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Implementation Of Fractal Technique In Digital Watermarking

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Abstract - *Image watermarking plays an important role in security. Watermarking is a process of hiding the data with respect to image or audio or video or text. This paper aims at image watermarking with the demerits in existing system and the key idea of proposed approach. Image embeds with the watermark image and resultant image will be used to send to the receiver, the whole process discussed in the paper. Experiments have been done by taking the image although the evaluation of the image are described which helps to attain a good quality resultant image which can suffer from several attacks. As a result, proposed techniques outcomes are better than the existing methods.*

Key Words: *Image Watermarking, Diffie-Hellman Key Exchange, embedded, encoded, decoded, cryptography*

1. INTRODUCTION

As technology enhances day by day due to which security becomes an important concern. In the traditional days, encryption had been performed to provide security to the data but this method is not secure enough. Consequently, new method has proposed that provides security to the data known as watermarking. Watermarking is a concept of hiding data into any form such as image, audio, video, text etc. Watermarking plays a vital role in security and also retains true authentication of the data which leads its significance in the real world. At the time of Watermarking, it should be taken care that data must not be loss as well as its original data or source must not be changed. Source can be audio, video, text or an image. The main idea behind using watermarking is the security of multimedia data as multimedia data can be manipulated and duplicated. In this research paper, focus lies on the image watermarking i.e. data will keep under the image for the security. Image watermarking has been done since image is used in various applications for further processing. Some of the applications of image are image restoration, medical visualization, image enhancement, image denoising etc. Thus, to make an image capable for future processing, it should not lose its originality as well as quality.

Watermarked image which is embed with the original image do not have its own identity. It also does not have any relation with the original image. Watermarked image have been used just for the hidden purpose of data so that no attacker can use the particular image for any purposes. Watermark can be visible or invisible depends on the requirement of the user.

Below diagram shows the basic watermark model that has been followed for watermarking purposes.

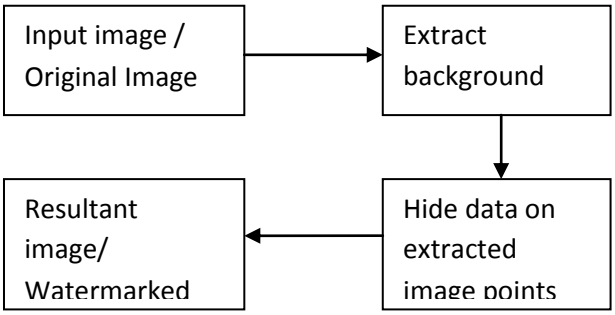

Fig 1Shows the basic flow to obtain a watermarked image [8]

First an original image is taken referred as input image on which watermark will be applied. Now from the first stage output will obtain and extraction of background area will be performed. After the extraction of the background area, it's time to hide data on extracted image points. At last the resultant image will acquire. Thus, these are the basic process that occurs in watermarking from the initial input image to resultant image. More instant the resultant image can process further in future for different applications.

1.1 Related Work

Watermarking is the most emerging technology for the research area. Hence, there are numerous researches that have been done in this field.

In the paper [1], DCT algorithm has been proposed used for watermarking. In which digital signal embedded into the watermark image for the image copyright protection.

In another approach DST is used to convert the image into the watermarked image and Inverse DST to acquire the original image from the watermarked image as mentioned in [2]. Transform domain watermarking (DCT, DWT and DFT) is an approach that can also be used for watermarking that secures multimedia data on the internet. It proposes an approach divides into spatial domain and transform domain watermarking [3].

1.2 Problem Formulation

With the increase in technology, there are frequent work has been done from years in the field of security. Watermarking is another concept that shows its hands for the security of the data with several techniques. Traditional methods are not capable in generating a robust and quality

oriented watermarked image due to which several techniques have been proposed. Some of them are DWT, HVS, and DCT etc [2]. Demerits of the existing systems are the efficiency, security, quality and robustness. Caused by these issues, proposed methods are considered. In this paper, proposed method is used for watermarking of the image and provides better security as compare to existing methods. Resultant image from the proposed technique is more robust and easy to attain original image from the watermarked image even after the various attacks which cannot implied on existing approaches.

2. PROPOSED WORK

Proposed work is done to provide efficient and secure communication between the sender and receiver. In the traditional method, security of data had not been performed efficiently due to which focus puts on the technology that must be enhanced. Thus, proposed approach provides more security and robustness to the data. So the basic idea of proposed approach is that data must not be loss as well as its quality should remain same. As a result there are numerous techniques of the existing approach that are proposed so that its quality may enhance.

In this paper, Diffie- Hellman Key Exchange technique has been proposed in which key (secret key) is the main concern.

DIFFIE- HELLMAN KEY EXCHANGE

Diffie-Hellman Key Exchange provides a secret key which is shared between the sender and the receiver on an unsecured network that will helps to keep away the eavesdropper which leads to secure communication.

Both sender and receiver allow selecting a secret number and then exchanges between each other. The resultant number will become key for both for communication. This technique provides cryptography not the encryption which leads to generation of private key known to sender and receiver only. Accordingly, if attacker attacks to the network may able to get the access but he/she will not be able to detect the key shared between both parties.

Data is encrypting through this technique in this paper and embed into the image via image watermarking.

3. METHODOLOGY

In this paper, Diffie-Hellman Key exchange algorithm is used as a proposed approach which provides the security to data while transmission over the network. Encoding and decoding by using proposed technique is as follows

Encryption part

In the encryption part of the algorithm, image is taken and embeds it with the watermark image Thus, steps are discussed as:

1) At first an image is selected from the given data set of images, further, this image will be used for embedding and send to the receiver at the other end.
2) After the selection of the image, next step will be the conversion of the image into the lab color space.
3) Simultaneously, select a watermark image from the given set of watermarked images. Then apply encoding algorithm on the selected watermark image for the compression of the data. Finally the data is compressed.
4) Now, obtained compressed data will embed into the image which was converted into the lab color space mentioned earlier.
5) This embedding helps in hiding the data into the image.
6) Finally, data embedded image acquired from the preceding stage and sends it to the receiver side for description purposes.
7) At the end of the stage, parameters will be calculated for the performance evaluation.

Decryption part

Decryption has been performed on the receiver side where received data is decoded to obtain the original image from watermarking image. Decryption works in same process but in reversing order with the help of secure key obtained by the sender in private communication. Encrypted image is the input for the receiver then decoding algorithm is applied on it and resultant image will be the original image if the process goes right.

Block Diagram of Encoding

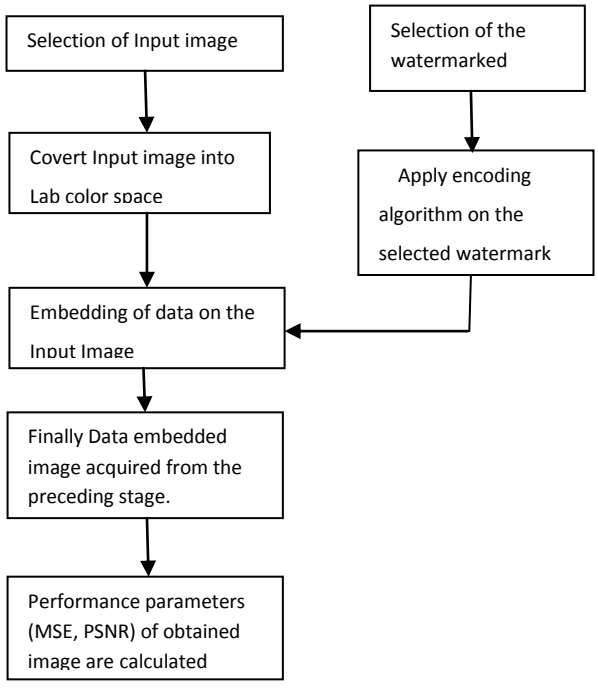

Fig 2:- shows the working of Image watermarking with the help of Diffie- Hellman Key exchange algorithm.

4. RESULTS AND DISCUSSION

The below section provides results of the proposed work performed on the image. Evaluation of the original image and watermark image is shown under this section. On the whole MSE and PSNR parameter values are used to compare the existing and the proposed technique.

Figure3. Original image referred as input mage for the watermarking purpose.

Figure4. Watermark image that will embed with the original image.

Figure5. Encoded image after embedding watermark.

5. COMPARISON TABLE

Table1. Shows the comparison of old and proposed technique by using the PSNR.

Parameter	Traditional	Proposed
PSNR	33.300	50.4798
	25.0500	62.7322
	30.5900	53.6579

Table2. Shows the values corresponding to various parameters after applying proposed technique

Parameter	Proposed Result
PSNR	53.6579
MSE	0.2801
BER	0.0159
Correlation	0.9999
SSIM	0.9998

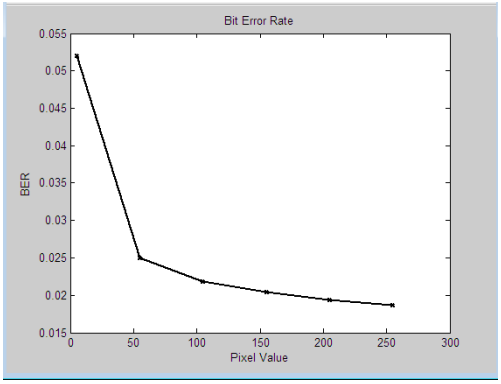

Fig 6: - This graph shows the bit error rate with respect to pixel value.

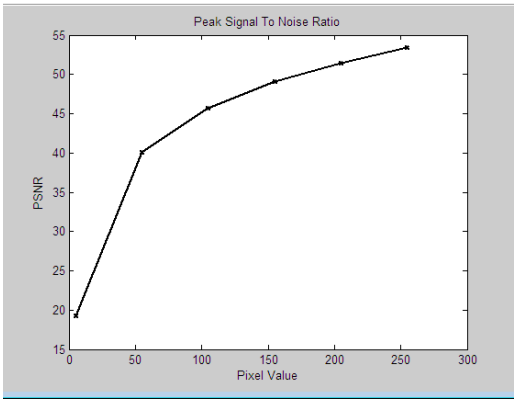

Fig 7: - This graph shows the value of PSNR.

5. CONCLUSIONS AND FUTURE SCOPE

Image watermarking has been performed in this paper. Drawbacks of exiting system have recovered in the proposed

method. LUV color space has applied on the original image to match it with the watermark image. Encoding of the data is performed on the watermark image and embeds it with the input image. It is observed after implementing the traditional methods that proposed method provides more secure and efficient response with the help of key exchange algorithm. Parameter values of MSE and PSNR helps in comparing the old and proposed techniques that clearly shows which techniques are better.

In future, more work can be done on the watermarking as multimedia data is most of the unsecure data nowadays. Thus this media need to be secure with the more efficient and robust techniques. Due to its active research field, advancements can be done for the security of the digital media.

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