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APPROACH FOR WATERMARKING USING DIGITAL IMAGE PROCESSING IN NON BLIND METHOD

Apeksha B. Bongirwar[1], Prof. Fazeel.I.Z.Qureshi[2]

[1] Computer Science & Engineering, RTMNU University, W.C.E.M Nagpur, Maharashtra, India, [2] Computer Science & Engineering, RTMNU University, W.C.E.M Nagpur, Maharashtra, India,

[1] bongirwarapeksha5@gmail.com , [2] fazeel.zama20@gmail.com

ABSTRACT—

Research in the field of watermarking is flourishing providing techniques to protect copyright of intellectual property. Among the various methods that exploits the characteristics of the Human Visual System (HVS) for more secure and effective data hiding, wavelet based watermarking techniques shows to be immune to attacks, adding the quality of robustness to protect the hidden message of third party modifications. In this paper, we introduced non blind with DWT & SVD . Also we applies a casting operation of a binary message onto the wavelet coefficients of colored images decomposed at multilevel resolution.

Index Terms— Discrete Wavelet Transform, Singular Value Decomposition, Elliptical Curve Cryptography.

INTRODUCTION

There has been an explosive growth in use of internet and World Wide Web and also in multimedia technology and it's applications recently. This has facilitated the distribution of the digital contents over the internet. Digital multimedia works (video, audio and images) become available for retransmission, reproduction, and publishing over the Internet. A large amount of digital data is duplicated and distributed without the owner's consent. This arises a real need for protection against unauthorized copy and distribution. Hence it became necessary to build some secure techniques for legal distribution of these digital contents. Digital Watermarking has proved to be a good solution to tackle these problems. It discourages the copyright violation and help to determine the authenticity and ownership of the data.

A Digital image watermarking systems have been proposed as an efficient means for copyright protection & authentication of digital image content against unintended manipulation(spatial chromatic). Watermarking techniques tries to hide a message related to the actual content of the digital signal, watermarking is used for providing a kind of security for various type of data(it may be image, audio, video, etc). Digital watermarking generally falls into the visible watermarking technology and hidden watermarking technology visible and invisible watermarks both serve to deter theft but they do so in very different ways.

Watermarking is identified as a major technology to achieve copyright protection and multimedia security. Therefore recent studies in literature include some evident approaches for embedding data into multimedia element. Because of its useful frequency component separation, the Discrete Wavelet Transform(DWT) is commonly used in watermarking schemes. In a DWT-based scheme, the DWT coefficients are modified with the data that represents the watermark.

In this paper, we present a hybrid non-blind scheme based on DWT and Singular Value Decomposition(SVD). After decomposing the cover image into four sub bands(LL, HL, LH and HH). We apply the SVD to LL band and modify diagonal singular value coefficients with the watermark itself by using a scaling factor. Finally, LL band coefficients are reconstructed with modified singular values and inverse DWT is applied to obtain watermarked image. Experimental results show that the proposed algorithm is considerably robust and reliable.

LITERATURE REVIEW

1.In 2009, Sadik. A.M .Al-Taweel et. Al. proposed a novel DWT- based video watermarking algorithm based on a three-level DWT using Haar filter which is robust against geometric distortions such as Downscaling, Cropping, and Rotation. It is also robust against Image processing attacks such as low pass filtering (LPF), Median filtering, and Weiner filtering. Furthermore, the algorithm is robust against Noise attacks such as Gaussian noise, Salt and Pepper attacks. The embedded data rate is high and robust. The experimental results show that the embedded watermark is robust and invisible. The watermark was successfully extracted from the image after various attacks.

2.Salwa A.K Mostafa et. al. presents a novel technique for embedding a binary logo watermark into image frames. PCA is applied to each block of the two bands (LL – HH) which result from Discrete Wavelet transform of every image frame. The watermark is embedded into the principal components of the LL blocks and HH blocks in different ways. The scheme is tested by applying various attacks. Experimental results show no visible difference between the watermarked frames and the original frames and show the robustness against a wide range of attacks such as MPEG coding, JPEG coding, Gaussian noise addition, histogram equalization, gamma correction, contrast adjustment, sharpen filter, cropping, resizing, and rotation. The proposed scheme is an imperceptible and a robust hybrid image watermarking scheme. Combining the two transforms improved the performance of the watermark algorithm.

3.In 2011, Sanjana Sinha et. al. proposed a comprehensive approach for watermarking digital image by using a hybrid digital image watermarking scheme based on Discrete Wavelet Transform (DWT) and Principal Component Analysis (PCA). PCA helps in reducing correlation among the wavelet coefficients obtained from wavelet decomposition of each image frame thereby dispersing the watermark bits into the uncorrelated coefficients. The image frames are first decomposed using DWT and the binary watermark is embedded in the principal components of the low frequency wavelet coefficients. The imperceptible high bit rate watermark embedded is robust against various attacks that can be carried out on the watermarked video, such as filtering, contrast adjustment, noise addition and geometric attacks.

4.In 2012, Poulami Ghosh et. al. proposed a novel watermarking technique where both visible and invisible watermarks are embedded in a image. Digital data can be copied easily without any degradation in quality, so the protection of the data is necessary. Digital watermarking is a technology to embed additional information into the host signal to ensure security and protection of multimedia data. The image frames contain both the watermarks, so it is more robust to attacks. The watermarking scheme described here deals with embedding and extraction of the watermarks. Discrete Wavelet transform (DWT) is used to embed the invisible watermark and Peak Signal to Noise Ratio (PSNR) is calculated to measure efficiency of this method. In this technique we are including both visible and invisible watermark which gives an extra edge in the copyright protection. As we are using compound mapping to embed the visible watermark it helps to increase the robustness of the image. The proposed algorithm works well on gray scale and on video of uncompressed .avi format and could be done in colored images further.

5.Nisreen I Yassin et. al. introduced a comprehensive approach for digital image watermarking, where a binary watermark image is embedded into the image frames. Each image frame is decomposed into sub-images using 2 level discrete wavelet transform then the Principle Component Analysis (PCA) transformation is applied for each block in the two bands LL and HH. The watermark

is embedded into the maximum coefficient of the PCA block of the two bands. The proposed scheme is tested using a number of image sequences. Experimental results show high imperceptibility where there is no noticeable difference between the watermarked image frames and the original frames. The proposed scheme shows high robustness against several attacks such as JPEG coding, Gaussian noise addition, histogram equalization, gamma correction, and contrast adjustment.

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PROPOSED TECHNIQUE

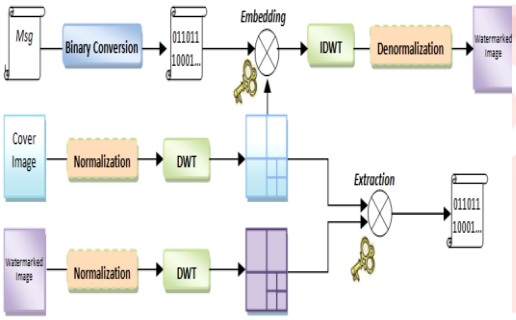

Fig:-3.1 Representation of colored image using embedding and extraction algorithm

In the proposed algorithm the images is highly encrypted since the encryption is done by encrypting the basic frequencies of the image, and the operation is done not by encrypting all the bytes in the image but only special frequencies in which when it return to its corresponding pixel values all the bytes of the image will be affected. Note that the image size will increase in width, since for each byte needs an extra bit for the sign of the pixel value. This will lead to a bigger size of the encrypted image that the plain original image.

The main reason of not hiding the sign in LSB for palette color images by changing the value of the pixel will effect the resulted decrypted image since each value have different Red, Green, Blue component, while in Gray images the change of the color value will not have the same effect since the pallet of the gray scale have a smooth change from one level to another.

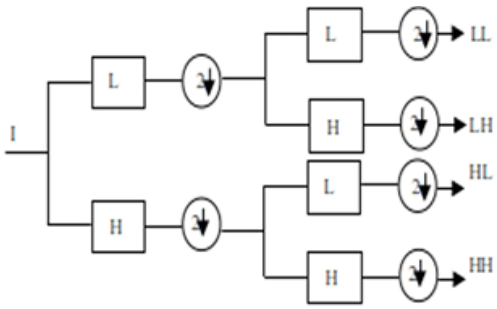

fig. 3.2 Analysis of 2D DWT

In fig 3.2 shows that analysis of 2D dwt In this the image is divided into four sub bands LL,LH,HL,HH. IT decomposes an image into several sub bands into three different directions horizontal, vertical and diagonal. It decompose an image into low and high frequencies using low and high pass filters.

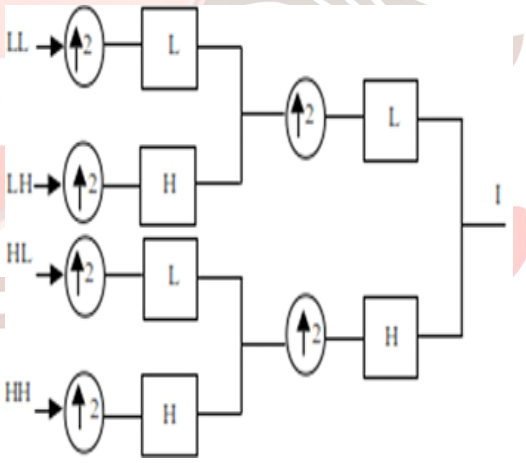

fig. 3.3 Synthesis of 2D DWT

fig 3.3 shows synthesis of 2D dwt image. Again using extraction algorithm this subbands join to form a host image.

Snapshots

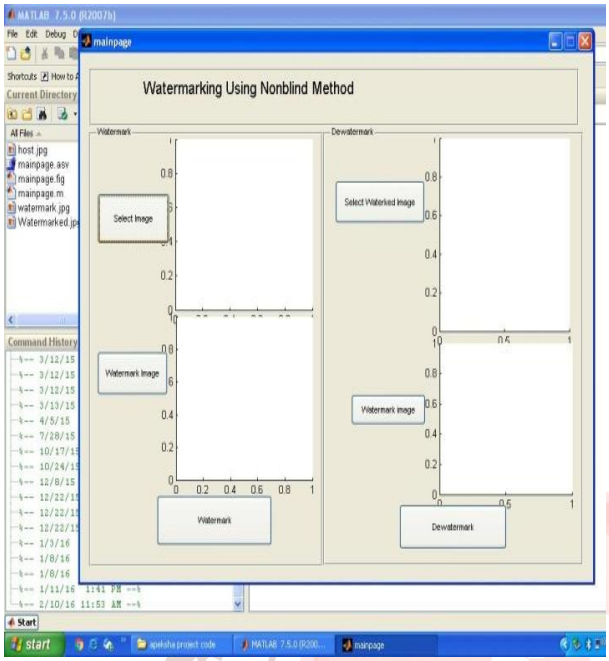

Fig 3.4: Image selection

Figure 3.4 shows how to select image using non blind method.

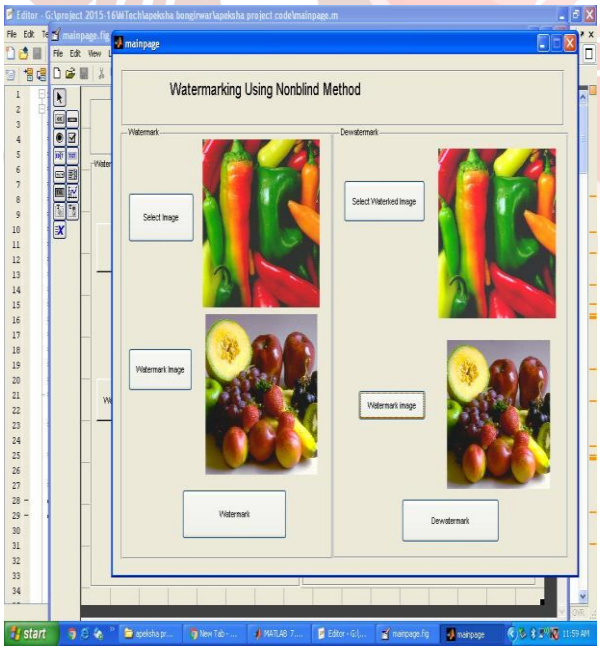

Fig 5: Output

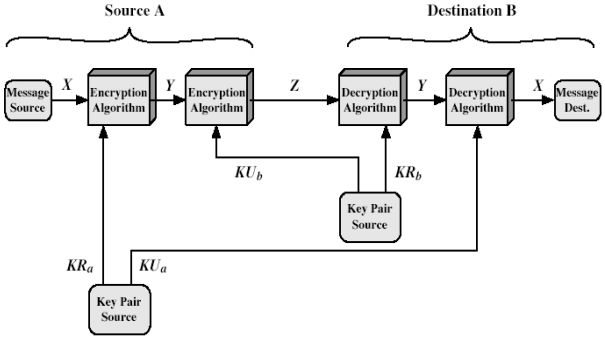

Figure 9.4 Public-Key Cryptosystem: Secrecy and Authentication

Fig 6: Public key cryptosystem, Secrecy and Authentication

CONCLUSION

In this paper we revised various proposed image watermarking algorithm and their robustness factor. A robust image watermarking scheme is proposed using 5-level DWT in conjunction with the svd transform. This algorithm will be more robust since the binary watermark is embedded in the low LL sub band and imperceptible in nature without much degradation in the image quality. The proposed scheme has a good performance compared with previous schemes as the embedding is done into the higher levels of wavelet transform. The quality of watermarked image and the extracted image would be improved.

Embedding the watermark in low frequencies obtained by wavelet decomposition increases the robustness against attacks like filtering, lossy compression and geometric distortions while making the scheme more sensitive to contrast adjustment, gamma correction, and histogram equalization. Embedding the watermark in high frequency sub-bands makes the watermark more imperceptible while embedding in low frequencies makes it more robust against a variety of attacks.

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Though perseverance and enthusiasm combined with effort in the right direction can bring forth the thing called success but the realization of the harsh reality that the path towards success is full of myriads, temptations, impediments and pitfalls ften proves to be disheartening in such situation, it is the able guidance of knowledgeable persons that steers one through difficulties and help her achieve success.

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