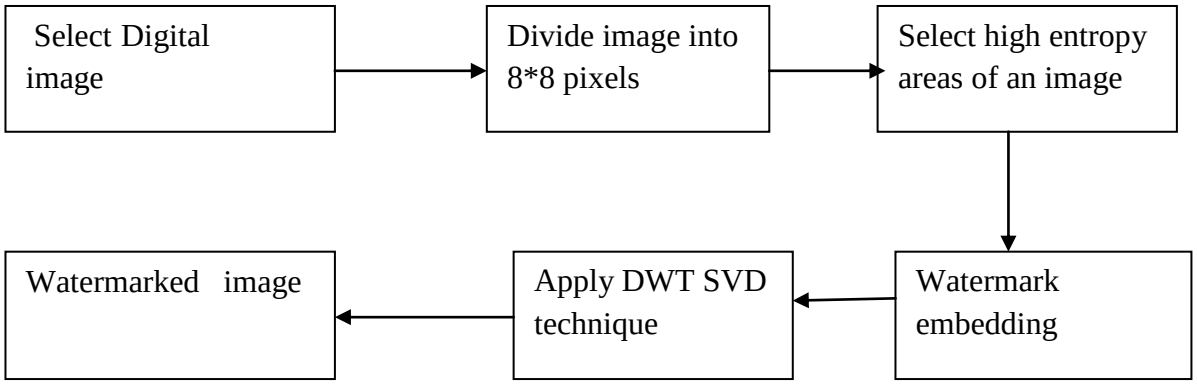

Figure1: Methodology

V. Conclusion

In the Watermarking, hybrid DWT SVD technique is an efficient technique for embedding watermark in image. In my work, I will embed the watermark only on high entropy areas of digital image rather using entire image. It will help to improve the quality of image and watermark which will be embedded in image.

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