A ROBUST IMAGE WATERMARKING SCHEME BASED ON 3 Level of DWT

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ABSTRACT

In this paper we will improve the level of decomposition upto 3rd level of DWT for providing ownership on image . For this alfa blending technique is used to embed the watermark on the low frequency sub band of the cover image .For embedding and extraction of the watermark we will use the gray scale of the cover image i.e. black n white image because it is quite simpler . In this paper we will also try to remove the diagonal line appeared on the extracted watermark . We will compare the PSNR with the Single level DWT , Two level DWT and Three level DWT to show that show that our proposed method is better than all the other existing systems .

1.Introduction

Internet is the only destination for searching any kind of information . Any buddy wants to collect the information about anything in any form , he just go to the internet and types a query to search the data according to his / her requirement like searching text , images , audio , video software etc . and gets 1000s of related data from there , he picks data from there according to his/her need . If a user is able to access the data stored on web then it is possible that he can make changes to original data by tempering or editing . So that there is need to protect our data stored on the web either by limiting the accessibility of the data or by copyright protection . Copyright on any kind of data can be applied by using either of the methods like Cryptography , Steganography or Watermarking . In this paper we are using watermarking for providing the copyright protection to any kind of image available for being accessed by any user . Watermarking will not allow any unauthorized user to temper or change the water marked image . Only a valid user can access the image , make changes on it , or temper the image by following the procedure to extract the watermark image from the watermarked image.

2.Cryptography

This is the process of converting the plain text into cipher text by using the public key of the user by using encryption algorithm at the senders end . Then he encapsulates the cipher text , key and the receivers address and send it . Receiver of the data uses the public key and decryption algorithm to decrypt the received data by converting the cipher text into the plain text[4] . When any other user want to access that data , any how he become able to access the data but without having the key he can't decrypt to read the data .

3. Steganography

This is the process of hiding information into cover data so that so that any other using the cover data unable to access the information hidden within it . In this a plain text hide within cover data by using secrete key by using stegano function . At the receiver end inverse stegano function is applied by using secrete key to access the hidden data [8].This process is called steganography .

4.Watermarking

This is the process of hiding the watermark on the cover image by using embedding and extraction algorithms . In which DWT-SVD is used to apply watermark on the cover image at the senders end and same methods are used by the receiver to extract the watermark from the cover image . Watermarking [1].

DWT

Discrete Wavelet Transform is the process of decomposition of cover image in four sub-bands LL , LH , HL , HH **.** It shows the result from multiple resolution[2] [6] . Same procedure will be used to extract the watermark from the watermarked image .

SVD

Singular Value Decomposition is the process of decomposing the matrix of lowest sub-band of the decomposed image into three sub matrix i.e. two orthogonal matrix and one diagonal matrix . SVD is again applied on the watermark image to decompose it[3][7] .

5.Proposed Methodology

Based on DWT technique we are proposing a new algorithm by improving the level of decomposition of image . We are proposing an algorithm to decompose the cover image upto third level by using DWT i.e. three level DWT[5][9] after that we will apply SVD to decompose the matrix of the cover image in three parts , two orthogonal matrix and one diagonal matrix and then SVD is again applied on the watermark image and after that embedding algorithm is applied . For the extraction of the watermark same procedure is used . Here we are describing DWT , SVD , 3 level DWT .

I . Watermark Embedding

In this methodology of the image watermarking we will take gray level of the cover image . We will apply 2 level and 3 level of decomposition of the cover image by using DWT to calculate low frequencies and high frequencies of the cover image . After that in the same way we decomposes the watermark image also upto 3 level of decomposition by using same method.

We will multiply the decomposed component of the cover image and of the decomposed watermark image with the scaling factor after that we will add it .

$$WMI = c*(LL3) + c*(WM3)$$

Where c is scaling factor , LL3 has lowest frequency on which watermark will embed , and wm3 is third level of decomposed watermark.

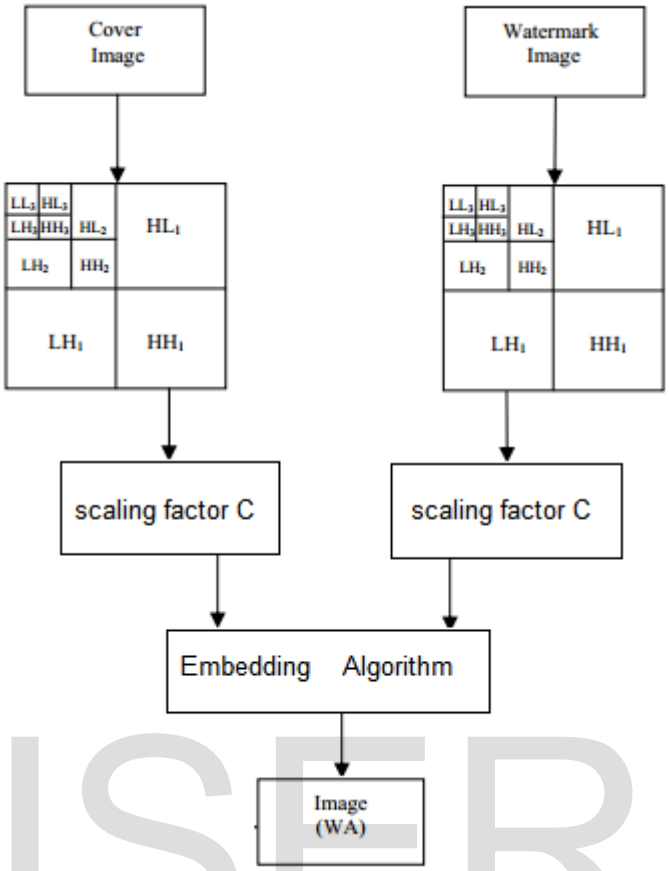


Fig 5.1 3 Level Decomposition of Image To Embed Watermark

II.Extraction Algorithm

For the extraction of the watermark we will again use DWT and we increase the decomposition upto 3-level . For extracting the watermark from the watermarked image we will subtract the decomposed cover image from the decomposed watermarked image .

$$RW = (WMI - c*LL3)$$

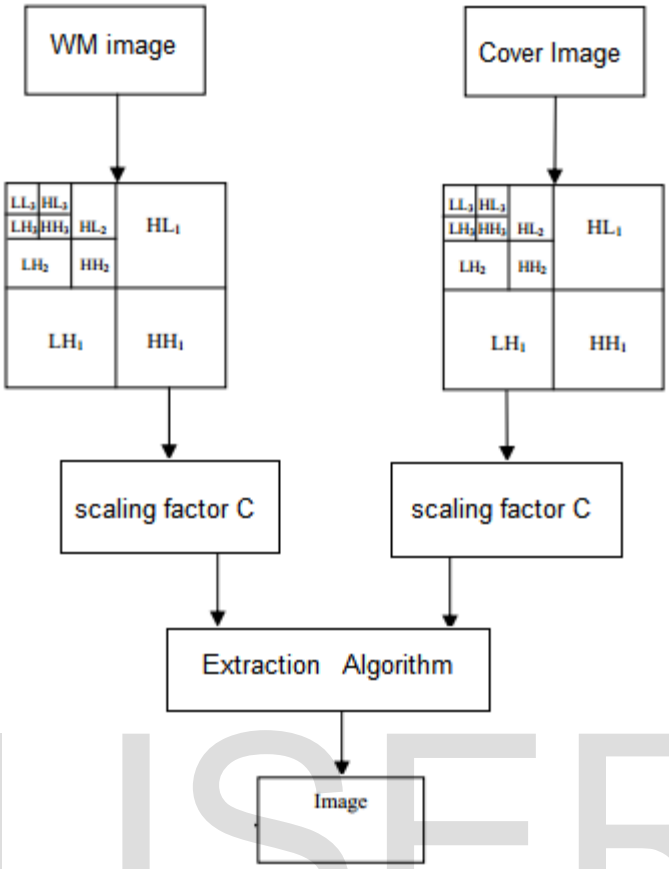
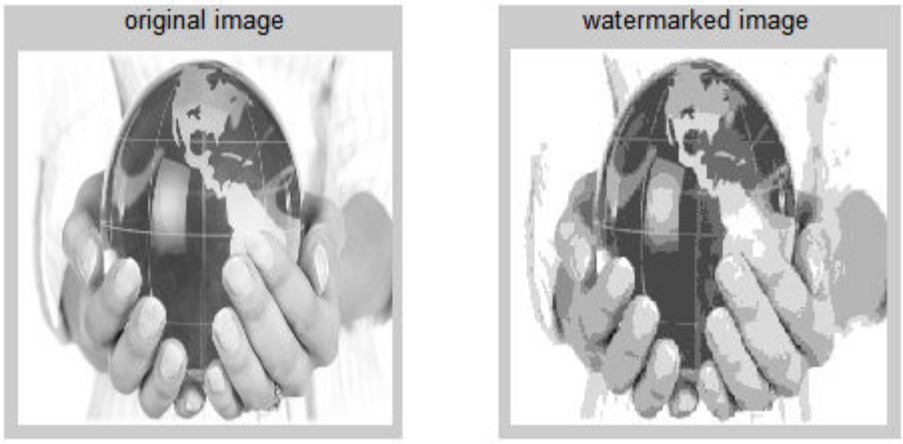
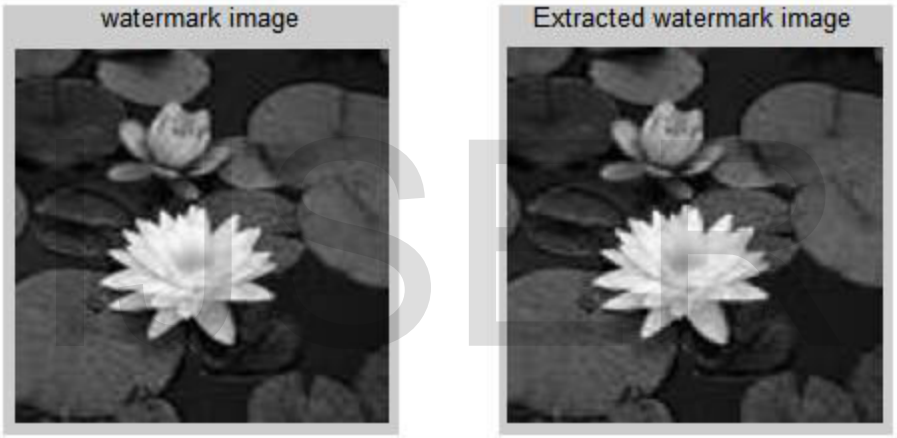


Fig 5.2 3 Level Decomposition of Image To Extract Watermark

6.Result



6.1 Fig Original image and the watermarked image



6.2 Fig Watermark Image and Extracted Watermark Image

7. Conclusion

Result shows that with increasing the level of decomposition quality of extracted watermark is improved and diagonal line appeared on extracted watermark is also removed .

8.References

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