Mary Sunitha. E[1], BCA Student
Department of Computer Applications
Presidency College, Bangalore, India
Sunithamary387@gmail.com,
+8088340117

Ms. Veena S Badiger[2], Assistant Professor
Department of Computer Applications
Presidency College, Bangalore, India
veenasbadi@gmail.com,
+8105221876

Abstract

In this research paper digital watermarking is been a hiding technique. It is been a resembles of wet paper Watermarking keep our information in secure manner. It adds a extra layer of security and makes them feel better when we share our information.

It is a huge watermark software it allows us to add text and image watermarks for multiple files at once. It is a software for hiding techniques. It is keeping our data as unique information.

The information is represented in binary bit as system stores the data or images. It generally embeds the identity of the information. Watermark is been used in different circumstances of the data transmission.

The topmost watermarking technique are authentication, watermarking, wavelet transforms, copyright protection, and reversible watermarking. I have described the usage of discrete wavelet transform in watermarking. I have been explained the types of watermarking and the process which is occurred in daily bases of the transmission.

In discrete wavelet transform how data is been secured without any encryption and detection. In this, the process of detecting the data is been easy. There are different associated attributes in this watermarking.

I have just defined of loss of robustness as a major problem in transmission data. Every watermarking is been used different techniques to solve such as discrete wavelet transform, discrete cosine transforms and many more.

As of now the watermarking rate is in increasing state. As of this year I have been given a small assumption of my value since the year 2020.

Keywords— Digital Watermarking, Discrete Wavelet Transform, Robustness.

INTRODUCTION

A digital watermark is a process of hiding the original   data as the secondary data. The information which have been passed out to others
can only seen by opposite person. These digital watermarks are done in image, fingerprint, audio and video etc.

Digital watermarking is introduced by Andrew Terkel and Charles's Osborne on December 1992. The first watermarks have appeared in Italy at 13th century, later the uses of digital watermarking are spread across the Europe.

Digital watermarking is major tool that helps us from securing the transmitted data. Digital watermarking is widely used in various applications like-copyright protection, tamper detection, broadcast monitoring, authentication, integrity, and verification. The main purpose of the watermarking is security, source tracking, software crippling.

Types of digital watermarking are:

Visible watermarks:
This watermark is used to make slight of movement in the original data. The watermarks can be noticed by the human's eye.
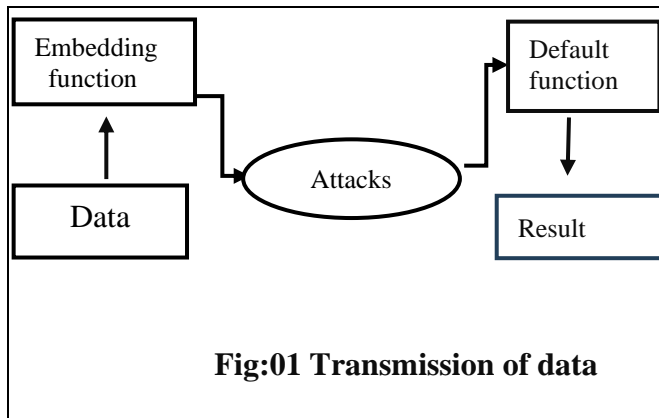
Invisible watermarks:
This watermark cannot change any of the movement in the   original data. The watermarks cannot be noticed by the humans eye.

Fragile watermarks:

It is one of the honest protection work done for the multimedia data like image ,video etc.

Public watermarks:

These watermarks are not secure because they can be modified by anyone who can understand and knows to utilize certain algorithm.

Fig:01 Transmission of data

As various data transformation doesn't have robust security. To improve this robustness, we should have powerful security. So, we require the 3main process to happen in digital watermarking.

1]Embed:
It is a process of fixing a certain range of watermarks can be allowed to access the original data. This process is also implanting data.

2]Attack:
It is the secondary process; these attacks have been protected by the watermarks. The attacks have been embedded by discrete wavelet transform.

3]Protection: This process secures the main data while transformation. If the main data is been attacked or injured the signal it is complicated to remove the watermark.

The below graph represents the amount of watermarking from the year 2020 to 2024. The 2024 line is an assumption as of now the year has started. Every year the rate of watermarks has been increased as it has loss of robustness security of the data.
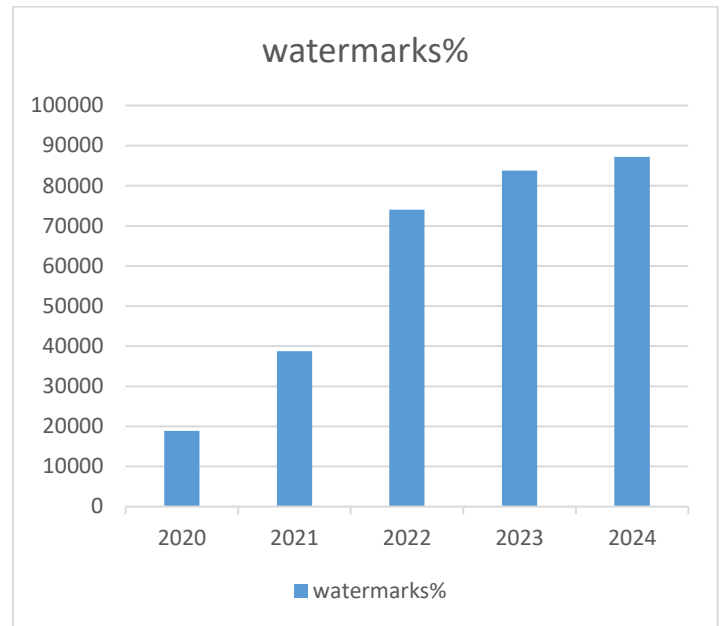

Fig :02

As of now watermark is increased in various field like fingerprint, Images, audio and video etc. This robustness is also solved in other way called discrete cosine transform [DCT]

This the process how images are located in binary bits

Image: 00101100 11001100 01010100
Watermark: 0 1 0
Watermarked Image: 10010100 00110011 11011100

This how the images are discrete wavelet transform coverts the images into binary bits.

THE REASONS FOR SECURE WATERMARKING

A Watermarking algorithm consists of the following three parts. Watermark.
●Encoder. ●
Decoder and comparator.

LITERATURE REVIEW

Dr. Prasanth Vaidya,
He is the author of Fingerprint-based robust medical image watermarking in hybrid transform

research paper. A non-blind medical image watermarking scheme based on hybrid transform is propounded in this research paper using lifting wavelet transform (**LWT**) and discrete wavelet transform (**DWT**). Due to covid-19 many of the hospitals maintained the telemedicine process .it was a great challenge to the doctors to analysis the report of the patients during the pandemic time. During the transformation the data should be not modified by others. [1]

Sonia Jain,
Her research paper tells us about the ability and authentication of the digital watermarking. Watermarks has been used for proving forgery and fraud works done in the fingerprint. Watermarking in database shows the integrity of the data. The two mechanisms by which watermark can be recovered. -
->by applying **board spectrum.** ->images should be **robust.** [2]

K. Zebbiche, F. Khelifi, and bourdain,
The biological measurement of determine somethings with the physical involvement. watermarking of the fingerprint images is used to the secure the central database information. The images are been transmitted on the request of the agencies. The algorithm used in this research paper is discrete cosine transform (**DCT)** and discrete wavelet transform (**DWT**). The basic issues of watermarking are **detection** and **extraction**. they have even implemented the **segmentation mask** [the results of segmentation in binary bits] and **watermarking mask [3]**

Mili Singh,
according to him digital watermarking is used to protect the information from the attacks. This provides the copyright and determine the digital images. As fingerprints are unique and they are used for long term investigation.
 There are three different methods that is used to secure the information or fingerprint .
 1)spread spectrum watermark.
 2) quantization watermark.
 3) amplitude modulation.[4]

Sandhya Tarar and Ashish Kumar,
Digital watermarking is been used for the purpose of security. securing the images such as the fingerprint and informatic data through the transformation in the wide network area in world. They have been proposed LSB and DWT algorithm as it gives various solution. it also provides the fingerprint as it is without effecting the quality by the algorithms. they are also flexible, cost effective, communication model and beneficial in transaction process. Its posses some serious drawbacks as digital data in duplicate form.[5]

Ritu Rawat, Nikita Kaushik and Soumya Tiwari,. Watermarking is a process of hiding the signal. The watermarked image is secondary image that has hidden from the original image as they are protecting from the original data. watermarking is a sequence of bits in the digital image. It is having a feature of digital watermarking digit watermarking has been user in several techniques of image.[6]

Mohamed Ledcor, Suryanti Awang and Ali Benziane in this paper DCT method is been used as a main domain for fingerprint this method of DCT is been used in dates transformation. in automated system AI technique is widely used to get the quality of system .it determines the uniqueness of fingerprint spital domain frequency multiresolution. A common technique is used foe watermarking such as watermarking in text watermarking in image [7].

Prabhjot Kaur Chahal, Amritpal Singh and Palwinder Singh Digital watermarking most suitable in security, robust they have used DCT and DET techniques. It has linear transform action of data. DCT is widely used for the goodness of the capacity of energy. DCT is faster than DCT because transform kernel is real. It is an effective and impressive for the image authentication and protection for different unauthorized action/attack.[8]

Melanos Averkiou digital watermarking is a process of hiding the data from the attack it transforms the data in the form of the digital signal. In steganography the digital signal has no connection the original data .it is merely used as a

cover to hide its existence. first application for watermarking was broad cast monitoring. Transaction tracking is others application of the watermarking. watermarking is a process of that alters of an original image to add some message it has an inevitably affects to the image quality.[9]

Dan Yu and Farook Sattar, Digital watermarking has a technique used for tracking the information in an illegal copy watermark can do the help to identify the person who is responsible for it. Limitation, robust copyright authenticates marking robust incompletely opposite to the authentication marking requires the embedded watermark. it is against to all the types are robustness.it is a loss of security in transformation of the data. In algorithm watermark detection and extraction are been used.[10]

Mohammed Sanne Hassenes and Gheorgheta Ghinea Digital watermarking term got introduced in 1988 around 1995 it started coming into trend because of the scarcity of the copyright protection technique for the original dates watermarking in a special technique to embed the original data transformation. This process is used for having some important data transformation. Watermarks are visible and invisible in some code where identification are embedded in the data.[11].

Lei Pei University of Science and Technology Beijing, Beijing 100083, China. He preserves the image to be invisible and good quality of watermark. He is been using three different levels of discrete wavelet transform algorithms such as
=> Preprocessing Digital Image Watermarking.
=> Embedded Synchronization Signal.
=> Embedding Digital Image Watermark with Low-Frequency Energy Ratio of Sound Channel.
=>Extracting Digital Image Watermarking.[12]

Rakesh Kumar Verma, Dr. Shiv Kumar, Dr. Varsha Namdeo, as of handling the robustness is difficult to secure in digital watermarking. In current scenario the data are been oriented. Its huge

number the data are multimedia and communication format. The techniques provide the copyright protection of the digital data.
One pixel is based on another frequency.[13]

Mrs. C. Christy, Mr. A. Baskaran Mr. P. Arunmani,
Watermarking is been an important issue for legal applications, news reporting and medical archiving, where it is sure that the digital image truly affects the scene looked like at the time of capture. The paper is they have introduced the watermarking with discrete wavelet transform method.[14]

Himanshu Kumar Sing
In the present scenario watermarking is been a major technique of protection the digital images. Designed a watermarking scheme using a deep neural network. The technique improved the robustness of the watermark but also increased the complexity of the technique.[15]

Methodology

DWT [discrete wavelet transform]
It is been used for new computing watermarking methodology for digital images. The Discrete Wavelet Transform pseudo – random codes are been added for large floating point .It is more useful to identify the watermarked data from original data. This techniques provide the copyright protection of the digital data. Security and ownership of digital data is a significant issue. The frequency-domain provides various transform functions such as DCT
During the transformation of data, the signal are converted inti binary bits or number of sets the time of testing the signal is been the same amount of frequency
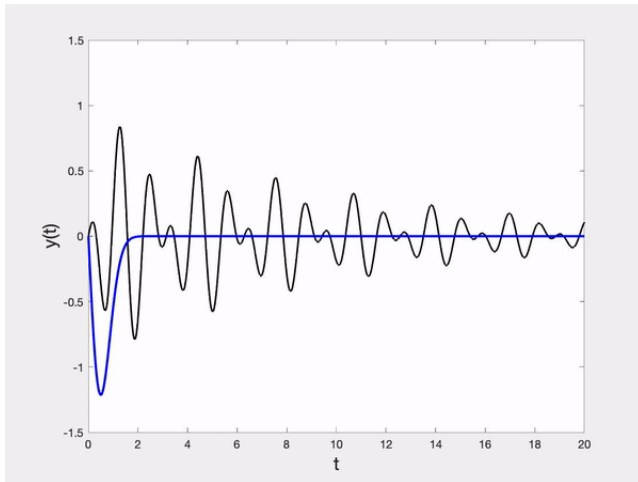
Band.

Fig:03 wavelet transformation

The colored line passing which is been protecting the data transformation. The final output will be the original data without any attacks.

There are different types of wavelet transformation

 process:
1] **Extended Wavelet**: This wavelet is transformed converting the data into different functions and the data transformation is easy and flexible.
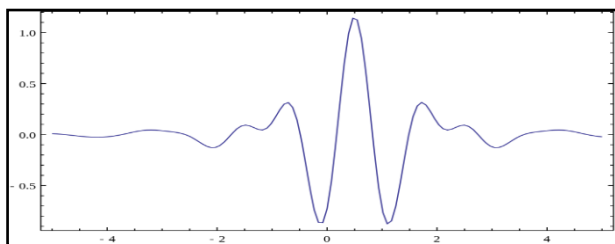

Fig:04

2]**Shrunken Wavelet:** This wavelet is been used for non -parametric function as of it does not require the functions usage in watermarking.
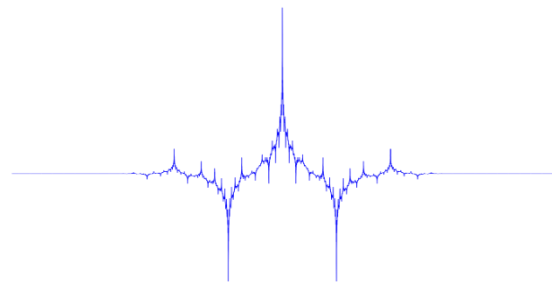

Fig :05

Conclusion

The paper is illustrated on the process of digital watermarking. These watermarks are been implemented on fingerprint, images, video etc. It helps to transform the data in a secure way. As of now there is loss of robustness in the data. My description is how discrete wavelet transform is been used to protect the data while the transformation process.
Even fingerprints are watermarked, as it protected from the attacks. while the transformation the wavelet is also passed in the original data.it under goes the three main process in watermarking.
In this paper, I have been described about the usage of discrete wavelet transform in digital watermarking.
Even we can describe the digital watermarking in different algorithms and techniques such as discrete cosine transform and discrete Fourier transform etc.

References

[1] S. Prasanth Vaidya, "Fingerprint-based Robust Medical Image Watermarking in Hybrid Transform", January 2022.

[2] Sonia Jain, "Digital Watermarking Techniques: A Case Study in Fingerprints and Faces".

[3] K. Zebbiche, "An Efficient Watermarking Technique for the Protection of Fingerprint Images",
2008.

[4] Mili Singh, "Self Embedding Fingerprint Watermarking and Steganography using LSB, RSA, 3-DWT and MLPSVM Algorithm", journal, volumeno.4, 2016.

[5] Mohamed Sameh Hassanein, "Fingerprint Scheme for Digital Text", volume 3, journal, 2013.

[6] Sandhya Tarar etc. all, "A Fingerprint Watermarking Algorithm to Enhance the Privacy of Fingerprint Data", volume 9, August 2012.

[7] Ritu Rawat etc .all," Digital Watermarking Techniques", vol.5, journal, April 2016.

[8] Mohamed Lebcir, "Reversible Watermarking Technique for Fingerprint Authentication based on DCT", Conference, 2020.

[9] Prabhjot Kaur Chahal etc. all, "Digital Watermarking Techniques", journal, November 2013.

[10] Melinous Averkiou, "Digital Watermarking".

[11] Juergen Seitz etc. all, "Digital Watermarking: An Introduction".

[12] Lei Pei, "Research on Digital Image Watermarking Algorithm Based on Scrambling and Singular Value Decomposition", journal, February 2022.

[13] Rakesh Kumar Verma etc. all, "Exploring the Robustness of Digital Watermarking Algorithm Based On Transform Function And Machine Learning", volume 12, journal, May 2021.

[14] Mrs. C. Christy etc. all, "A Survey on Digital Watermarking for Image Authentication", volume 4, journal, 2016.

[15] Himanshu Kumar Singh etc. all, "Digital image watermarking using deep learning", April 2023