A Review Paper on Digital Watermarking Techniques for security Application

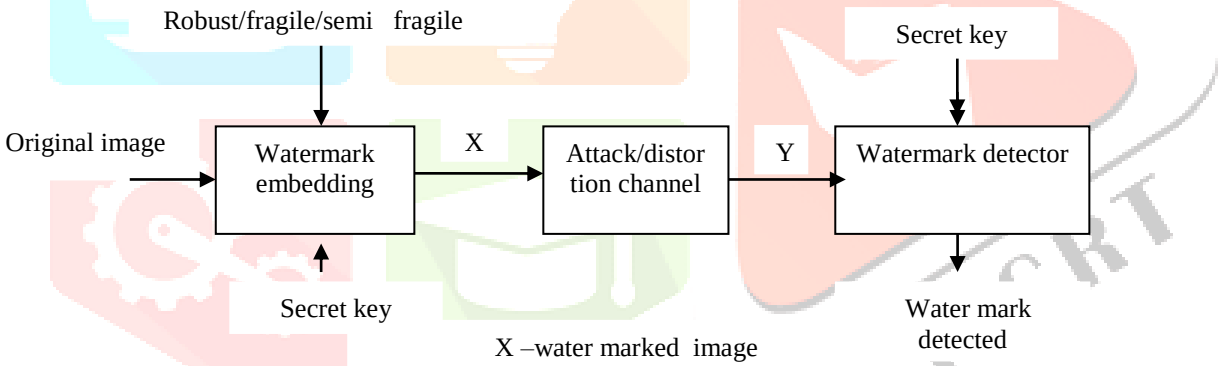
[1]Manish Rai, [2]Sachin Goyal, [3]Ratish Agarwal
[1]Phd scholar, [2]Asst Prof, [3]Asst Prof
[1]Department of Computer Science,
[1]UIT Rgpv, Bhopal, India

Abstract - Water marking plays a very important role in the field of network security and authentication of data. The need and requirement of online transaction of data is increasing day by day in internet so we need a authentication and security of our data and digital water marking is the solution of that problem .Digital water marking illustrate methods and technologies that hide the data in the form of text, images ,audio and video. In this paper we present various method for security and authentication of data for preventing unauthorized access and discussed about these technologies, application, types and its characteristics.

***IndexTerms* - watermarking, images, security.**

I. INTRODUCTION

Digital watermarking is the method of embedding data by using some algorithm into digital multimedia content such as audio video and text and water mark media is processed and then watermark i.e. private information is extracted by using the particular algorithm. This is used to verify the authentication of the content and protection of the identity of the digital content's owner. Here two phases are used watermark embedding and detection or extraction of watermark.it is used for proof of ownership, copyright protection, and validation of data, information hiding, and broadcast monitoring. In this Section discuss introduction of watermarking their characteristics, application type and various attack on it. In section II we discuss various related method for water marking security and in section III conclude the paper.



X –water marked image
Y- Distorted watermarked image
Fig 1 Digital water marking system

1.1 Characteristics of watermarking

In this section we discuss characteristics of watermarking some of them given below

Robustness- [3] when we transmit a watermark then there are variety of processing operation and attack on that so in these condition watermark should be strong against them and must not degrade its quality

Imperceptibility- indicate that water mark cannot be detected by human eye or ear can only be accessed by authorized person only.

Security – only authorized person can access the watermark by particular operation thus copy right protection can achieve in watermarking system.

Data payload – it's simply indicates that the no of bits embedded into the original image and amount of data should be enclosed as a watermark so that it can be effectively detected during extraction process.

Computational cost – it depend on the process or algorithm which is used for watermarking. Complex alg require more software and hardware for strong security so its increase the computational cost & vice versa.

1.2 Application of Watermarking

Digital water marking is used in a variety of fields some of the important field given below

copyright protection- the goal is to detect unauthorized distribution of images, video audio and other important document, owner can copyright their work by inserting a digital watermark with in a a file which allow identification of genuine owner of the file

Data security- its aim is to certify and authenticate a file for eg id card

Forgery and tempering detection – it's simply aim is to find any modification made to a file.

Broadcasting monitoring – tele vison news often contain watermark video from global news organization.

Bank notes – it is used in banking notes for prevention of forgery detection

Medical application it is used in medical field to protect the hospital information from unauthorized people such as patient's report,mri scan,x ray .

1.3 Classification of watermarking

Watermarking is divided into a number of various ways some of them given below

visible vs. invisible - visible water mark is viewable by human eye or detect by ear Eg black line running through a video file were as invisible watermark is uniquely detectible with special computer program eg in audio file high frequency noise is added.

fragile vs robust- in fragile digital water mark is corrupted if any part of the file is modified it is used in tamper detection and security were as in robust it is protected and can be extracted if any part or all of file s modified it is used in copyright protection and ownership control.

spatial domain vs frequency domain- in spatial watermark method we embed the watermark by modifying the pixel of selected images some of that methods are LSB,SSM modulation based technique .in frequency domain the certain frequency are altered from original image some of these methods are DCT,DFT,DWT.

source vs destination based –it is used for ownership recognition where a uncommon watermark that distinguish the owner, from all sets of copy is distributed in a particular image and destination based watermark is used in case of illegal reselling to track the buyer.

1.4 Attacks on Digital watermarking

In internet when the watermarked data is travelling then several types of attack take place on the watermarked data , an attack is succeeds if it weakens the watermark. Some of them given below-

Geometric attack- it can change the basic geometric transformation in an image.eg are cropping, scaling, warping, rotation etc.

Removal attack- unauthorized person tries to remove the watermark from the watermark data.

Cryptographic attacks –the main objective of this attack is that it damage the security protocol in watermarking schemes and then finding a way to remove the embedded watermark information eg brute force attack, oracle attack

Protocol attack- its main objective is attacking the whole phenomenon of the watermarking application. its generate a ambiguity between the true ownership of the data and attacker delete his own watermark from the watermarked data and claims to be the owner of the watermarked data

2. RELATED WORK

In this section we discuss some related work for protecting and authentication of data in watermark

In 2010 [2] In this paper the author work on improve the quality of image with the help of genetic algorithm insert in roulette wheel selection alg which Is used to find a suitable position for watermark insertion and their experimental result showed that they achieve a maximize optimize fidelity in digital watermarking and improving Peak signal noise ratio of watermarked images.

In 2016[4] in this paper, the author proposed a new algorithm which completely utilized the ratio of singular values and embedded watermark cannot be easily detected and highly robustness against several types of attack and his alg called blind digital audio watermarking and his experimental result show that his algorithm perform work well as compare to conventional audio water marking methods which is lacking of physical interpretation.

.In 2017 [3] in this paper author work on digital watermarking which is based on heart sound wavelet and copyright protection of database containing heart sound which is a very new concept because there is no previous research done in this field this paper mainly point on audio, image and four corner watermarking and their experimental result proof that the four corner code watermarking (HS wavelet) is more suitable for heart sound as compare to without hs wavelet.

In 2014 [10] the author proposed a method called Novel bit watermarking which is based on human visual system and the amount of information is increased in watermark with this method and experimental result show that this method has high robustness for digital image processing for instance noise adding, image compression and filtering of image and enhancement of image etc.

In 2016 [9] in this paper author develop a hybrid watermarking which is combination of NSCT and DCT called new embedding algorithim for the purity and validation of hospital and medical images their experimental result show that this algorithim is more robustness interceptibiltiy and more.capacity then any others method.

In 2016 [8] N. Vinay kumar, K. Sreelatha , Dr.C.Sunil Kumar proposed an Invisible Watermarking In Printed Images they have proposed and implemented dithering techniques in various colour spaces like RGB and HSV. An attempt is made to develop full colour water marking scheme using those techniques. One feature of the algorithm is that these user defined characters are used as a region of interest for the water marking process and eliminates the changes of watermark removal . .The pattern of colours printed is unique to the mask and they showed that the pattern is recoverable if scanned at sufficiently high resolution. Their experiment results showed the best results when the scanned resolution is more than four times the print resolution .We feel that this method has the potential to greatly enhance our concept of secure documents Specifically we are interested to develop dithering techniques intended to embed colour watermarking into colour image

In 2016[5] this paper gives an completely view of digital watermarking. What is the importance of digital watermarking why we are using and why it is importaint in our daily life because internet is spreading all over the world and data is transmitted all over the internet so it assure the protection of copyright and authentication of data and to prevent from unauthorized user. In this paper the author explain many methods for instance spatial domain methods and transform domain method which consists DCT, DWT and DFT they have discussed the watermarking characteristics ,application , types, and possible attacks on these methods.

In 2015 [6] the author Proposed a method which is used to identify for forgery detection. In digital images because there is a lot of image editing software and tempering scaling and transformation of images is easily done. So security of images from forgery detection is necessary the author work on three methods and in experimental result show that auto color correlogram achieve highest accuracy while increasing value of features taken into account for forgery detection..

In 2014 [7] the author work on to deal with lack of protection of digital content as popularity of taking photos from camera is increasing day by day and uploading the photos in social networking sites is gaining popularity so it is very essential to protect our digital images from duplicacy and copyright in this paper the author develop a method to overcome this type of problem and protect towards various attack

3. CONCLUSIONS

In this paper we examine the latest literature on digital image watermarking .in the field of internet where data is transmitted from sender to receiver via many network so security of data is a primary issue for user to protect our data from unauthorized person and create a ownership of data and copyright control for this, watermarking is the best method This paper provided a recent research in the watermarking field and gives an overall analysis of various types of digital water marking methods ,their application and its characteristics and various possible attacks on watermark. Research point of view ,watermarking is an new technology to protect our data because many technologies are appearing for protection of data and many still have to come

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REFERENCES

[1] Sachin Goyal, R.Gupta, A.Bansal " Survey of Digital Watermarking with Genetic Algorithm" in Computer Society of India Communication Jan-2010.pp22-25

[2] Sachin Goyal,Roopam gupta " optimization of fidelity with adaptive genetic watermarking algorithm using roulette-wheel" 2010 ieee computer society pp 591-596.

[3] Cheng Xie-feng, Zhang You-xun,"Research on heart sound digital water-marking based on heart sound wavelet"in IEEE 2017,PP 4829-4832

[4] Min-jae hwang,jeesok lee "SVD based Adaptive qim watermarking on sterio audo signals" in ieee transaction on multimedia ,dec 2016

[5] sonamTyagi,HarshVikramSingh," Digital Watermarking Techniques for Security Applications"in IEEE ,ICETEESES 16,PP 379-382 2016

[6] AshwiniV.Malviya,Siddharth A. Ladhake "Copy Move forgery detection using low complexity feature extraction" in IEEE 2015 PP 978-1-4673-8507

[7] Shaifali Bhatnagar, Shishir Kumar,Ashish Gupta "An Approach of Efficient and Resistive Digital Watermarking using SVD" inIEEE 2014,PP2470-2475

[8] N.vinay kumar,k srelatha "invisible water marking in Printed images " in ieee 2016.

[9] Harsh m patil, babab u rindhe " study and overview of Combined NSCT –DCT Digital image water marking in ieee 2016

[10] lououjun,Tang Shuang Tong " Anovel multi bit watermarking alg based on HVS " in ieee 2014

[11] "R.G. Schyndel, A. Tirkel, and C.F Osborne,—A Digital Watermark, Proceedings of IEEE International conference on Image Processing, ICIP-1994, pp. 86-90, 1994.

[12] Christine I. Podilchuk, Edward J. Delp,—Digitalwatermarking:Algorithms and applications, IEEE Signal processing magazine july 2001

[13] Jiang Xuehua,—Digital Watermarking and Its Application in Image Copyright Protection, 2010 International Conference on Intelligent Computation Technology and automation

[14] Ruchika Patel,Parth Bhatt,"A Review Paper on Digital Watermarking and its Techniques"in IJCA 2015 Volume 110 No. 1 pp 11-14