A Survey on Image Watermarking Using Spread Spectrum Method

Pranita Dibe[1*], Satya verma[2]

[1, 2] CSE, School of Engineering and IT, MATS University, Raipur (C.G.), India

[*]*Corresponding Author: dibepranita@gmail.com , Tel.: 9406370410*

Abstract— Digital pictures have a crucial role now days in everyday life applications like resonance imaging, satellite TV, pictorial representation, optical character recognition, Universal Product Code reader. Watermarking still as in areas of analysis and technology like geographical info systems and natural philosophy. Watermarking is basically the tactic of passing information, referred to as a watermark, in which during very existence of the message is unknown. The aim of watermarking is to avoid drawing suspicion to the transmission of the watermark, whereas providing some a lot of price to the covering media. Watermarking encompasses ways that of transmitting secret messages through innocuous cowl carriers in such the simplest way that the very existence of the embedded messages is undetectable. In Inventive ways that are devised among the activity technique to cut back the visible detection of the embedded messages. Spectrum technique is below of separate wave remodels on DWT Domain. Watermarking theme quality is determined victimization hardiness, transparency and capability.

Keywords – Watermarking, Spectrum Method

I. INTRODUCTION

Digital image process is outlined because the processing of 2 dimensional pictures by an electronic computer is on [1, 2]. An image is processed as quickly as we have a tendency to begin extracting facts from it. The facts of interest in seeing systems are those associated with the article underneath investigation. A picture typically goes through some enrichment steps, so as to enhance the extract ability of attention-grabbing knowledge and alternative data. The term "Digital Watermark" was coined by saint Tirkel and Charles dramatist in Gregorian calendar month 1992. The primary winning embedding and extraction of a steganography unfold spectrum watermark was incontestable in 1993 by saint Tirkel, Charles dramatist and Gerard political leader [1]. Figure 1 show basic model of watermarking.
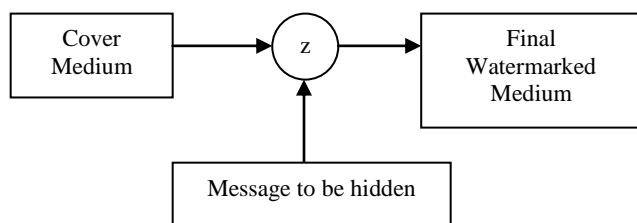

Figure 1: Basic Watermarking

Like ancient physical watermarks, digital watermarks are usually solely perceptible on below sure conditions, i.e. when using some rule [3]. If a digital watermark distorts the carrier signal in a very means that it becomes simply perceivable, it's going to be thought of less effective computation on its purpose.[3] ancient watermarks is also applied to visible media (like pictures or video), whereas in digital watermarking, the signal is also audio, pictures, video, texts or 3D models. A proof could carry many totally different watermarks at the identical time.

Spectrum technique is below of separate wave remodels on DWT Domain. Watermarking theme quality is determined victimization hardiness, transparency and capability. Transparency suggests that when insertion of watermark the original image shouldn't be distorted. Hardiness is explained to attacks. If watermark removal is tough to various attacks like rotation, scaling, compression, noise then watermarking theme is powerful. Capability suggests that the amount of knowledge inserted into the original image.

B. Types of Watermarking –

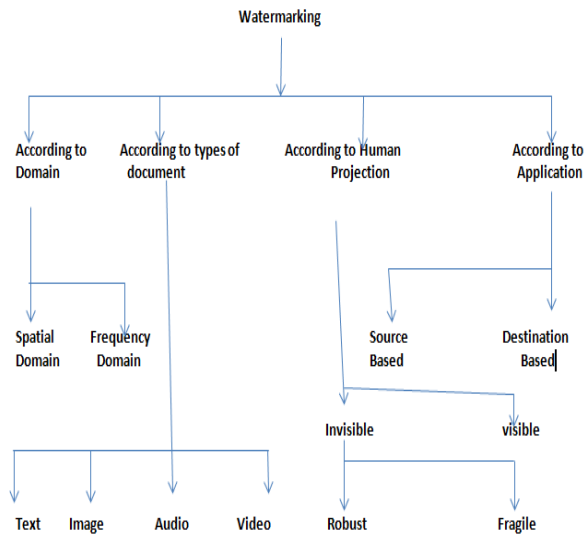On this figure 2, it explains outlines types of watermarking.

Figure 2: Types of watermarking Technique

There are two types of watermarking, which is mentioned on below.

(i) Visible watermarking: Visible watermark is Associate in nursing opaque or semi-transparent sub-image or image that's placed on prime of another image (that is watermarked) thus is evident to the viewer. Associate in nursing example: an emblem placed by TV networks. Sometimes performed at intervals the abstraction domain [4]
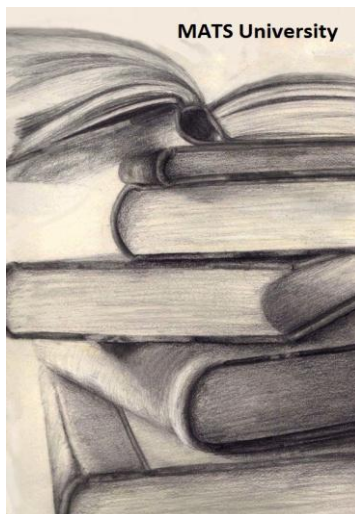

Figure 3: Visible watermark image

(ii) Invisible watermarking: Invisible watermarks can't be seen with the attention but they'll be recovered with associate degree applicable secret writing formula. The property is assured by inserting them as visually redundant data (something that human sensory system doesn't perceive): watermarked image once top of the range JPEG compression and additionally the extracted watermark.

Figure 4: Invisible watermark image

II. LITERATURE SURVEY

The purpose of literature survey is to explore all the past analysis works performed within the involved research topic; so new concepts are often generated for future work. . In log-2-spatio domain, the variance of the info is reduced considerably [5]. This improves the efficiency and strength of unfold spectrum technique. Low intensity and mid-band regions are elite to enter the data therefore on guarantee Associate in nursing invisible watermark to boot as a result of the robustness to JPEG compression. Simulation results are show that the embedded knowledge still survive up to the JPEG compression magnitude relation of fourteen 7 [6]. A secure (tamper-resistant) algorithmic of program for watermarking footage, and a way for digital watermarking which is able to be generalized to audio, video, and transmission data. We have a tendency to tend to advocate that a watermark should be made as associate freelance and identically distributed (IID) Gaussian random vector that's imperceptibly inserted in an extremely spread-spectrum-like fashion into the perceptually most significant spectral elements of the data [7]. Watermarking may be a terribly active analysis field with lots of applications. Though it's a comparatively new field, it's created vital algorithms for activity messages into digital signals. 2 broad classes for these models were delineated during this essay [8]. A way for unfold spectrum watermarking is bestowed and its realization with MATLAB half 12.5 [9]. Then we have a tendency to imbed the watermark within the rework image or in the transformation coefficients. Finally, we have a tendency to take the inverse rework to induce the watermarked image [10]. unremarkably used rework domain strategies are separate circular function rework (DCT), separate riffle rework (DWT), and separate Fourier rework (DFT) [10] Image quality assessment may be a common drawback for several applications together with image restoration, coding, further as watermarking. Image quality metric are often classified into full reference (FR), reduced reference, and no reference, in keeping with the provision of the distortion free image [11], which can be used because the relevance value the distorted counterpart. The Fr metric will give them a lot of reliable assessment regarding the annoyance introduced by watermark. PSNR and weighted

PSNR (WPSNR) [9, 14, and 4] are presently the foremost unremarkably used for watermarking, thanks to their simplicity. A new approach supported spread-spectrum technique beneath separate riffle domain has been introduced. The experimental results show that PSNR has been improved which suggests higher quality watermarked image has obtained QIM watermark. Division Index Modulation [14, 15] are often conjointly developed as (1) with AN adequate definition of and so use the SOS metric. The Principal element Analysis (PCA) technique is often used for image matching. The SOS metric is really a similarity within the PCA domain, with secure accuracy [12, 5]. These are communication primarily based models and geometric models. Communication-based models are often additional divided into those that use side-information and people that don't. One example system was accustomed illustrate non-side-information models, and 2 example systems were accustomed illustrate side-information models [19, 20].

III.   WATERMARKING METHODS

There are some ways within which at intervals which we'll model a watermarking methodology [12].

a. Communication-based models:

Communication-based models describe watermarking really suggests that very nearly just like the ancient models of communication systems. Watermarking is in fact a way of human activity a message from the watermarking embedded to the watermarking receiver.

b. Geometric models:

It is typically useful to think about watermarking in geometric terms. Throughout this form of model, images, watermarked and unwater marked, is also viewed as high-dimensional vectors, in what's stated because the media space.

 c. Watermarking whereas not side-information:

As depicted earlier, some communication-based watermarking models don't profit of the channel side-information. Throughout this fairly models, the image is simply thought of as another type of channel noise that distorts the message throughout its transmission.

d. Blind embedding and linear correlation detection:

This system is Associate in nursing example of blind embedding, that doesn't exploit the primary image statistics to implant a message during an image. The detection is completed exploitation linear

e. Watermarking with side-information:
Some of the weaknesses of systems that don't exploit side-information were known by the blind embedding example system. The capability and effectiveness of the watermarking methodology is also greatly increased by taking advantage of the initial image information throughout the.

f. Dirty-paper codes:

A dirty-paper code is also a classification of codes. In distinction to classical message writing, wherever each message is diagrammatical by one code word, in associate extremely dirty paper code each message is diagrammatical by a set of code words.

g. Spread Spectrum Technique:

Spread spectrum technique has been used for watermarking in [6]. For convenience, we tend to use the identical image printed in [6]. According to [6], to introduce barely sequence of m bits, the image is equally segment to m reciprocally exclusive regions. On each region are responses to store one bit knowledge. As an example, if the length of the bit sequence is four, the image are visiting be divided as shown in Figure one. The jth little of the bit sequence, diagrammatic by the image aj, is printed in eqn. 1: The image aj, is then unfold by associate degree large issue number twenty four, noted because the clip rate, to induce the unfold sequence bi: The unfold sequence is modulated with a binary pseudo-random sequence pi and amplified by a component aj, yielding the watermark sequence wi: The watermark sequence is then any to the image vi, to make the watermarked image : The watermark embedding technique are usually pictured in Figure 5.
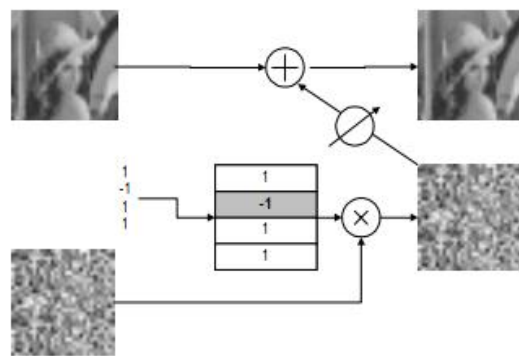

Figure 5: Visualization of the embedding
Process

The embedded bit is usually decoded by just figure the sign of the correlation total between the watermark sequence and thus the corresponding pseudo noise sequence. The decoded jth bit, denoted by, is figure by the next eqn. To decipher the correct knowledge, the amplification issue a j should be large

enough that the second term is larger than the first term in Eqn. seven therefore on make sure the decoded bit is that the identical as a result of the embedded bit. However, associate degree outsized aj implies low signal/noise quantitative relation ratio (SNR). As a result of the amplitude of the embedded watermark is freelance of the intensity of the pixels, the SNR are usually really low for those pixels with low intensity. Moreover, if the watermark sequence is embedded among the regions with high frequency, the watermark may even be removed once the compression method. As a result, if the bit watermark image is compressed at a lower bit rate, the embedded bit sequence cannot survive. To resolve this drawback, we've got a tendency to project to embed the bit sequence within the log-2-spatio domain within the regions consisting in the main of mid-band frequency [13].

To insert a watermark among the frequency domain of an image we tend to should always initial apply DCT (Discrete cosine Transformation). This can be often an everyday due to represent an image in frequency domain [9].

Figure 6: Original image without watermark

Figure 7: Image with watermark using spread spectrum technique

IV. CONCLUSION

Watermarking could be an extremely active analysis field with lots of applications. Spread-spectrum technique below separate ripple domain has been introduced. The experimental results show that PSNR has been improved which implies higher quality watermarked image has obtained. 2 dimensional modulation mistreatment P Orthogonal sequences permits to get high strong system with extremely reconciling system with combination of used domain and embedding areas so as to face up to the bulk of

attack and guarantee the copyright protection. Simulation results recommend that the projected SSTLOG is a lot of strong against JPEG compression than the standard SST. The watermark bit sequence is decoded properly once the watermarked image is compressed at low bit rate. The projected SSTLOG also can be employed in watermark detection. Simulation results recommend that the North Carolina of SSTLOG is best than the normalized correlation of the standard SST. As we will see that digital watermarking is incredibly helpful technique for digital information authentication. It ensures the protection of copyright and authentication. This paper offers associate degree overall analysis of mixed sorts of digital watermarking strategies.

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