A Review on Digital Image Watermarking

Payal Kaushal
M.Tech(CSE) student of
ASRA college of Engineering and Technology,
Bhawanigarh, Punjab

Navjot Kaur
Assistant Professor at
ASRA college of Engineering and Technology,
Bhawanigarh, Punjab

Abstract— **Image watermarking is an important application of the image processing .Image watermarking is the process of inserting the watermarked message in a host document in some multimedia format. Watermarking presents the basic model for embedding and extraction of watermark. It is basically required to protect the information from the unauthorized access. The copyright protection, capacity, security, robustness etc are some of the important factors that are taken in account while the watermarking system is designed. This paper presents study of the digital watermarking process, concept, applications and its contributions in various other fields.**

Keywords
Imageprocessing;Imagewatermarking,Security,Robustness

I. INTRODUCTION

With the increasing use of the internet, copyright protection for the multimedia data has turned into a vital issue. For reliable communication the security of the data is the prime concern. Traditionally the cryptographic techniques were used for providing the security to the information but this theory has its own limitation. So to resolve the problem of the traditional technique the analyst has been focusing on the study of the digital watermarking technology. It increases the security of the data and protects the information from unauthorized access. Watermark information can be patent information, authentication information in order to determine the copyright owner of the digital works, it also certify the reliability and probity of the multimedia works .A digital watermark is insertion of an impalpable signal into information, like   sound, video and pictures, for an assortment of purposes, including inscribing and copyright control. It is basically used for the identification of the ownership of the copyright of an image. Digital watermarking is a code that is embedded in the image .it is very similar to the steganography as in both the information is embedded inside the cover message with less or no degradation of the cover – object. In steganographic systems the large amount of data is embedded which results in the secure data transmission without the degradation of the cover objects and in the watermarking systems the large amount of the data is embed that can't be extracted or diversified without making the cover object entirely unusable .Many image watermarking techniques are used for process of watermarking techniques like DCT, DWT, LSB etc

II. WATERMARKING TEHNIQUES

Digital watermarking comprise of various watermarking techniques for the protection of the data .The techniques of watermarking are generally classified into two fields. Watermarking techniques are divided into two categories
1) Spatial Domain Watermarking
2) Frequency Domain Watermarking

Spatial domain watermarking: In this type of watermarking the information is added by changing the pixel values of the carrier signal .least significant bit is one of technique of the spatial domain watermarking.

- Least significant bit: - in this the watermark is added in the pixel of the image .the pixel of the images is accessed and the information which is to send is inserted in the pixel. This is an method for providing security to the data that is to transmitted.

Frequency Domain watermarking:-In this type of watermarking the information is embedded into the frequency coefficient of the carrier signal. It is more robust, and its capacity of hiding the information is more. Fourier transforms (FT), Discrete cosine transform (DCT), Discrete wavelet transform (DWT) etc are some of the technique of frequency Domain watermarking

- Discrete cosine transform (DCT):- in discrete cosine transform an image is broken into the different frequency bands that are high, medium and low frequency bands. It transforms a signal from the spatial domain to the frequency domain. The watermark is embedded into these band according to the choice made. DCT is applied in many fields like data compression, pattern recognition and every field of image processing. DCT is a real transform with better computational efficiency and also gives a better performance in the bit rate reduction.

- Discrete wavelet transform (DWT) :- In discrete wavelet transform image sis divided into subbands of different resolution. On the arrival of the image the decomposition of an image can be done at different level using series of low pass and high pass filter. Due to its spatial localization and multi resolution technique DWT is used in the digital watermarking. it give better visual image quality , localization and is highly robust technique .
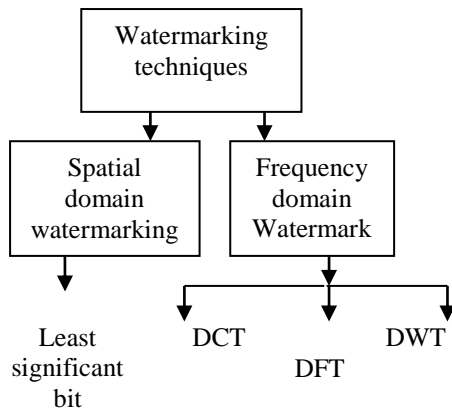
Fig 1 .Watermarking techniques

III. RELATED WORK

Image watermarking is an efficient method for hiding the information in the image. It is the secure method for the reliable communication. This paper is based on the image watermarking technique for increasing the security of the information. Many different image watermarking methods have been proposed to enhance the security of these images

Manpreet Kaur et al [1] present the comparison between various watermarking technique, describing uses and the limitation of each technique. This paper presents study of the various image watermarking techniques for the protection of the data.

Jobenjit Singh et al [2] this paper describes the process of the digital image watermarking, its applications and its properties .various parameters like Peak signal Noise ratio(PSNR), normalized Cross correlation (NCC) are used to check the Robustness and the imperceptibility of the system

Chaturvedi et al. [3] this paper compares the digital image watermarking methods DWT and DWT-DCT on the basis of PSNR and concluded that DWT-DCT method is best technique for level one watermark embedding.

Mohan Durvey et al [4] this paper is the based on the study of the digital watermarking techniques and its contribution in various other field. In this paper the features, applications, challenges, limitations, quality and performance of the various watermarking techniques.

Jaishri guru et al [5] this paper describes the study of the various watermarking algorithms for the digital image. The algorithm are defined to inversed the Robustness, capacity security and other factors of the watermarking process.

Hai Tao et al [6] this paper presents the analysis and the performance of watermarking system in the transform and the geometric domain invariant region. The basic attributes of the watermarking are taken in the consideration.

IV. PROCESS OF WATERMARKING

Watermarking is the process of embedding data, image or audio in the image that helps to identify the file's copyright information. Image watermarking consists of two parts one is inserting the watermarking in the image, video, and audio. And other process of extracting the watermark from the carrier signal.

a) Process of inserting watermark in the signal :
For inserting the watermark in the images followings steps are followed
1) Select the carrier signal in which watermark is to be inserted.
2) After selecting the signal, next step is to select the watermark that is to be inserted. The watermark can be in the form of text ,image ,etc
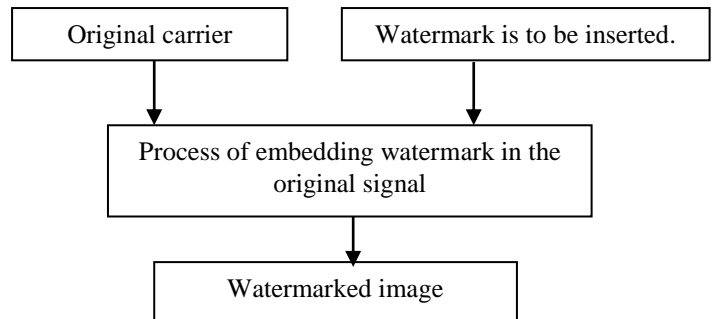3) After selecting the watermark ,the watermark is embedded into the carrier signal

Fig 2 .Process of embedding watermark in the image

b) Process of extracting the watermark from the image
For extracting the watermark from the signal following steps are followed: -
1) Select the watermarked carrier signal from which watermarked is to be removed
2) After selecting image detect the watermark form the carrier signal.
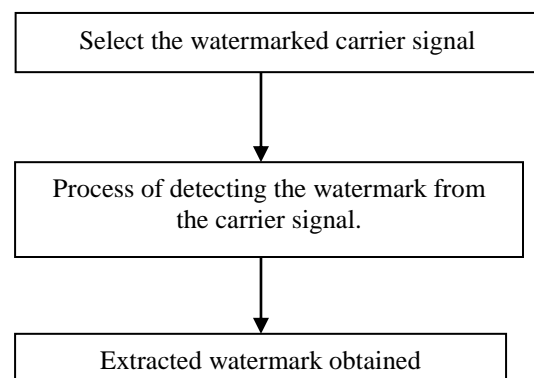3) Finally the watermark is extracted from the carrier signal.

Fig 3. Process of extracting watermark from the image

V. CHARACTERISTICS OF WATERMARKING

The factors of the image watermarking are the properties or attribute on which the watermarking depends. Requirements of Digital Image Watermarking vary and result in various design issues depending on applications and purpose. The main factors that need to be taken in consideration while designing the watermarking system are discussed as following:
1) Impalpability: The watermark that is embedded in the image should cause little degradation to the image in which it is inserted.
2) Security: security is the ability of the system to resist against the unauthorized access. Embedding and

extracting of the watermark should be done securely so that the purpose of watermarking is not changed.

3) Capacity: it is defined as the total numbers of bits that are embedded into the original image. The number of bits varied as the size of the watermark varies. Capacity defines the amount of the data that is embedded as the watermark and is detected during the extraction process.

4) Robustness: The watermark present in the image should not be affected by doing any sort modification in the image like filtering, scaling, printing etc. The watermark should be robust against such modifications. For the robustness the watermark can be added at more than one places in the image, so that if one is loss or removed the other is present there.

VI.   APPLICATIONS OF THE IMAGE WATERMARKING

Image watermarking can be used for varieties of applications, some of the applications are given below:-

1) Tamper detection: Image watermark are used for the tamper detection, it identifies the degrade or destroy watermark in the image and that content is not trusted.

2) Telecast monitoring :- This type of monitoring is used to especially in the advertisements to make sure that the content broadcasted as the contract between the advertisement company and the customer

3) Software clipping :-   In this the consumers are able to see the software before they buy it , some of the features of the program such as saving it, or printing it   are disabled until they purchase a registration key to use it for this the watermarking is used .

4) Copyright protection: Image watermarking is basically used for the copyright protection. The copyright data or information can be inserted as the watermark into the image and can be extracted to show the ownership of the company if needed.

5) Validation of the Authentication and   integrity: To detect whether the image is modified or not watermark can be used. Integrity of image can be verified by using fragile watermark which has low robustness.

6) Medical applications: - Image watermarking can be also used in the medical images .it can be used for keeping the patient's data confidential so that an unauthorized user cannot access it.

VI.   CONCLUSION

Image watermarking is the efficient process of sending the data securely. Security is the major factor that is taken in the consideration while the data is transferred over the internet. Many watermarking techniques have been proposed earlier for the secure data transmission. After studying the literature it is concluded that the most of the work is done in embedding the watermark in the image but the security of watermark after it is embedded in the image is not considered anywhere. So the security of the embedded watermark is also an important factor that is to be considered while designing the watermarking system. Further implementation can be done on this concept to provide security to the watermark image which is to embed in any media file.

REFERENCES

[1] Manpreet Kaur (2014), "Review Paper on Digital Image Watermarking Technique for Robustness "International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, Issue 5, Pp 948-952

[2] Jobenjit Singh Chahal (2013), "A Review on Digital Image Watermarking" International Journal of Emerging Technology and Advanced Engineering Website, Volume 3, Issue 12, Pp 482-484

[3] Chaturvedi Navnidh (2012)i "Comparison of Digital Image watermarking methods DWT and DWT-DCT on the basis of PSNR," International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET), Vol. 1, Issue 2,Pp 147 -153

[4] Mohan Durvey (2014), "A Review Paper on Digital Watermarking "International Journal of Emerging Trends & Technology in Computer Science (IJETTCS) Volume 3, Issue 4,Pp 99- 105

[5] Jaishri guru(2014), "A Review of Watermarking Algorithms for Digital Image ",International Journal of Innovative Research in Computer and Communication Engineering, Vol. 2, Issue 9, Pp 5701- 5708

[6] Hai Tao(2014), "Robust Image Watermarking Theories and Techniques: A Review "Journal of Applied Research and Technology, Volume 12, Issue 1, Pages 122–138

[7] inita Gupta M(2014), "A Review on Image Watermarking and Its Techniques" International Journal of Advanced Research in Computer Science and Software Engineering Volume 4, Issue 1,Pp 92- 97

[8] Manjit Thapa (2011)" Digital Image Watermarking Technique Based on Different Attacks", (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 2, No. 4,Pp 14 -19

[9] Radhika v(2013), "Comparative Analysis of Watermarking in Digital Images Using DCT & DWT" International Journal of Scientific and Research Publications, Volume 3, Issue 2,Pp 1-4

[10] Zhu Yuefeng(2015), "Digital image watermarking algorithms based on dual transform domain and self-recovery" international journal on smart sensing and intelligent systems vol. 8, no. 1,pp 199- 219

[11] Puneet Kr Sharma(2012), "Analysis of image watermarking using least significant bit algorithm "International Journal of Information Sciences and Techniques (IJIST) Vol.2, No.4,Pp 95 -101

[12] Md. Selim Reza(2012), "An Approach of Digital Image Copyright Protection by Using Watermarking Technology" IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 2, No 2,Pp 280 -286

[13] Shrusti Porwal(2013), "Data Compression Methodologies for Lossless Data and Comparison between Algorithms" International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 2, Issue 2,Pp 142- 147

[14] Shankar Thawkar(2012," Digital Image Watermarking for Copyright Protection" International Journal of Computer Science and Information Technologies, Vol. 3 (2) , pp 3757-3760