A Survey Paper on Authentication and Protection of Data based on Digital Watermarking scheme

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Abstract*—The rapid development of digital image processing Investigators used a huge amount of information such as medical images, satellite images, video images, digital images, and so on. These information is gathered using digital and electronic media. Digital communication is important in both the Internet and communication technology. The confidentiality of communication is an essential part of transmitting data or information. Digital Watermarking is one notable technique. Copyright owners seek methods to control and detect such reproduction, and henceforth research on digital product copyright protection has henceforth This paper provides an overview on some previous work done in the field of watermarking.Experimental data evaluated algorithms are collected to focus on the broad scope of encrypted digital steganography for data transmission security and authentication.*

Keywords—*DWT, DCT,Digital, Watermarking, PSNR.*

Introduction

The growth of the Internet has increased the availability of multimedia applications in a variety of copyright issues. One of the regions that has helped fuel this growth is digital water. The responds appropriately of incorporating information bubbles in the original file in order to obtain a variable file is known as digital water. And the media, and therefore included, serves as one of a variety of uses, for example, detect piracy and tampering of the sensor, or the safety of reassuring. Approach to a variety of water and can be broadly classified based on vision, duration, or frailty. The implementations are also diverse; it can be applied to text, images, audio, or video.

Multimedia have become easy to be delivered and exchanged with the growth and advances in digital communication technologies. These types of digital information can be easily copied and distributed via digital media. These concerns sparked significant research in the image and video watermarking fields [1]. Watermarking is mostly used for authentication and ownership protection. New advances in digital technologies, such as compression techniques, have introduced new challenges to watermarking.

In contrast hand, the High efficiency video coding (HVC) or H.265 standard, which was officially introduced in 2013, needs only half the bit rate of its predecessor, ITU-T H.264 | MPG-4 Part 10 'Advanced Video Coding' (AVC), which was considered the most deployed vide The new standard is intended to take into account advancing screen resolutions and is anticipated to be phased in as high-end services and products outgrow the limits of existing network and display technology [2]. Various watermarking strategies based on various techniques have been suggested over the years [3-8]. A watermark must be imperceptible within its host, easily extractible by the owner, and resistant to intentional and unintentional distortions [6].

In particular, DWT has a wide range of applications in the field of images and videos watermarking; this is due to its many characteristics and specifications, which make the watermarking process robust. Some of these specifications are [4]: spatial-frequency localization, multiresolution representation, fantastic human visual system (HVS) modelling, and ability to adapt to the original image. Y. Wang [9] proffered a wavelet-based watermarking technique for ownership verification. It utilises orthonormal filter banks that are produced at random to decompose the host image and incorporating the watermark in it.

Our goal in this paper is to develop a watermarking technique based on discrete wavelet decompositions and integrate it into the high efficiency video coding (HVC) process. The technology will be used to hide data in encoded videos in order to meet the requirements of imperceptibility, robustness, storage requirements, security, and sophistication. Digital watermarking is used to avoid digital information from being forged. Digital watermarking is integrated permanently into host media in the form of identification code or image that is visible or invisible and tends to discourage illegal copying [2].

If an attacker tries to mage or temper the water marked digital data, Watermark helps to catch the activity performed by the intruder on the basis of that copyrighted material. In order to server copyright protection, video authentication, and finger printing and copy control, watermark must have various characteristics such as imperceptibility, transparency, secure, and robustness [3].

II. LITERATURE SURVEY

When it comes to digital offerings [6,] the significance of copyright cannot be overstated. Digital watermarking is widespread used as a mechanism to protect internet files. The introduction of social networking sites in recent times has emphasized the significance of research in the security of video downloads. The features of digital watermarking and the factors that influence rights management have been used in this study to analyse the needs of online content producers for digital rights management.

Digital image watermarking techniques provide a way to secure the rights of the content provider and aid in the establishment of digital image ownership.

These techniques add some valuable information to the image while retaining the image's perceptual quality. Various techniques have been proposed to achieve this goal. Images are watermarked at pixel level or transformed into other transform domains such as Discrete Transform (DFT), Discrete Cosine Transform (DCT), and DWT, etc. Some methods involve hybrid combinations of these transforms to achieve better results.

A watermarking scheme should obtain greater value of three major quality parameters, i.e. robustness, imperceptibility, and embedding strength of watermark Information, which 2 - 3 times innovable in nature. Rise in one dimension may lead to a reduction in another. All 3 constraints should be met by the watermarked image. The applicability of a technique also depends on the goal of the watermarking for the particular application at hand. DWT is a popular signal-processing technique that is now used in a variety of image processing applications. The DWT of an image produces four distinct sub-images recognised as approximate, horizontal, vertical, and diagonal sub-bands.

They are also referred to as the LL, LH, HL, and HH frequency bands, including both. represents low growing and expanding contents and H represents high frequent contents Watermarking is done in one or more of these regions using the traditionally defined [1, 2]. The findings showed that the importance of the action, protection, and management are four factors that can be used to analyse the needs of a digital content provider. Furthermore, it was found that online content providers respond favourably to the planning of the content they share, and when they start sharing content online, they want to avoid illegal attacks.

A few vendors were examined, and it was discovered that women frequently shared digital content, implying the need for more digital protection male respondents. Older people were discovered to be very careful about the value of digital content they publish on-line; they need protection to preserve this value. Users will be happy to use it if the digital content industry and the Internet can ensure appropriate digital rights management. People nowadays[7] use social networking sites to share moments in life such as pictures.

Other users can access or download these digital images from another side. Exploit Fake as many changes and changes made to the original image as possible. After changing the images, they can be downloaded and decided to share.

Unauthorised use of personal images is covered by copyright. This research work presentes a digital image authentication system prototype (DIAS). This system can work with both visible and invisible watermarking images. DIAS works with both colour and greyscale images. The input image can be any size, and the resulting image will have the same size as the input image.

DIAS recognises the digital watermarking estate with digital. The concept of digital watermarking is used to conceal and detect image data. This is the best way to safeguard the copyright consumer.

You cannot hold the forger responsible for the property if you use watermarking. This is known as an authentication process for located near. The entire system consists of two functions: one for the image and one for hiding other information in order to detect image information. The watermark was performed using the discrete wavelet transform (DWT) in this approach, and the results were analysed. Wireless Sensor Networks (WSN) [8] are a merging technology with great potential for use in critical situations such as battlefields and commercial applications such as construction, traffic surveillance, habitat monitoring, smart, and many other scenario - based homes. This article discusses the watermarking technique of acoustic signals of vehicles for detecting vehicles using sensor networks.

Vehicle identifying consists of identifying the type of vehicle. Here, it is assumed that the classification can be either buddy or foe. Watermarking technology has been created to verify the vehicle's beeps. Acoustic signals from vehicles belonging to the friend segment are verified using a digital watermarking technique, and the signals are integrated into digital watermark to represent in a uniform manner. The step-by-step process of incorporating watermarking innovation is discussed here, along with the outcomes. Following the use of the digital watermarking technique, the resulting signals are used to identify or classify the vehicle.

In modern times, [9] the rapid expansion of the Internet has made digital content protection a critical issue of authorship. A digital rights management (DRM) system aims to protect elevated digital assets while also controlling their distribution and use. Watermarking technologies are thought to be an essential tool for absolute digital copyright protection. The information needed for the identity of the property to provide copyright is hidden in digital images. This paper proposes an invisible birth mark blind and innovative scheme for copyright protection of digital images in order to defend themself against digital piracy rights.

In the proposed watermarking scheme, a binary image watermark is invisibly built into the host's image to ensure copyright protection.

Integration in the watermark, every pixel in the image watermark is embedded in different blocks of the host image size 2a 2 The watermark extraction process in the proposed watermarking scheme requires only image watermark and does not require the original image or one of its characteristics, and thus the proposed watermarking scheme is blind. The effectiveness of the proposed watermarking system has been demonstrated by experimental results.

A watermarking scheme should achieve higher values of three major quality parameters, i.e. robustness, imperceptibility and embedding strength of watermark information, which are non-commensurable in nature. Increase in one dimension may result in decrease in another dimension. The watermarking technique should suitably satisfy all the three constraints. Applicability of a technique also depends upon the objective of the watermarking for the particular application on hand.

DWT is a popular signal-processing technique that is now being used in a variety of image processing applications. The DWT of an image yields four distinct sub-images recognised as approximate, horizontal, vertical, and diagonal sub-bands.

They are also made reference to as LL, LH, HL, and HH frequency bands, respectively, where L symbolises low frequency components and H represents high frequency components. According to the specified method, watermarking is done in one or more of these areas [1, 2]. We

proposed a new method for integrating non invertibility- in digital watermarking schemes, especially private digital watermarking schemes, in this job using the Digital Signature Algorithm (DSA). What we propose here is not only a new water technique, but also a secure system that is clear and irrevocable, has characteristics such as the melting time and the use of keys, is asymmetric, and is secured by the use of the lower Digital Signature Al.

III. CLASSIFICATION OF WATERMARKING TECHNIQUES

Watermarking approaches may classify based on inherent characteristics such as visibility and invisibility.

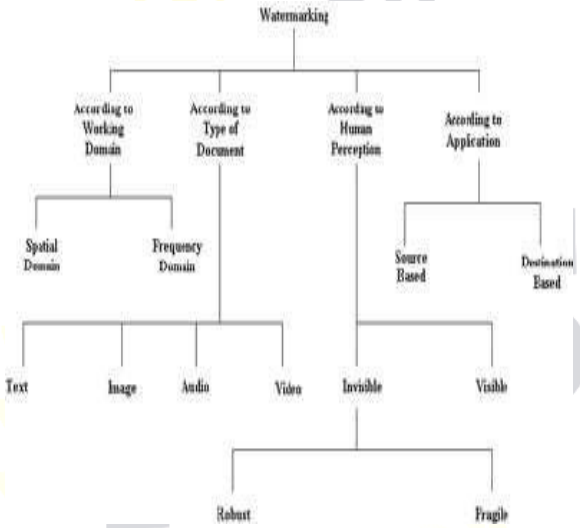

Fig.1. Classification of Watermarking

A) Visible Watermarks :- Visible watermark refers to the alteration of a digital image by the application of a "logo" on the image. This ones usually directly to the pre-digital era in which it was printed watermark on the document and the possibility of imposing authenticity.

B) Invisible Watermarks:- Despite what may be expected, the watermark is obvious, despite the fact that the name recommends this is particularly noticeable generally, and is utlized with a example last. Whereas the water's ostentatiousness makes it undetectable adaptations of licit and illegal particular simple perceivability makes it less reasonable for all applications. Undetectable water spins around the pertinent contents that integrate the acknowledgment of the beneficiaries bona fide, as well as to recognize the genuine source and nonrevocation.

There are numerous different ways to arrange the watermarking strategies, and these modules are based on use. For example, hearty, delicate, and spatial otherworldly watermarks. Furthermore, a semi-delicate approach is used.

C) Robust watermarks:- Watermarks can be used to keep good learning contained. These watermarks necessitate consistency on the first picture in order to do what they claim. Furthermore, the uprightness of the watermark is a measure of its quality. These watermarks must be able to withstand typical treatment of pictures, such as decreasing the measure of the picture, the picture of misfortune, change the difference in the pictures, and so on.

D) Fragile watermarks:- This is essential to the watermarks' ability to dream, generally speaking, and more sensitive to changes in solid watermarks. When exposed to even minor changes, they lose their skills. Use is the ability to stick point the appropriate zone that has been adjusted in the first picture watermark. The techniques differ from water evidence delicate and pseudoarbitrary sucession in dialect LSB division errands to sniff any progressions to the watermark.

E) Semi-Fragile watermarks:- These types of watermarks are classed as center ground. These depend on delicate and delicate watermarks. They overwhelm the finest of both universes and are stronger than delicate ones in terms of power. They are, by all accounts, superior to strong watermarks.

F) Spatial watermarks: Watermarks which use• to apply in “spatial domain of an image” is known as spatial watermarks [5].

G) Spectral watermarks: These are watermarks• use to applied in “transform coefficients of the image” called the spectral watermark. [5]

IV. CRITERIA FOR A GOOD WATERMARK

- Though watermarks fall into various categories, some of the general characteristics that watermarks must have are as follows [6]:
- Watermark should strongly bind the image, and any changes to the watermark should be visible in the image.
- You must also be able to withstand changes made in the image watermark 2.
- These changes include, but are not limited to, modifications and improvements to image adjustments such as size, cropping, and loss.
- The presence of a watermark must not detract from the visual impact of the images (especially if the watermarks are not visible).
- Must be able to watermark independently and survive in linear or nonlinear operations on the image [2].
- The following criteria apply to the visible watermark: [7]

Table 1: Table of Literature Review

Application	Algorithm	Performance
Online Secure ID card Authentication, Online passport Authentication System on Ecommerce model [3]	A Block based algorithm using Hadamard Pattern in spatial domain.	Accuracy is of 99% in average to achieve high quality watermarked images. PS distortion model of halftone effect (variable for scanners and printers) is not required. PSNR ratio is approx. 43 DB
Watermarking Technique applied in a QR code image [2]	Robust Invisible QR Code Image Watermarking Algorithm in SWT Domain (frequency domain)	A novel method to embed the QR code into digital images, lowering the JPEG degradation. It can achieve viable copyright protection and authentication. Most robust to attacks in different considerations. PSNR ratio on various images is approx. 47 DB
Colour Image Watermarking encrypted in QR code [4]	XOR operation for encryption of QR code and watermark, after applying DWT on the Cover image	This algorithm is robust and enhances the security. It does not change the quality of watermarked image. Simple XOR operation is used for encryption. PSNR ratio on various images is approx. 62 DB
Digital Image Watermarking for compressed image format (such as JPEG format) used on the web [5]	Robust and Invisible digital image watermarking algorithm through a 2Dbarcode and scrambling method based on DWT DFRNT transform. The Watermark extraction process is the inverse of watermarkembedding process.	PSNR ratio is approx. 40 DB for various images.
Authentication of Medical Images [6]	Elliptic Curve Cryptography (ECC) algorithm, along with LSB data embedding and through Lossless Watermarking (LWM) Technique.	Lossless Watermarking Image Authentication with high embedding capacity with complete recovery of original images. PSNR ratio is approx. 73 DB for various images.

V, THE WATERMARKING PROCESS

The watermarking operation includes the following stages [9]:

1. mbedding stage
2. Extraction stage
3. Distribution Season
4. Determination Stage

Embedding phase: In this stage, the watermark is handled by the President to incorporate. This includes the transformation of the image to the change initiative. This would include discrete cosine change (DCT), discrete Fourier change (DFT), and wavelet spaces. Watermarks can be implanted in two ways: a bit stream or pseudoirregular number is locked in, for example, a Gaussian dispersion. To the watermark of the important operations (lowrecurrence or middle of the road recurrence) at that point

as prescribed by examining the human visual framework (HVS). The executive of this procedure are acquired by playing out the reverse change to adjust the transformation coefficients [9]

Phase of Distribution:- Watermark picture acquired above are then conveyed through the advanced channels (on the site). In this procedure, and this was one of a few occasions, for example, the weight, the picture control that decrease picture size, and upgrades, for example, pivot, for instance, yet not just. Subside Meerwald [9] alludes to the above as "Assault of the incident." One of these has built up an arrangement to test the water, as we might find in the accompanying segment. Likewise, malevolent assaults is additionally conceivable at this phase to battle with the watermark. This is shown in the work Meerwald in [9] as "antagonistic assaults".

Phase of xtraction: An endeavor is made at this stage to reestablish the water or the mark of the watermark picture disseminated. This progression may necessitate an uncommon key or a joint open key in addition to the first picture, or it may necessitate only a watermark picture [9].

Stage of Determination: In this phase, compare the extracted watermark to the original watermark to see if any differences have arisen during the distribution process. A common way to do this is to calculate the distance to exaggerate [9].

VI. CONCLUSION

In this paper, a brief investigation of several works on digital watermarking from previous decades is done (literature review) to overview the development of Digital Watermarking Techniques. Encrypted digital watermarking can be used not only for data authentication but also for secure data transmission. The entrusted algorithms, with minor modifications, can be used in a variety of fields ranging from the medical industry to medical science and even e-commerce transactions. The application range of digital watermarking is extremely broad. New novel approaches can also be sought. The information provided in this paper on this topic may assist new

researchers in gaining knowledge in this field. Furthermore, researchers can improve existing techniques to make them more effective in a variety of novel applications.

Water marking is a popular scheme used in image processing to secure data over images. This paper is an idea about watermarking and its technology. This paper also sheds some light on previous watermarking work. Where the PSNR value indicates the visual quality of the image, higher PSNR values lead to better image quality. As a result, the primary research gap must be filled by developing a watermarking scheme that ensures the authenticity of digital information while also maintaining a high PSNR ratio.

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