

# Secured Digitally Embedded Audio Transmission Based On Discrete Transformation

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**Abstract**— All sorts of data today is getting digitized and internet among others is the easiest and a very effective source and host for sharing information. So, it becomes very important to track, protect and monitor the data and maintain its security, Secret, data integrity, authentication, robustness and ownership. And, techniques like steganography, watermarking and non repudiation of messages help us to do so. In steganography, information is hidden inside the data (like image, audio, video, text) and the data is kept secret maintained as only the sender and the receiver know how to retrace the information. Watermarking is used to hold the secret data. In this paper, a secure way of Audio- Watermarking is implemented using Distinct Wavelet Transform (Haar Wavelet) and Distinct Cosine Transform. It requires a cover file that can hide the message that is to be transmitted.

**Keywords**— Distinct Wavelet Transform, Distinct Cosine Transform, Arnold Transform

## I. INTRODUCTION

Information, today, is mostly transmitted in a digital format, and the growth in this trend will not fade in the foreseeable future. Digital data is susceptible to duplicity with the same quality as the original. And security of data is an issue. Though it can be achieved by cryptography, steganography or watermarking. Cryptography deals with encryption which is defined as protecting the information by encrypting it into unrecognizable format. It doesn't hide the existence of the message from the attacker instead it renders the content of the message garbled to unauthorized people. Steganography and watermarking help in data hiding. Steganography hides the information in such a way that the existence of information is undetectable.

It requires a cover file that can hide the message that is to be transmitted. Cover may be an image, audio, text file or even video. Hidden information may be a text file, a cipher text, audio or image. Stego key is required for the embedding and extracting the secret message. Embedding a message in a cover file is carried out in a way that the quality of the cover file is not compromised. But watermarking hides only the legal information inside the carrier for copyright protection. It embeds information into carrier in a way that its removal becomes impossible. It can also be used for authentication. Watermarks, originally, were faint imprints on paper that could only be seen at a specific angle. This process was designed to prevent counterfeiting and is still in use. Printed watermarks though are intended to be proportionally visible but digital watermarks are designed to be completely invisible, and in the case of audio files, totally inaudible.

## II. RELATED WORKS

The audio watermarking can be classified into temporal watermarking and spectral watermarking, based on spatial and transform domain [1] where watermarks are inserted. Temporal watermarking helps in hiding watermarks directly into digital audio signals in the time domain, and spectral watermarking methods first transform the given audio signal, where FFT (Fast Fourier Transform), DCT (*Distinct Cosine Transform*) [2], and DWT (*Distinct Wavelet Transform*) [3], etc. are commonly used as the underlying transform, and hides watermarks in the transform domain.

### III. PROPOSED

In this project, a secure way of Audio- Watermarking is implemented using *Distinct* Wavelet Transform (Haar Wavelet) and *Distinct* Cosine Transform.

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Temporal watermarking helps in hiding watermarks directly into digital audio signals in the time domain, and spectral watermarking methods first transform the given audio signal, Here we use a spectral watermarking.

DWT (*Distinct* Wavelet Transform) technique is used to hide data in transform coefficients of the audio signal.

*Distinct* Cosine Transform (DCT) coefficients using quantization index modulation method propose a blind audio watermarking. In addition the multi resolution characteristics of *Distinct* wavelet transform (DWT) and the energy compression characteristics of *Distinct* cosine transform (DCT) are combined in this method.

Encoding is the process of embedding a watermark image on an audio signal in such a way that there are no audible changes in the audio and it seems exactly like the original audio.

Decoding is done at the receiver's end to extract the embedded watermark image.

### IV. SYSTEM MODULES

*Audio Signal Transformation* done by *Distinct* Cosine Transformation (DCT) and *Distinct* Wavelet Transformation (DWT).

*DWT* actually decomposes the audio signal into many multi resolution sub-bands, which in turn helps to locate the most appropriate sub-bands for embedding bits of watermark gray image.

*DCT* coefficients using quantization index modulation propose a blind audio watermarking method by using adaptive quantization against synchronization attack.

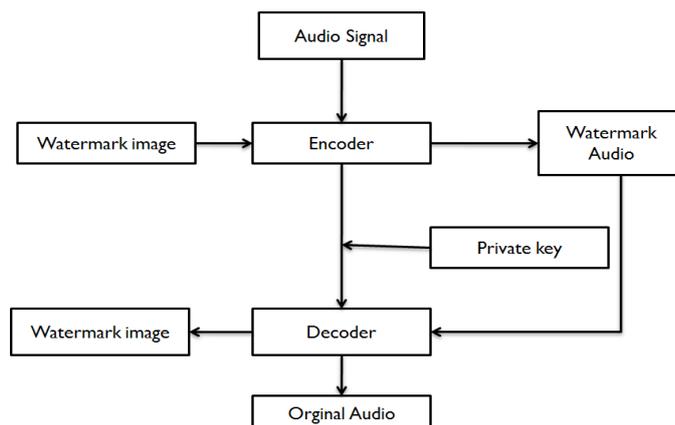


Figure 1 Architecture Diagram

## V. IMAGE TRANSFORMATION

Image transformation is done by Arnold Transform. Image scrambling based on Arnold Transform changes the position of pixels resulting in a disordered image. Mathematically, it can be defined as: Where  $a$  and  $b$  are the coordinates of the original image;  $N$  is the order of image matrix;  $a'$  and  $b'$  are the coordinate of the transformed image. This technology of image scrambling is commonly used due to its periodicity. If the parameters which are used at the time of scrambling are known to us, then we can easily restore the original image by using reverse scrambling. Scrambling can be used for data hiding techniques. So, if it is hacked by some attacker, only the scrambled image is shown

## VI. CONCLUSION

The watermarking of audio data is an appropriate mechanism to protect the intellectual property rights. In this scheme we scramble the watermark with Arnold transformation and embed quantitatively it into the audio signal. Before embedding the watermark first we apply DCT and DWT on the audio file. Audio watermarking schemes can prove really valuable for copyright control of digital material. Available studies on audio watermarking are far less than that on image watermarking or video watermarking. Although, audio watermarking studies have advanced considerably during the last a few years. Those studies have contributed much to the progress of audio watermarking technologies. Recent research works have investigated many new audio watermarking techniques which preserve the integrity of the hidden data and its securing. In this work, one such approach has been presented. Also the strengths and weaknesses are portrayed. Also, it can be concluded that the transform domain is preferred over the spatial domain in terms of imperceptibility, non-detection and capacity. However, more sophisticated technologies are required. As every technique is different from another one, comparison among them cannot be done.

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