

AUDIO WATERMARKING IN IMAGES USING WAVELET TRANSFORM

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ABSTRACT

The digital media fast increasing and advance communication network has need to protect from the illegal piracy of the media file. It look toward the intellectual property right to protect the data. In protection technology watermarking is the main objective. Watermarking can be used to identify the owner license information as well as it protect the secret information from the unauthorized access. The audio water marking is basically depend on the wavelet transform and the algorithm that is Haar algorithm. Watermarking consist of the two process that are embedding and extraction of the bit in the watermarked data. Versatile and simple-to-use software and decreasing prices of digital devices have made it possible for consumers from all around the world to create and exchange multimedia data. Watermarking is better than the conventional methods that are used in protection purpose. It has some advantages in terms of the invisibility and robustness. The watermarked data has recovery rates of 90% from the single and double attack.

Keywords: Watermarking, Embedding, Extracting,

I INTRODUCTION

The media files are send or distributed to user over the network. So that we need the protect the data from the copying[1].the watermarking is the hotspot in recent year and it is best alternative of the encryption and decryption of the data when we are protecting the intellectual right on right data[2]

This makes the protections of digital intellectual property rights and content authentications have been a serious problem. Hence the technology of digital watermarking is received a large deal of attention.

The watermarking is depend on the three main components : embedding algorithm, extraction algorithm or detection technique and importantly a watermarking structure. Watermarking are work on discrete cosine transform[DCT] or discrete wavelet transform [DWT]which is the transfer domain[3].

The watermarking problem mathematically express as follow:

$$XN = KN(SN) + \alpha M$$

Where;

M is the watermark embedding in S_n , α is the embedding strength using the KN secret key function are operate on the host message to deliver watermark message X N that is send by the transmitter. These data are extracted at the receiver side [1].

The main need of the this paper is robust audio watermarking algorithm. The fully use of the low frequency component [LFC] of the audio signal is available . The modification of amplitude is the process of the insertion of the audio signal at certain location. The amount of the embedded watermark in the signal is indicated by the number of the location and amount of distortion that found in signal after embedding is indicated by the amount of amplitude modification[4]

II PROPOSED SCHEME

The watermarking is used to find out the owner license information or it will find out the information about the digital data carrying watermark. The watermarking is work on the mechanism of reality that mean if need find out the particular work has been tampered or copy illegally. Low frequency signal in the digital watermarking is imperceptibly embedded in the other signal. The property of which is used for characterized the digital watermarking is totally depend on the requirement and application and role of the watermark play in system. The requirement of modification in image during the embedding the process that time watermarking process are added controlled amount error in the digital image. After recovery from the distortion it will find out the original owner of the image. The properties of the human visual system is minimize the distortion in image using the invisible or transparent watermarked. The system uses the Haar transform for the watermarking [1].

The component of LFC[Low Frequency Component].The audio signal that are use as half sinusoidal which are the mixture of the high and low frequencies with uneven amplitude and wave length . The high component are reduce when the signal are passing through the low frequency component and only low frequency component are remain as shown in fig.(1) it is also called as the low frequency component[4].

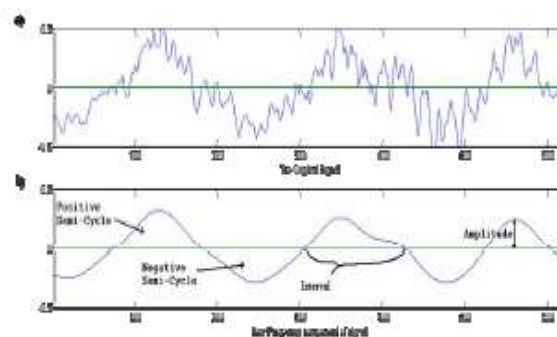
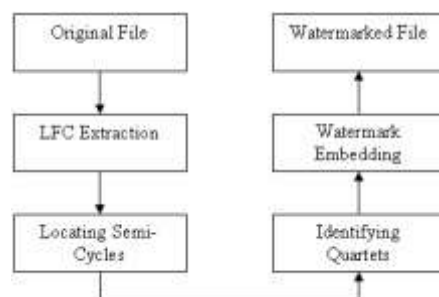


Figure 1. a) Audio Signal. b) Corresponding Low Frequency Components (LFCs).

III PROCESS

As shown in the fig. extract the LFC original signal are passing through the low pass filter that are temporary. So that the determined quartets need is modifiable semi cycle to do that process. These steps are important because the encoder has no idea about the priority of location of the quartets till it depend on the audio file. After these process it known the location of the quartets in LFC then can find out the corresponding location of the quartets in the audio file are marked and quartets in original file are modified in such way that it intended watermarked i.e 0s and 1s[4].



IV WATERMARK EMBEDDING

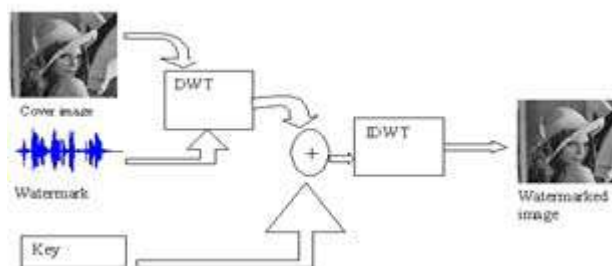


Fig. 2: Watermark Embedding

The host image S , watermark are inserted into the host image using watermark embedding in the target area of the image. Here use the transfer domain for the decomposition of the cover image using the DWT. The mathematical structure of the decomposition is

$$C = \{CA1, CD1, CD1-1, \dots, CD1\}$$

Where

C is decomposition structure and $CA1$ and $CD1$ is the mark approximation and L is the detail coefficient at resolution level respectively. At resolution level L is the entropy of the each band.

The scaled secret data with the coefficient in qualifying block are modified is given as

$$CDI = CDI + \alpha (Cw) + k(i, j)$$

Where

CDI marks the transformed coefficients after embedding stego data Cw with an embedding strength α .

Using the Inverse Discrete Wavelet Transform[IDWT] for the further reconstruction of the cover image[1]

V EXTRACTION

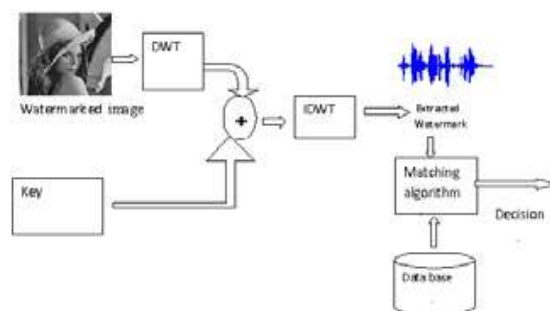


Fig. 3: Watermark Extraction

The given secret key is used for the extraction of the algorithm of audio watermarked data. At receiver end, the level L using DWT transform of watermarked image. The propose of the algorithm is as follows:

- 1) On the cover image two level discrete DWT is performed. The cover image is contain the sub band of coefficient in that sample of watermarked is embedded. Which do not contain significant detail.
- 2) While doing embedding the random key is generated of the size of $1/4^{\text{th}}$ of the cover image
 $I_{w,m}(i,j) = I_w(i,j) + k(i,j)$
 $I_{w,m}(i,j)$ is the substituted pixel of the sub band of the cover image
- 3) For the secure watermarked image perform the inverse DWT.[1]

VI RESULT AND DISCUSSION

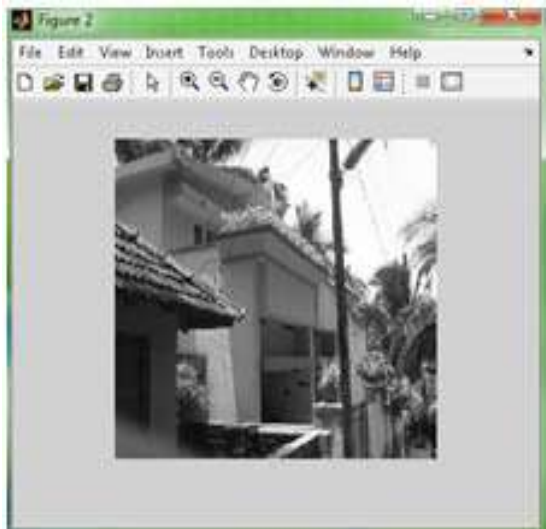
The number of gray scale images and audio files that are used for the proposed technique for experiment. In that we use three image Lena image, Home image, and Medical image and also use four type of audio sample like sample 1, sample 2, sample 3, sample 4 these sample is taken. The performance of these systems are decided by the various parameters: the entropy of the host image, watermarked image. Peak signal to noise ratio (psnr) is used to measured the visual imperceptibility of the audio watermarked.[1]

The image processing attack like cropping rotation ,salt and pepper effect is to check scheme of the robustness. Sub band coefficient robust of the embedding watermark against different type of attack is shown by the experimental result.[2]

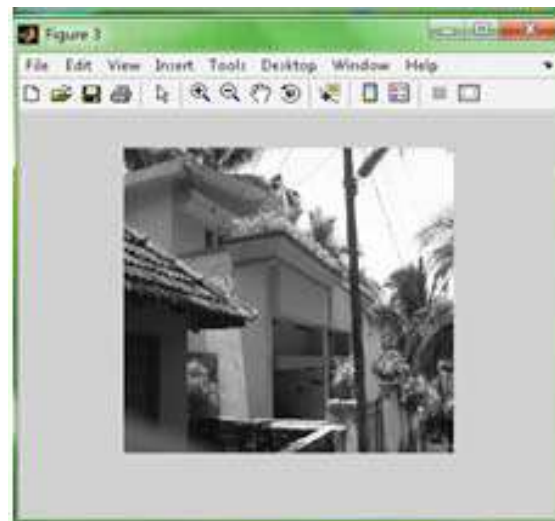
VII ANALYSIS

Measuring the quality of the image:

In that analyses effect of embedding algorithm on original image or the cover image. Using the PSNR and Entropy has discuss about similarity of the original image and the watermarked image. In our proposed system we use the transfer domain for the embedding data it has advantage in can be explode the external frequency attack and also compare the quality of the gray scale image and watermark image. (font).



(a) Original Image



(b) Watermarked Image

VIII PERFORMANCE OF THE EXTRACTION ALGORITHM:

8.1 Before any Attack

In that can see the extraction algorithm before the attack of the watermarked gray scale image. following fig.(5) show that watermarked image ,original image and recovery of watermark before attack.

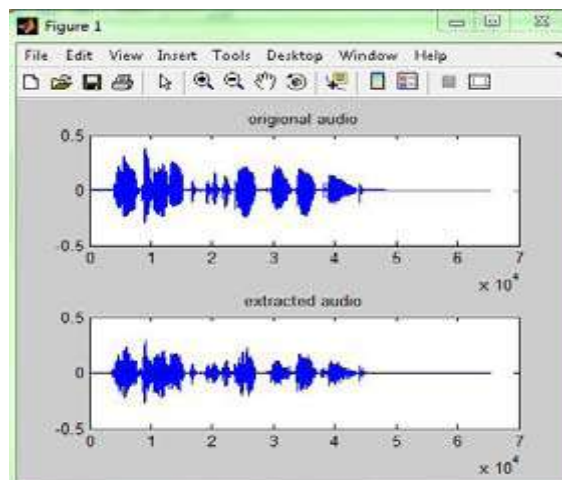


Fig. 5: Subplots of Original and Extracted Audio

8.2 Effect of attack

In this section we discuss performance of extraction algorithm by considering different types of image processing attacks on watermarked gray-level image such as rotation ,adding salt and pepper noise, contrast enhancement, adding Gaussian noise and compression[1]

IX CONCLUSION

In this paper we discuss about the watermark method of the image using the DWT. This method is better than the conventional methods. It increases the robustness and invisibly using the concept of the entropy. Experimental results show that the proposed method outperforms the well-known P&Z algorithm, in terms of both robustness to major attacks and watermark transparency

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