DWT-DCT-SVD BASED DIGITAL IMAGE WATERMARKING USINGSALT AND PEPPER METHOD

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ABSTRACT

Digital Watermarking technique is now day wants to provide new vigorous for any image and also benign from many type of attack. Because every day need of multimedia techniques develop so another hand also producing of copying problem. In this paper works study many methods discuss year by year using for resolving this problematic. But rendering to my examination hybrid digital image watermarking using of Singular Value Decomposition and Discrete Cosine Transformation algorithm is best .by using of this hybrid digital watermarking imaginable to inoffensive our image from various type of attack and less PSNR value when you yield back image matching spot. We are also manipulative the value of Correlational Coefficient on different step size step.

Keyword: DCT, DWT, DCT, Digital Image, PSNR

I. INTRODUCTION

Day by day it has been seen a rapid development of network multimedia systems. This has led to a developing awareness of how easy it is becoming to duplication of the data. The ease with which impeccable copies can be prepared may lead to large-scale illegal copying, which is a great anxiety to the music, image, video, and book. A digital data can be definitely transferred, received, repeated or improved by using the Internet. The copyright shield of digital data is an significant legal issue [1]. There are many methods are used for copyright security of digital data. The Digital watermarking is new and most collective technique for copyright safety and measured as a probable solution. Watermarking is very similar to steganography in a number of respects. Both pursue to surround information classified a cover message with slight to no deprivation of the cover-object. Watermarking techniques can be categorized rendering to the type of watermark presence used, i.e., Watermark may be a visually perceptible logo or a sequence of random numbers. Another association is based on the domain which the watermark is applied.

II. TECHNIQUE

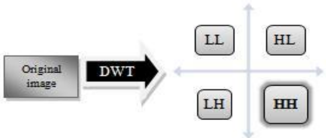
Three **essential factors** used to determine quality of watermarking scheme*:*

2.1 Discrete Cosine Transform (DCT)

The Discrete Cosine Transform (DCT) is a method that translates a spatial domain waveform into its constituent frequency modules as represented by a set of coefficients. DCT is most popular linear transforms and a compression tool of digital signal processing[4]. It is a lossless system and has been broadly used because of its good capacity of energy compression and de-correlation. These transforms are the members of real-valued discrete sinusoidal unitary transforms.

2.2 Discrete Wavelet Transform (DWT)

This watermarking system is aiming on its embedding power would run useful insight in how to improve its performance. The performances measured contain robustness, softness and computational cost. DWT decomposes an image into three high- pass sub bands and low-pass sub bands. In this study, this method embeds a watermark in high-pass (or higher frequency) band of the DWT domain[3]. This is due to the good softness providing by high-pass band. To rebuild an image, an inverse DWT is used after alteration has been made by using singular values of SVD of watermark.



2.3 Singular Value Decomposition (SVD)

Its a linear algebra transform technique used in watermarking. It is collected of three vectors. First vector lies of diagonal matrix and two vectors lies of orthogonal matrices. This diagonal matrix is liable for an image luminance and orthogonal matrices are liable for the geometry of an image. In that algorithm, we are found the singular values of cover image and then modified them by adding a watermark[3]. SVD transform is again applied on the resultant matrix for discovery the adapted singular values. These singular values are combined with the known orthogonal components to get the watermarked image. For watermark extraction, inverse process is used.

III.PROPOSED WORK

For the operation of the future algorithm it is assumed that the dimension of the cover image C is N x N. First we will embed the watermark in a cover image or host image by using watermark embedding algorithm and then the watermark will be extracted using extraction algorithm. In two-dimensional Discrete Wavelet Transformation, each level of decomposition produces four bands of data denoted by LLHL, LH, and HH. The LL sub-band can further be decomposed to obtain another level of decomposition. In two-dimensional Discrete Cosine Transformation, we apply the transformation to the whole image but need to map the frequency coefficients from the lowest to the highest in a zig-zag order to 4 quadrants in order to apply SVD to each block. All the quadrants will have the same number of DCT co-efficient .The salt and pepper method of the algorithm will measured by applying attacks on watermarked image and then with the help of PSNR values the robustness of the extracted logo will be evaluated

3.1 Watermark Embedding

1. Apply the DCT to the whole cover image *A*.
2. Using the zig-zagsequence, map the DCT coefficients into 4 quadrants: B1, B2, B3, and B4.
3. Apply SVD to each quadrant: $A^k = U_A^k \Sigma_A^k V_A^{kT}$, k = 1,2,3,4, where k denotes B1,B2,B3 and B4

4. Apply DCT to the whole visual watermark *W*.

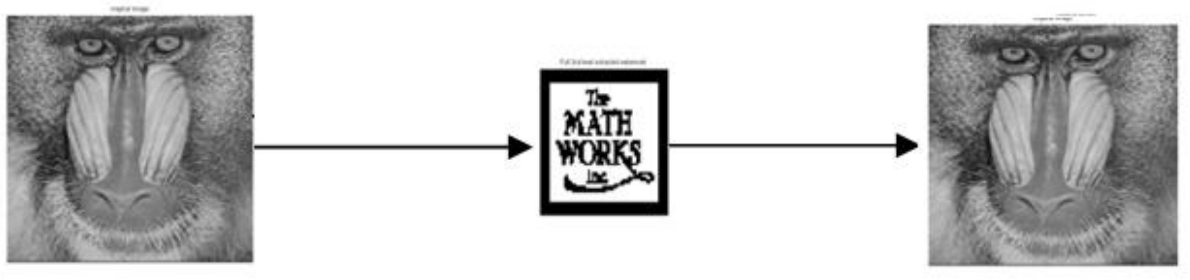
5. Apply SVD to the DCT-transformed visual watermark *W*: $W = U_W \Sigma_W V_W^T$.

6. Modify the singular values in each quadrant B^k, *k* = 1,2,3,4, with the singular values of the DCT-transformed visual watermark: $\lambda_i^{*k} = \lambda_i^k + \alpha_k * \lambda_{wi}$ $i = 1 \ldots\ldots n$ where λ_i^k $i = 1 \ldots\ldots n$ are the singular values of Σ_A^k, and λ_{wi} $i = 1 \ldots\ldots n$ are the singular values of Σ_V.

7. Obtain the 4 sets of modified DCT coefficients: $A^{*k} = U_A^k \Sigma_A^{*k} V_A^{kT}$, $k = 1,2,3,4.$

8. Map the modified DCT coefficients back to their original positions.

9. Apply the inverse DCT to produce the watermarked cover image.



Embedding Process

3.2 Watermark Extraction

1. Apply the DCT to the whole watermarked (and possibly attacked) cover image A^* .

2. Using the zig-zag sequence, map the DCT coefficients into 4 quadrants: B1, B2, B3, and B4.

3. Apply SVD to each quadrant: $A^{*k} = U_A^k \Sigma_A^{*k} V_A^{kT}$, $k = 1,2,3,4.$ where *k* denotes the attacked quadrants.

4. Extract the singular values from each quadrant $Bk, k = 1,2,3,4$: $\lambda_{wi}^k = \frac{\lambda_i^{*k} - \lambda_i^k}{\alpha_k}, i = 1, \ldots\ldots n$

5. Construct the DCT coefficients of the four visual watermarks using the singular vectors: $W^k = U_W^k \Sigma_W^k V_W^k$, $k = 1,2,3,4.$

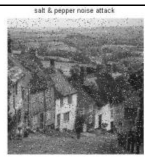
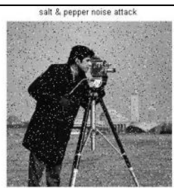
6. Apply the inverse DCT to each set to construct the four visual watermarks

The Discrete Cosine Transformation factors with the maximum magnitudes [1] are establish in quadrant C1, and those with the lowest magnitudes are found in quadrant C4. Consistently, the singular values with the highest values are in quadrant C1, and the singular values with the lowest values are in quadrant C4.

The major singular values in quadrants C2, C3, and C4 have the same order of magnitude. So, in its place of allocating a different scaling factor for each quadrant, we used only two values: One value for B1, and a smaller value for the other three quadrants.

IV.RESULT

Results of Watermark Extraction after applying salt and noise pepper attack

Sr no	Different Origional Images	Water mark	Salt and Pepper Image	Attack	Psnr Value
1				Salt and pepper	18.0963
2				Salt and pepper	19.0941
3				Salt and pepper	18.4219
4				Salt and pepper	18.1087
5				Salt and pepper	18.5342

V.CONCLUSION

In this paper , a salt and pepper noise method image watermarking based on dwt and svd has been prepared. It is ultimate filter for removing salt and pepper noise. Our experimental result show that our method performs much better than median based filter or the edge preserving regularization method.

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