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Watermarking of compressed-encrypted images

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Abstract
Digital asset management systems (DAMS) access the media data for the transfer over the channel in the form of compressed and encrypted image. This system apply watermark signal this compressed encrypted data for tamper detection or ownership declaration or copyright When media data is transform. There is a big problem to insert a watermark into compressed encrypted domain because the compression process applies over the each block of data or information. Which contain a redundant or a raw media which are replace by encryption process apply on low number of bits which are randomized and compressed process apply over each bit data or information which unable to see original data to unauthorized person for transmission purpose. Embedding process of a watermark to randomized bit stream cause degradation into image quality. So choose an encryption scheme for media data such that it will secure and will allow us to embed a watermarking scheme in a predictable manner into compressed encrypted domain and degradation of image should be Minimum.
Watermarking algorithms are described to apply watermark to different types of image format to compressed and encrypted images. Data can be transfer from sender to Receiver in the form of block cipher or stream cipher. There is different encryption algorithm depending Key Selection but encryption process apply over the stream type. In this we propose insert of watermarking done in the compressed-encrypted domain, but watermark can be extracted into decrypted domain. By studding embedding capacity, perceptual quality, robustness, and security there are three watermarking schemes such as Spread Spectrum (SS), Scalar Costa Scheme Quantization Index Modulation (SCS-QIM), and Rational Dither Modulation (RDM).

Keywords: spread spectrum, watermarking, rational dither modulation, quantization index modulation, embedding watermark, encryption process

1. Introduction
Now a days, all media data transfer through a network. That media data contain information which must be protect by accessing it by unauthorised way or use that data for wrong purpose so digital watermarking techniques provide facility to author to protect the data by copyright, ownership declaration. Three watermarking schemes have been proposed for multimedia content (images, video and audio signal) for protection purpose and ownership. Now digital watermarking is use by many organization or person by which document can be protect by illegal access or copying process and use it. As data may send into piece of data by breaking it into stream or packet and it provides a good protection to this embedding a message by maintaining quality. Digital watermarking is nothing but insert some useful information into a piece of digital data which authenticate the ownership of data. These techniques is useful for many types of digital data including still imagery, movies, and music etc [1].

2. Literature Review
Jun *et al*. [2] gives a watermarking algorithm technique based on the image segmentation, which gives the more security to the watermark. it use RDM algorithm for the watermark process, and also analyse the algorithm having robustness property. Robust is one of good feature of the algorithm for security of the data. It has good power of resistance against attack such as histogram equalization, intensified image, darken image, reducing contrast and etc.
J.Li *et al*. [3] gives implementation by using FCM algorithm. In the scheme, encryption of watermark by using double phase encoding technique. And at extraction side there is no need of host image and it is blind type watermarking. Image is break into blocks which are classified and select suitable blocks b using characteristics of HVS, FCM algorithm. From them for embedding watermark in it. By iterative process of embedding process imperceptibility and robustness water-mark can be obtained. Private keys are not correct then it is unable to retrieve the encrypted watermark after decryption process.
L Ghouti *et al*. [4] used balanced multi wavelet transform by using robust watermarking algorithm it placed updated version of the perceptual watermarking model for embedding scheme in image. So host image properties can be used for controlling the strength of the watermark. This is only because of updated version. And this is not depend on which filter are used but it depend on image activity.

3. Methodology
3.1 Existing System Design

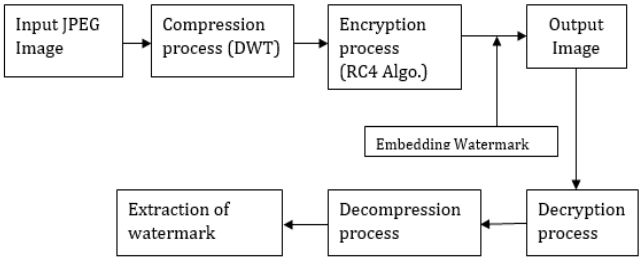

Fig 3.1: Existing System

1. **Input image:** JPEG2000 image is input for processing
2. **Compression Process:** DWT transformation is used for compression process.
3. **Encryption Process:** On compressed image by using stream cipher algorithm RC4 is applied.
4. **Watermark Embedding:** On compressed-encrypted image different Watermarking schemes are applied.

3.2 Proposed System

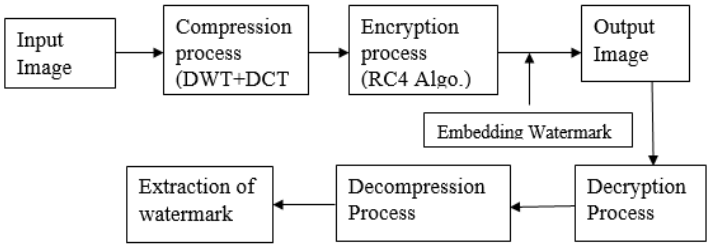

Fig 3.2: Proposed System

4. Result and Discussion

The main objectives of this work are: a) to improve image quality, b) to improve watermarking result and, c) to compare watermarking result on basis of SSIM and PSNR value for multiple watermarking schemes on multiple images. For watermarking SS, SCS-QIM AND RDM are used. The method is checked out on various database images. Database used is SIPI image database for checking the algorithm. Results of watermarking are compared on various images for various watermarking sachems.

4.1 Results of Watermarking using SS, SCS-QIM and RDM ON TIF Images

Table 1

Sr. No	Image Name	Image	Compression ratio	PSNR	SSIM
1	Woman.tif		0.33410645	46.043945	0.91015625
2	River.tif		0.2948049	58.50293	0.97265625

Table 2

Sr. no	Image name	Name of scheme	Noise type	Payload (bits)	Watermark capacity	Algo.Exe. time	PSNR for schemes	PSNR after noise attack
1	Woman.tif	SS	normal	3100	0.88	399	42.04395	
			rotation	3100	0.48	396	44.04395	43.043945
			gaussion	2400	0.88	396	45.04395	43.043945
			blurring	6200	0.1	405	42.04395	42.043945
			salt &pepper	2400	0.5	399	42.04395	43.043945
2	River.tif	SS	normal	3100	0.88	399	42.04395	
			rotation	3100	0.48	396	44.04395	43.043945
			gaussion	2400	0.88	396	45.04395	43.043945
			blurring	6200	0.1	405	42.04395	42.043945
			salt &pepper	2400	0.5	399	42.04395	43.043945

Table 3

Sr. no	Image name	Name of scheme	Noise type	Payload (bits)	Watermark capacity	Algo.Exe. time	PSNR for schemes	PSNR after noise attack
1	Woman.tif	SCS-QIM	Normal	2400	0.42	408	45.04395	
			Rotation	3400	0.1	408	42.04395	44.043945
			Gaussion	3400	0.5	408	44.04395	44.043945
			blurring	2300	0.5	409	45.04395	43.043945
			salt & pepper	2300	0.38	396	45.04395	43.043945

2	River.tif	SCS-QIM	normal	2100	0.42	399	54.50293	
			rotation	2000	0.1	399	54.50293	56.50293
			Gaussion	2100	0.38	409	57.50293	55.50293
			blurring	3400	0.88	405	54.50293	55.50293
			salt &pepper	3000	0.1	399	56.50293	55.50293

Table 4

Sr. no	Image name	Name of scheme	Noise type	Payload (bits)	Watermark capacity	Algo.Exe. time	PSNR for schemes	PSNR after noise attack
1	Woman.tif	RDM	normal	3400	0.38	399	42.04395	
			rotation	3200	0.1	405	40.04395	42.043945
			Gaussion	3200	0.35	409	43.04395	42.043945
			blurring	3000	0.56	408	42.04395	42.043945
			salt &pepper	2400	0.1	399	45.04395	44.043945
2	River.tif	RDM	normal	3100	0.38	400	56.50293	
			rotation	2500	0.42	396	54.50293	54.50293
			Gaussion	3200	0.56	399	53.50293	57.50293
			blurring	3300	0.5	409	53.50293	54.50293
			Salt & Pepper	3000	0.42	405	52.50293	54.50293

5. Conclusion

Digital watermarking techniques design to protect the copyright of media data for transmission purpose. There have been Different watermarking schemes proposed for multimedia content (images, video). Insertion of watermark in such a way that it is invisible and not easy to separate it from host image data and It resist to many operation to modify it or detect it from host image by maintain image quality. So, it embedded such a way that it will reside into host document

6. References

1. Multimedia security staganography and digital watermarking techniques for protection of intellectual property, Chun-Shien Lu, Institute of Information Science Academia Sinica, Taiwan, ROC, Idea Group Publishing.
2. Kang Xiao Jun, Dong Li Jun. A Digital Watermarking Algorithm Based on Image Segmentation and DFT, Conf. ICISE2009, 2009, 1511-1514.
3. Jianzhong LI, Xiaojing Chen. An Adaptive Secure Watermarking Scheme Using Double Random-Phase Encoding Technique, Support Project of Hanshan Normal University, 2009 IEEE.
4. Lahouari Ghouti, Ahmed Bouridane, Mohammad K. Ibrahim, Said Boussakta, Digital Image Watermarking Using Balanced Multiwavelets, IEEE Transactions On Signal Processing. 2006; 54(4):15-19.
5. Steganography And Digital Watermarking. Jonathan Cummins, Patrick Diskin, Samuel Lau and Robert Parlett, School of Computer Science, The University of Birmingham.
6. Prabhishek Singh Chadha RS. A Survey of Digital Watermarking Techniques, Applications and Attacks, International Journal of Engineering and Innovative Technology (IJEIT). 2013; 2:9.
7. Sin-Joo Lee, Sung-Hwan Jung. A survey of watermarking techniques Applied to multimedia, IEEE, 2001.
8. Mahmoud El-Gayyar Watermarking Techniques Spatial Domain Digital Rights Seminar Media Informatics University of Bonn Germany, 06.
9. http://www.digitalwatermarkingalliance.org/dwm.asp
10. Wei Zhou Xifeng Liang. Color Image Segmentation Algorithm based on Target Characteristic Analysis, IEEE transaction, 2011, 3028-3830.
11. Jun Tang. A Color Image Segmentation algorithm Based on Region Growing, 2nd International Conference on Computer Engineering and Technology. 2010; 6:635-637.
12. Shikai Wang. Color Image Segmentation Based on Color Similarity, International Conference on Digital Object Identifier CISE, IEEE, 2009.
13. Keri Woods, Genetic Algorithms: Color Image Segmentation Literature Review, 2007.
14. Gui-Mei Zhang, Ming-Ming Zh ou, Jun Chu, Jun Miao, Labeling Watershed Algorithm based on Morphological Reconstruction in Color Space, 2011.
15. Yingli Wang, Xue Bai, Shuang Van. Digital Image Watermarking Based on Texture Block and Edge Detection in the Discrete Wavelet Domain, International Conference on Sensor Network Security Technology and Privacy Communication System (SNS & PCS), 2013, 170-174, Harbin, China.
16. Chenxue Wang, Junzo Watada. Robust Color Image Segmentation by Karhunen-Loeve Transform based Otsu Multi-thresholding and K-means Clustering, Fifth International Conference on Genetic and Evolutionary Computing, IEEE Trans, 2011, 377-380.
17. Marat Kazanov. A New Color Image Segmentation Algorithm based on Watershed Transformation, IEEE Proceedings of the 17th International Conference on Pattern Recognition (ICPR'04), 2004.
18. Emad A, Mohammed Mostafa MA, Mohamed, Christopher Naugler. Chronic Lymphocytic Leukemia Cell Segmentation From Microscopic Blood Images Using Watershed Algorithm And Optimal Thresholding 26th IEEE Canadian Conference Of Electrical And Computer Engineering (CCECE), 2013.