

# *Unbreakable Digital Watermarking using combination of LSB and DCT*

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**Abstract-** Digital Image Security is still or recent topic of research in computer science engineering. Images are sharing very frequently from one device to another device. Due to this functionality and features it is very complicated situation for all of the application users because users share their personal images publically. A very unsolvable problem is still there is no appropriate method for image security to identify ownership with the image sharing tool over the internet. The digital image watermarking is still appreciable and demandable techniques. Though it is still in research because it has to be utilizing with all the applications those work with images. This research is done to find the best digital watermarking technique to highly secure digital image form the illegal copies. The research work also done to analyze the possibilities of dual watermarking. Various standard research articles were studied and it is found that dual watermarking is possible with some situation. This research work motivates and offers different combinations on digital watermarking techniques in near future for efficient output of watermarking.

**Keywords-** Digital Image, Digital Watermarking, Discrete cosine transformation (DCT), least significant Bit (LSB), Discrete Wavelet transformation (DWT).

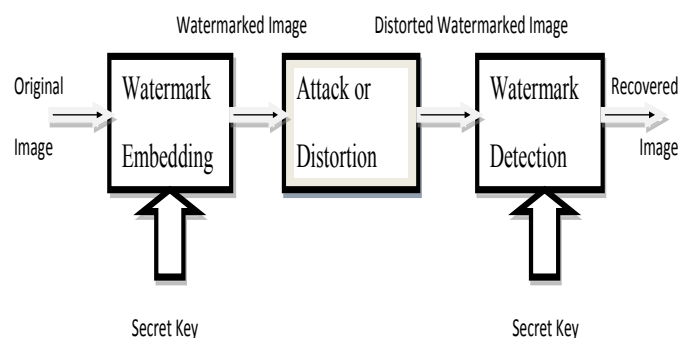
## I. INTRODUCTION

In the current trends of the world, due to the progress in technologies, most of the entities prefer to use the internet as the primary medium to transfer data from one end to another across the world. Security Threats and integrity are most important issues while sending data through the internet. Network Multimedia Systems Recently always gained greater popularity due to increasing amount of information stored and A more vertical rate of advanced multimedia Services such as electronic commerce, interactive TVs, teleworking etc. will be widely available. The future development of networked multimedia systems is conditioned by the development of capable methods to protect data owners against illegal copying and rearrangement of the material put on the network [1]. People invented a technique to hide the company logo, specific digital identifier and other information into the multimedia files for the sake of recognition of ownership. Data Security provides protection from unauthorized hackers [8]. The digital watermarking technique had been a

crucial measure for the security of the multi-media information. Recent years, the digital watermarking technique had been a vital measure for the safety of the multi-media information, and been attached importance to.. People invented a technique to secrete the company logo, specific digital identifier and other information into the multimedia files for the sake of identification of ownership. The logical property rights would be protected effectively and the embedded information.

wouldn't have any effect to the original content. In recent years, with the progress of the technology of computer software and network technology day by day, digital products such as text, image, audio and video are widely used. At that time an invisible watermark message was inserted into a image which is to be transferred such that the invisible message will survive proposed or accidental attacks.

Fig1. Block Diagram of Watermarking



## II. DIGITAL WATERMARKING

Security of data basically means protection of data from unauthorized parties and providing high level security to prevent data modification. The watermark is projected to be permanently embedded into the digital data so that authoritative users can straightforwardly read it [1]. Digital watermarking is a technique which allows a separate to improve secure copyright announcements or additional authentication messages to digital image, audio or video signals and documents [2]. In Digital Watermarking, which is subdivision of

information hiding technology. The basic requirements are: (a) Transparency, referring to that a certain amount of digital watermarking information is embedded in a digital media host, with the hidden data being undetectable and without causing dreadful conditions to the original media. (b) Robustness, referring to that the digital watermarking must

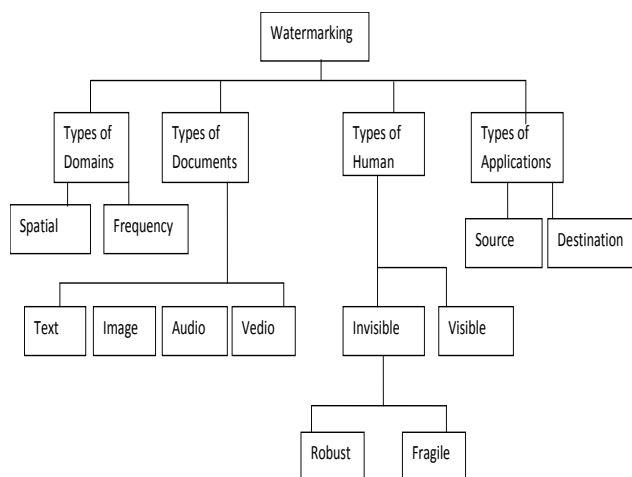
be unaffected to the transformation applied on host media such as less compression, filtering and cropping, that is, the watermark information should not be lost due to some transformation applied to the host media. (c) Safety, referring to that the digital watermark can oppose all kinds of deliberate attack, and it is difficult to be copied or forged by others, as long as they do not know the secret key control algorithm[9]. In Digital Watermarking, there are two types of Watermarking, Visible and Invisible Watermarking. Digital image watermarking method provides Clarity [3].

Security and Integrity are also two essential requirements of perfect watermarking. A perfect watermarking depends upon the Robustness [4][5].

There are many problems of watermarking-

1. Transparency
2. Security
3. Robustness
4. Imperceptibility

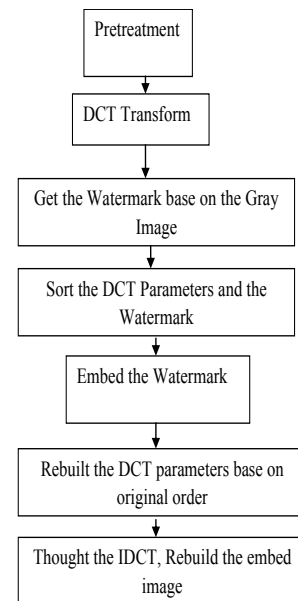
Fig2. Classification of Watermarking



### 1. Discrete Cosine Transform (DCT)

In digital watermarking Discrete cosine transform (DCT) relies on orthogonal transform which is one in all the most normally used linear transform in digital signal process. It affects the connection properties of image signal during watermarking. It shows the complexities and simplicity of the cover image.

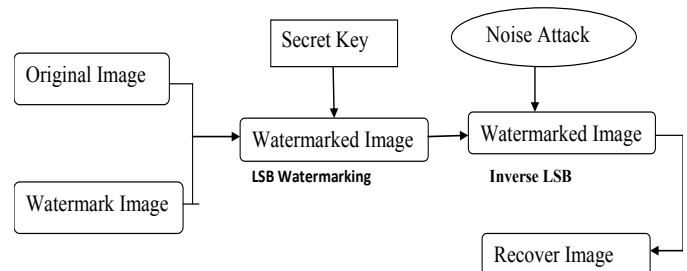
Fig3. Process of Watermarking using DCT



### 2. Least Significant Bit (LSB)

In the digital watermarking Least significant bit (LSB) is the most common technique to embed the watermark. In the LSB technique images are changed into pixels to bits. LSB tactic would be to use a pseudo random number generator which confirms the pixels to be used for embedding watermark primarily based upon the secret key [2].

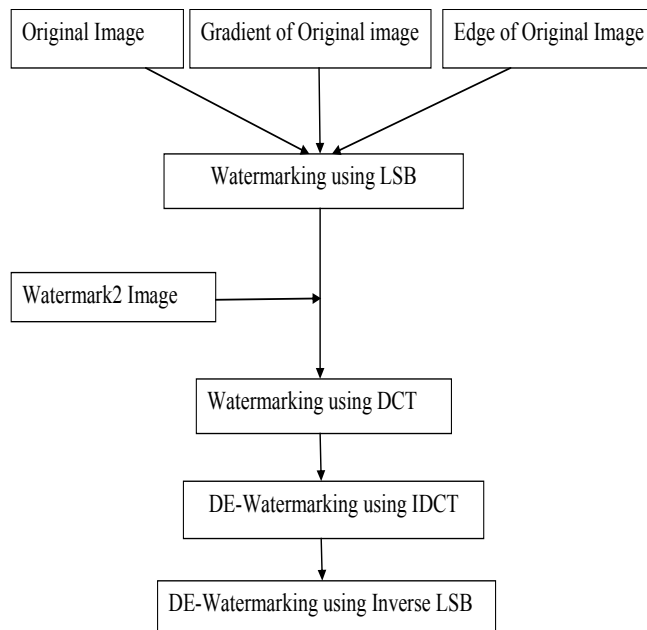
Fig4. LSB Watermarking



### 3. Combination of DCT and LSB






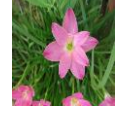




Here we combined the LSB and DCT techniques which provide the multilevel image security.

Fig5. Combination of LSB and DCT on Dual Watermarking



Calculated PSNR and SNR values for Sample image taken are shown in the table.

### 1. Calculated Results for LSB

Sr . N o.	Original_I mage	LSB_Wat ermarkedI mage	SNR	PSNR
1.	 1.jpg	 1LSB_Wa termarked	48.58	56.24
2.	 2.jpg	 2LSB_Wa termarked	48.84	55.98
3.	 3.jpg	 3LSB_Wa termarked	45.03	55.92
4.	 4.jpg	 4LSB_Wa termarked	45.45	55.74
5.	 5.jpg	 5LSB_Wa termarked	46.14	55.99

Here to show a tendency to used combined approach of LSB-DCT watermarking for multilevel image primarily based knowledge security. In LSB DCT approach author used edge of original image as a watermark image that is calculated by edge detection technique. This watermark is embedded on original image with the help of LSB watermark approach. Once the primary watermarking method is completed author embedded next watermark on the first image with the help of DCT Watermarking.

### Advantages:

1. The robustness of the watermarking is dramatically improved
2. It is very complex to erase or damage security information.
3. DCT over LSB does not affect originality of the image.
4. Dual Watermarking hide owner information in very efficient manner such that DCT does not affect the information embedded using LSB.











### III Experiment Results-

Results are calculated on the basis of Experiment done in MATLAB on variable images from the different cameras. Two test quality of watermark it is necessary to check the color appearance and object location on the image panel. The originality of the image taken should not be affected with the watermarking algorithm.

As shown in the table it is very clear from the values that quality of image is slightly affected LSB watermark. In which image 1 has the highest value of 56.24. For the good quality image the highest value

should not be exceed 50 .It shows image is in good quality with LSB watermarking.

## 2. Calculated Results for DCT

Sr. N o.	Original_ Image	DCT_ Watermarked Image	SNR	PSNR
1.	 1.jpg	 1DCT_ Watermarked	30.92	35.56
2.	 2.jpg	 2DCT_ Watermarked	31.96	36.88
3.	 3.jpg	 3DCT_ Watermarked	28.98	35.68
4.	 4.jpg	 4DCT_ Watermarked	29.94	35.24
5.	 5.jpg	 5DCT_ Watermarked	28.50	33.30

It is very popular for its complexity no doubt its takes time but produce quality results. As shown in the table above it is very clear for five sample images the values is in required range(32-50).Her we have image 2.jpg

which has highest value compare to all images which is does not affect the quality.

## 6. CONCLUSION

The Dual Watermarking is possible or not it is a question which needs to solve to check the double security on the image.LSB is very popular but affect the image quality and also it is very easy to broken and modify the watermark embeebed.but in the case of DCT the situations are differently. Here we have complex watermarking which is robust to face different types of attack .Here we have choosen DCT over LSB for best quality of watermarking which is successfully implemented and calculated for different parameters where are result calculated and the presented for quality performance from the research work. The conclusion induces that dual watermarking is the possible in the special case of LSB and DST which provide recovered information in the readable format. The PSNR and SNR calculated which proof image quality after watermarking does not affect originality.

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