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Dual Domain Based Digital Watermarking For Authentication of Digital Electronics Data Images

Anup Digambar Pawar[1], Gireesh K. Gautam[2]
Acropolis Institute of Technology & Research, Bhopal, India[1,2]
anuppwr@gmail.com[1], gireesh.gautam@gmail.com[2]

Abstract: The water around for many centuries, in the form of watermarks found initially on plain paper and then goes away. However, the field of digital water and placed only during the last 15 years, and is now used in many different applications. The proposed work has based on digital water marking on image processing. The implementation has been tested on different a method which shows the proposed approach gives the batter results.

Keywords: Image Processing, watermarking, DWT

I. INTRODUCTION

Digital Watermarking is an action of hiding a message that an digital signal (eg, images, songs and video) of the signal. It is a concept closely linked hide information, as both hide a message in a digital signal. But what separates them is their goal. Water trying to hide a message in relation to the actual content of a digital signal, hiding information in the digital signal is not related to the letter, and just use it as a cover to hide its presence.

II. DIGITAL IMAGE PROCESSING

In today's digital world of advanced technology, where most of the remote sensing data recorded in digital form, and almost every image interpretation and analysis involves some element of digital processing. It may involve the processing of digital images of many procedures, including coordination and correct the data, and the promotion of digital to facilitate better visual interpretation, or even automated classification of targets and features entirely by computer

III. PROPOSED WATERMARKING SCHEME

In this work an encoded hybrid digital watermarking Scheme (EHDWS) has been proposed. EHDWS is based on DWT haar transformation with higher band Singular value decomposition. In proposed EHDWS initially DWT decompose host image into four frequency sub band namely LL , HL , LH and HH with help of harr transform.

EHDWS used higher frequency sub band for singular value decomposition as show in figure 2. Watermark embedding scheme is briefly express by figure 1 and watermark extraction has been show in figure 2.

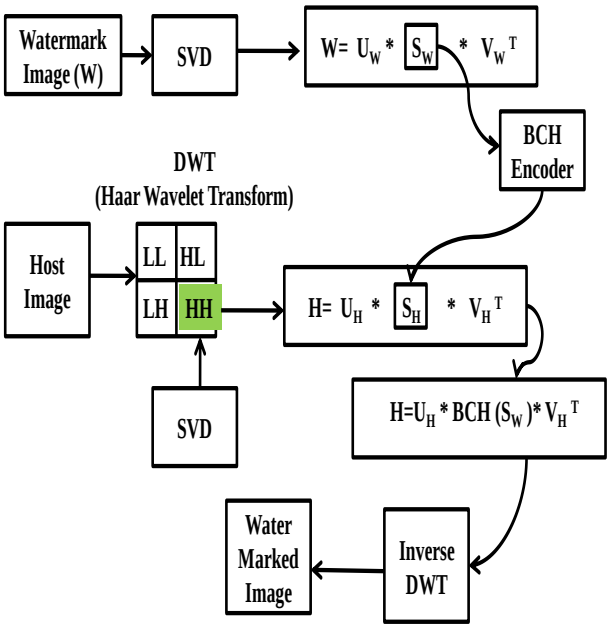

Figure1: Proposed EHDWS Watermark Embedded Scheme

The proposed techniques use the DWT transformation scheme for the digital watermarking. Which decomposes the input image in four components, namely, LL, HL, LH and HH, where the first letter corresponds with frequency offset of the row either low or high and second latter refer to filter applied to the columns.

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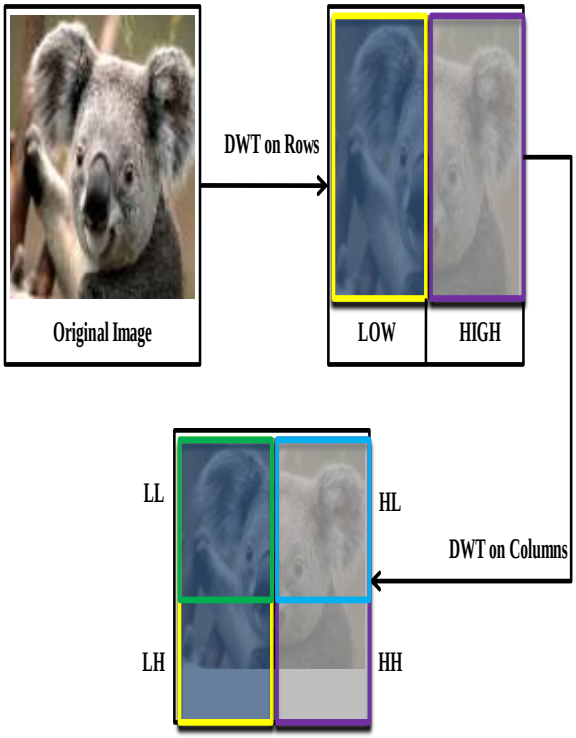

Figure 2: DWT Transform Of Host Image

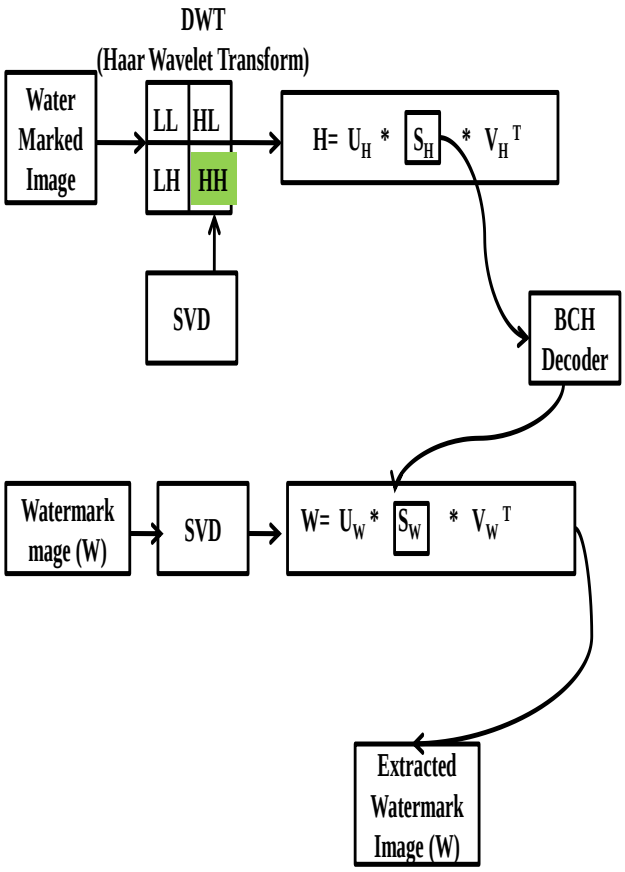

Figure 3: Proposed EHDWS Watermark Extraction Scheme

The lowest resolution level LL refer to approximate part of the host image [4] whereas rest three refer to detail parts and give the vertical high (LH), horizontal high (HL) and high (HH) frequencies. In the proposed algorithm, watermark is embedded into the host image by modifying the high frequency coefficients band i.e. HH sub band described in figure 2.

As show in figure 1 and 3 proposed watermarking scheme is based mutually on both DWT and SVD with BCH code authention . Initially DWT decomposes the host image into four frequency sub-bands namely LL, HL, LH, and HH band. LL band deals with approximate details, HL band deals with horizontal details, LH gives vertical details and HH band contain diagonal details of the image.

EHDWS use HH band to embed the watermark since it haves the finer details about image energy. In this way embedded watermark will not influence the perceptual fidelity of cover image.

The proposed scheme watermark is embedded by replacing singular values of the HH band of host image with BCH code of singular values of the watermark. Selection of watermark image is such a manner that its singular values lies within the given range and energy of the singular values of watermark will be approximately equal to the energy of the singular values of the HH band. Hence the replacement of the singular values will not affect perceptual quality of image and the energy content of HH band

IV. RESULT ANALYSIS

The proposed works has tested on the different images of size 512x512. All These images are colored. Here the images are used called baboon, LENA and pepper. The watermark image has also the same size as the host image. To simulate the proposed work the implementation has done in MATLAB. The execution has been done on the i3 processor with 4 GB RAM and 500 GB HDD.

Table 1 Comparison Table

Image name	Algorithm	PSNR (dB)
Baboon	Proposed Approach	38.8924
	Single Scaling Factor (2014)	53.0487
	Multiple Scaling Factors (2014)	50.76746
	Loukhaoukha et al. (2011)	52.379
	Ishtiaq et al. (2010)	44.9624
	Xianghong et al. (2004)	49.075
Lena	Proposed Approach	73.7808
	Single Scaling Factor	53.3062
	Multiple Scaling Factors	55.7296
	Loukhaoukha et al. (2011)	47.718
	Ishtiaq et al. (2010)	48.105
	Xianghong et al. (2004)	49.075
Peppers	Proposed Approach	65.4692
	Single Scaling Factor (2014)	52.09
	Multiple Scaling Factors (2014)	52.15925
	Loukhaoukha et al. (2011)	48.097
	Ishtiaq et al. (2010)	NA
	Xianghong et al. (2004)	49.075

The Table shows the result with different authors which has given in past years. PSNR is Factor of an image which is use to know the quality of the picture or image. it is calculated by using mean squire error of MSE. The PSNR will calculate the original image and resulting image. Both parameters are calculated by the following formulas.

$$\text{PSNR} = 10\log_{10}\left(\frac{\text{MAX}^2}{\text{MSE}}\right)$$

$$\text{MSE} = \frac{\sum_{M,N}[I_1(m,n) - I_2(m,n)]^2}{M * N}$$

The experimental results shows that the proposed algorithm gives the batter performance with compared to previous approaches. The results are batter in Lena and Peppers which were also used by previous authors.

Figure 4 Host Image

This figure shows the host image on which the watermark image will be embed. In this work there are different images has been use. Here only the outputs of lena image has shown.

In this manner there is also need of any watermark. In this scenario the image of fruits is woks a water mark image. Both images will take as a input using the MATLAB code.

Figure 5 Watermark Image

Here we need to apply the bch code on watermark image. The output has shown below in the form of figure.

Figure 6 BCH watermark

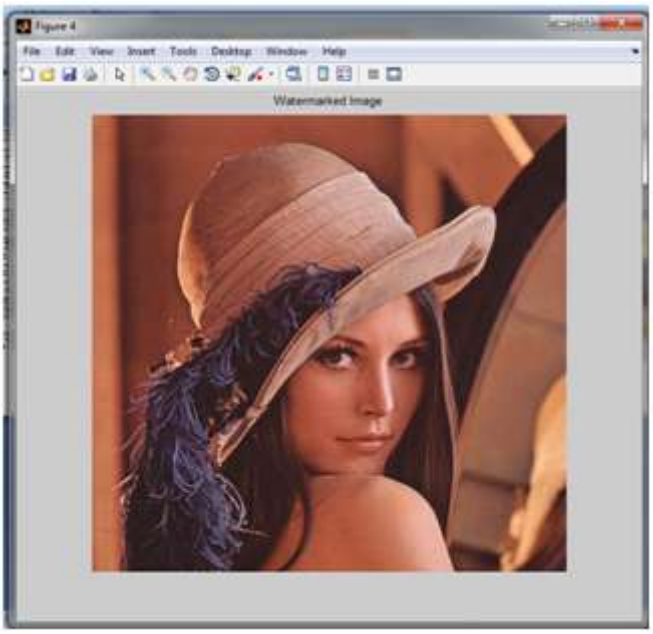

Figure 7 Watermark Image

This figure is our final output. This output conations the watermark which can transfer one end to another end.

Figure 8 Extracted Host Image

There is need to remove the watermark from the host image. Above figure is a extracted host image from final output.

V. CONCLUSION

Proposed scheme has high degree of robustness ie proposed scheme is very strongly validate by extracting the watermark against on e of strongest attack like print and scan. Along with that proposed scheme is blind in nature which is superior to non-blind scheme. Many of the existing DWT and SVD based approaches do not handle the issue of authentication and security. The proposed method covers this flaw by incorporating signature-based authentication mechanism. Thus the resultant method is both robust and secure.

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