

Approach for watermarking using digital image processing in non blind method

Apeksha B. Bongirwar¹, Milind S. deshkar²

¹ Miss. Apeksha B. Bongirwar, W.C.E.M, Nagpur, Maharashtra, India

² Prof. Milind S. Deshkar W.C.E.M, Nagpur, Maharashtra, India,

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.

1. INTRODUCTION

There has been an explosive growth in use of internet and World Wide Web and also in multimedia technology and its 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

2. 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.

3. PROPOSED TECHNIQUE

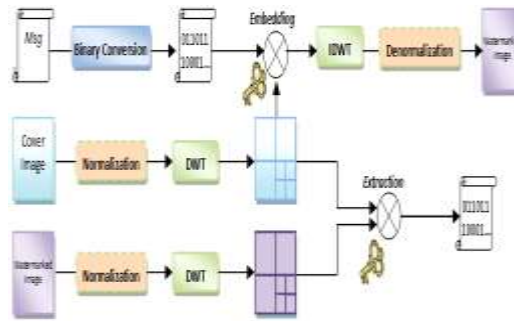


Fig:-3.1 Representation of colored image using embedding and extraction algorithm

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.

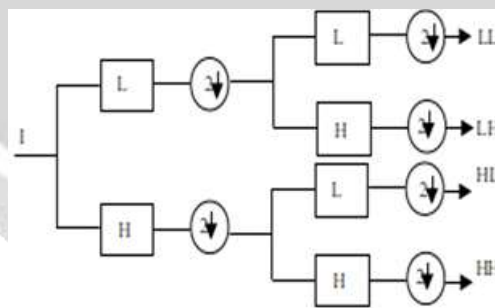


fig. 3.2 Analysis of 2D DWT

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.

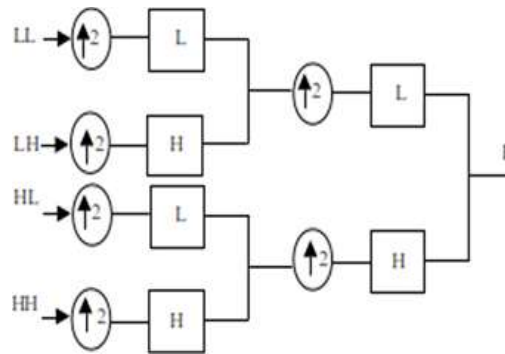


fig. 3.3 Synthesis of 2D DWT

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

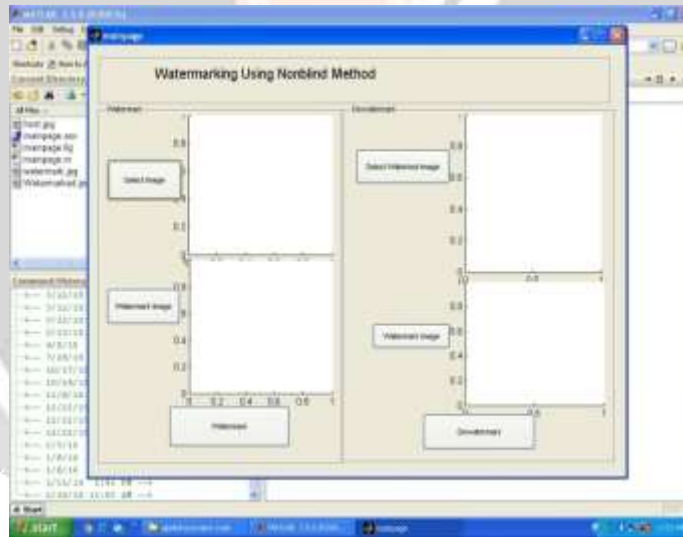


Fig 3.4: Image selection

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

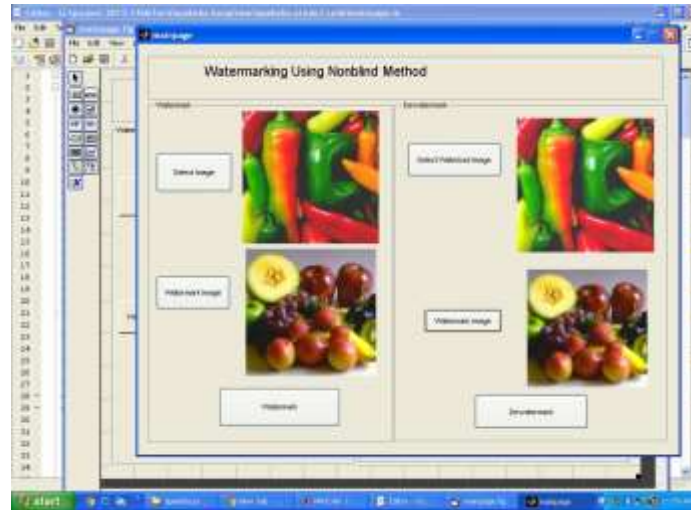


Fig 3.5: Image selection, watermarking and dewatermarking of image

we obtained watermarked image. It also shows original host image, watermark image and watermarked image.

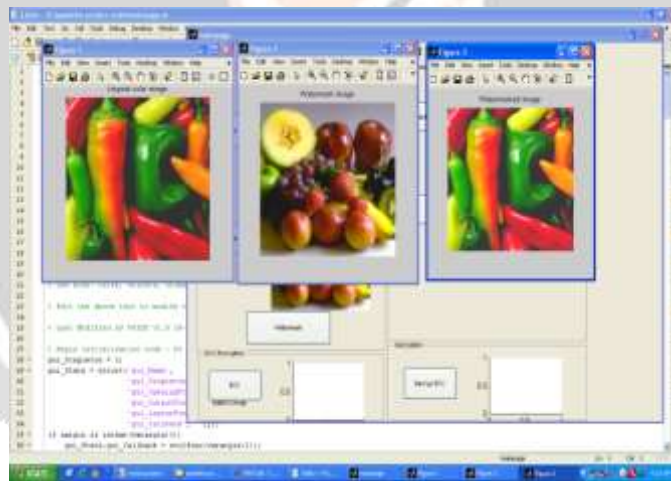


Fig 3.6: Watermark Image

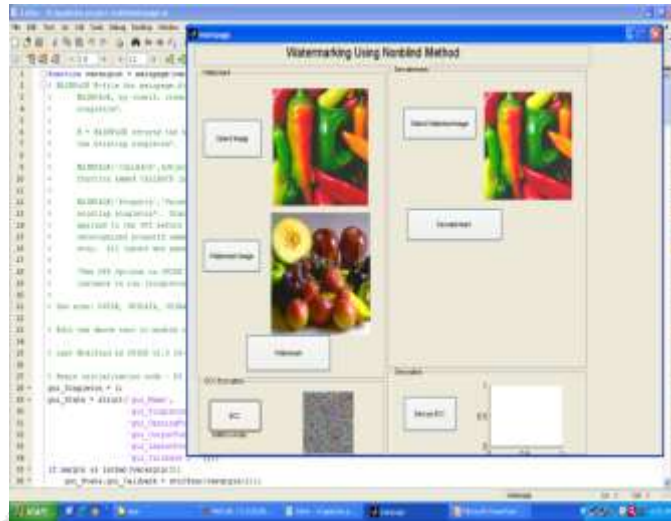


Fig 7: Dewatermark Image

After obtaining watermarked image. It is secure with encrypting techniques. Now we have to decrypt the image by applying decrypting techniques and we obtain dewatermark image .

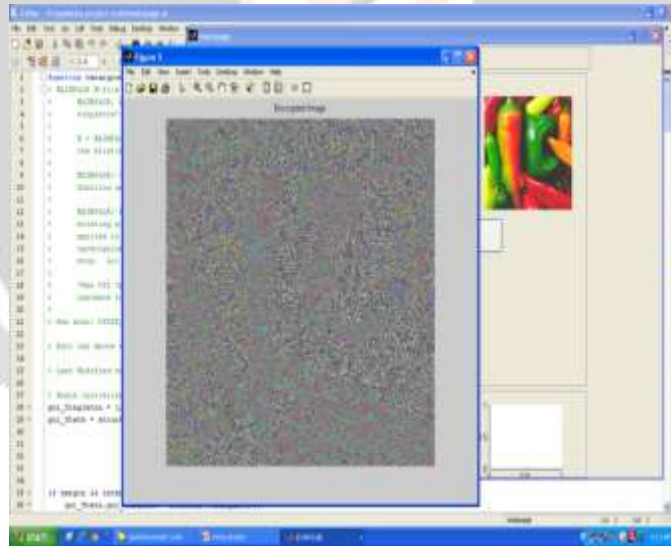


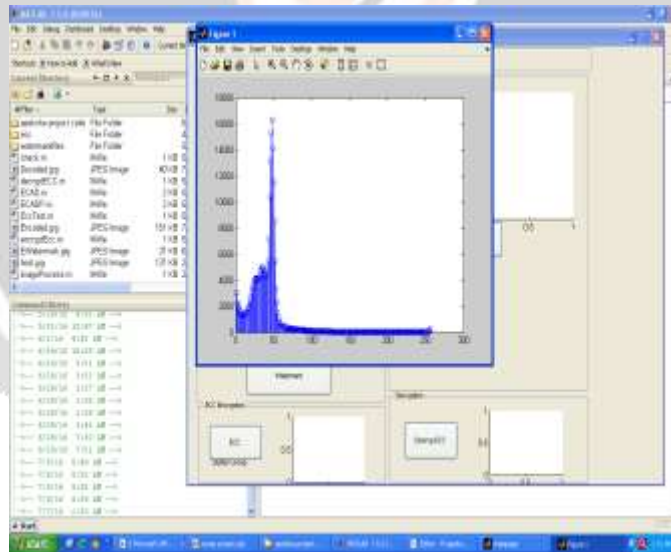
Fig 3.8: ECC Encryption

After applying algorithm elliptic curve cryptography we get the encrypted image which is secure and not seen to anyone.



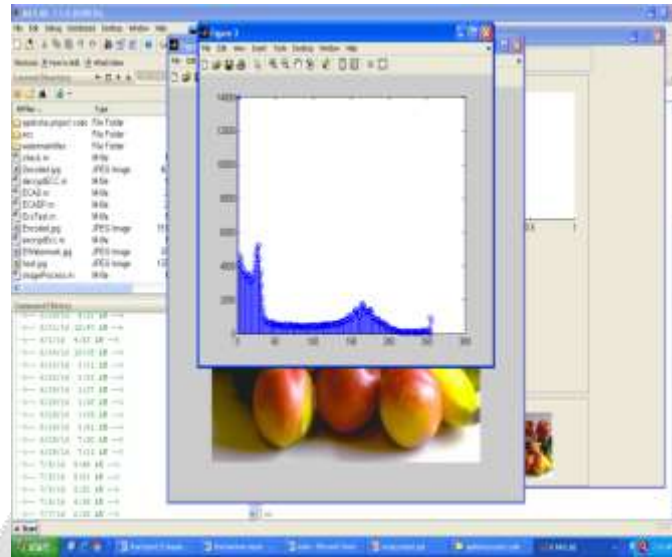
Fig 3.9: ECC Decryption

Do Reverse procedure to obtained the original watermarked image.



When first time the host image is selected then graph of host image is like this.

Fig 3.10: Histological analysis



After obtaining watermark image we get such type of graph. We obtained difference between this two graphs

Fig 3.11: Graph of watermark image

4. CONCLUSIONS

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.

5. REFERENCES

- 1.Nisreen I. Yassin, Nancy M. Salem, Mohamed I. El Adawy "Block Based image Watermarking Scheme Using Wavelet Transform and non blind method" IJCSI International Journal of Computer Science Issues, January 2012
- 2.Sanjana Sinha, Prajnat Bardhan, Swarnali Pramanick, Ankul Jagatramka, Dipak K. Kole, Aruna Chakraborty "Digital image Watermarking using Discrete Wavelet Transform and non blind method" International Journal of Wisdom Based Computing, Vol. 1 (2), August 2011.
- 3.Hanane H.Mirza, Hien D.Thai, Yasunori Nagata and Zensho Nakao "Digital image Watermarking and non blind method", IEEE 2007.

4. Salwa A.K Mostafa, A. S. Tolba, F. M. Abdelkader, Hisham M. Elhindy “image Watermarking Scheme Based on non blind method and Wavelet Transform” IJCSNS International Journal of Computer Science and Network Security, VOL.9 No.8, August 2009.
5. U.Mehraj Ali, E.Vinoth Kumar, A.John Sanjeev Kumar “Wavelet based Watermarking Techniques using non blind method” National Conference on Advances in Computer Science and Applications with International Journal of Computer Applications (NCACSA) Proceedings published in International Journal of Computer Applications (IJCA),2012.
6. Nikita Kashyap, G. R. SINHA “Image Watermarking Using 3-Level Discrete Wavelet Transform (DWT)” I.J. Modern Education and Computer Science, 3, 50-56, April 2012.
7. Manish Choubisa, Kamal Hiran, S. K. Singh “Permutation Based Invisible Digital Watermarking Technique using DCT Domain” International Journal of Computer Applications (0975 – 8887) Volume 31– No.6, October 2011.
8. Gaurav Bhatnagar, Balasubramanian Raman ”Wavelet packet transform-based robust imagewatermarking technique” Indian Academy of Sciences, Vol. 37, Part 3, pp.371–388, June 2012.
9. Neeta Deshpande, Dr. Archana Rajurkar, Dr. R. Manthalkar “Review of Robust image Watermarking Algorithms” (IJCSIS) International Journal of Computer Science and Information Security, Vol. 7, No. 3, March 2010.
10. Chrysochos E., Fotopoulos V., Skodras A., "Robust Watermarking of Digital Images Based on Chaotic Mapping and DCT", 16th European Signal Processing Conference (EUSIPCO 2008), Lausanne, Switzerland, 25-29 August, 2011.
11. T.Jayamalar, Dr. V. Radha “Survey on Digital imageWatermarking Techniques and Attacks on Watermarks” International Journal of Engineering Science and Technology, Vol. 2(12), 6963-6967, 2013.
12. Kshama S. Karpe, Prachi Mukherji “Hybrid Digital image Watermarking Technique Based on Discrete Wavelet Transform (DWT) and non blind method” International Conference on Electronics and Communication Engineering (ICECE) -12th Sept, 2014.