Inconspicuous Watermarking With Optical/Sound Security Key

Sunil Kr. Sharma[1], Divyanshu Varma[2]

Abstract - **The digital age is here. One creation of the digital era is that digital media copies are the same as the original. This fact has led to great concern for media theft via illegal duplication. Thus, the need for tracing ownership of such artistic works has spawned the digital data hiding technique known as watermarking. The field of digital watermarking has recently seen vast interests covering theoretical studies, novel techniques, attacks and analysis. Watermarking is defined as the process of electronically attaching the identity of the owner of the copyright of an artistic work in such a way that it is difficult to erase. In this paper we utilize a watermark generation technique based on OPTICAL CODE/SOUND CODE as a security key & same key to extract the data. Here we first crop the image then watermarked the cropped image with inserting the OPTICAL CODE/SOUND CODE as a security key.**

Keywords- **Cosine, Fourier & Wavelet Transform; Optical Code; Sound Code; Image Cropping.**

I. Introduction

Digital watermarking can be defined as the process of embedding a certain piece of information into multimedia content including text documents, images, audio or video streams, such that the watermark can be detected or extracted later to get this document. A most common watermark model consists of watermark embedding and detection processes as shown in Fig. 1 and Fig. 2
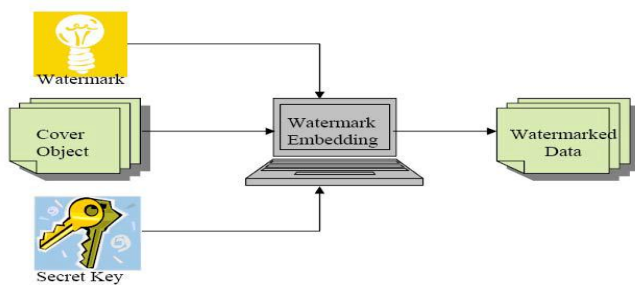

Fig. 1 Watermark embedding.

Sunil Kumar Sharma
Bhagwant University, Ajmer
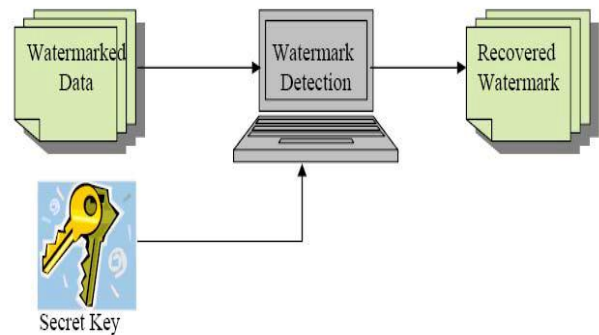
Divyanshu Varma
Bhagwant University, Ajmer

Fig. 2 Watermark detection.

Watermarking techniques can be divided into four categories according to the type of document to be watermarked as follows Text Watermarking, Image Watermarking, Audio Watermarking and Video Watermarking. Types of watermarking are shown in Fig. 3:
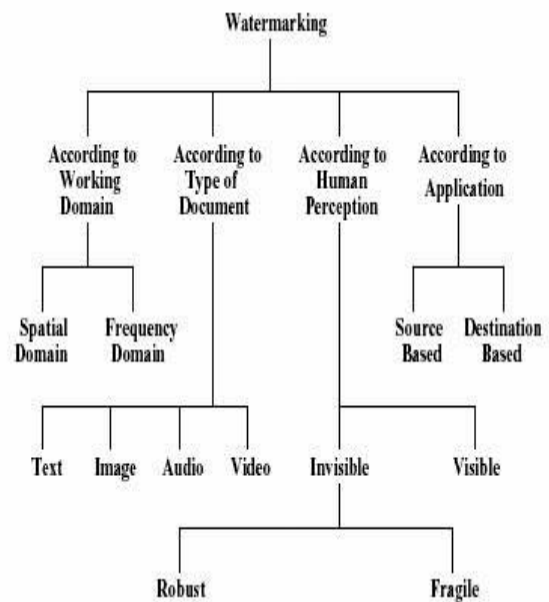

Fig. 3 Types of watermarking

II. Proposed Technique

Digital watermarking is a technique of embedding some information (usually hidden copyright notices) into an image. Number of applications has been found in various fields like copyright protection, content authentication, document annotation, medical imaging. So, an enhanced semi-blind, hybrid digital image watermarking scheme based on OPTICAL CODE/SOUND CODE as a security key & same key to extract the data is our proposed approach in this paper. OPTICAL CODE/SOUND CODE as a security key we may propose the following Fig. 4 block representation for watermarking embedding & Fig. 5 block representation for watermarking extraction.
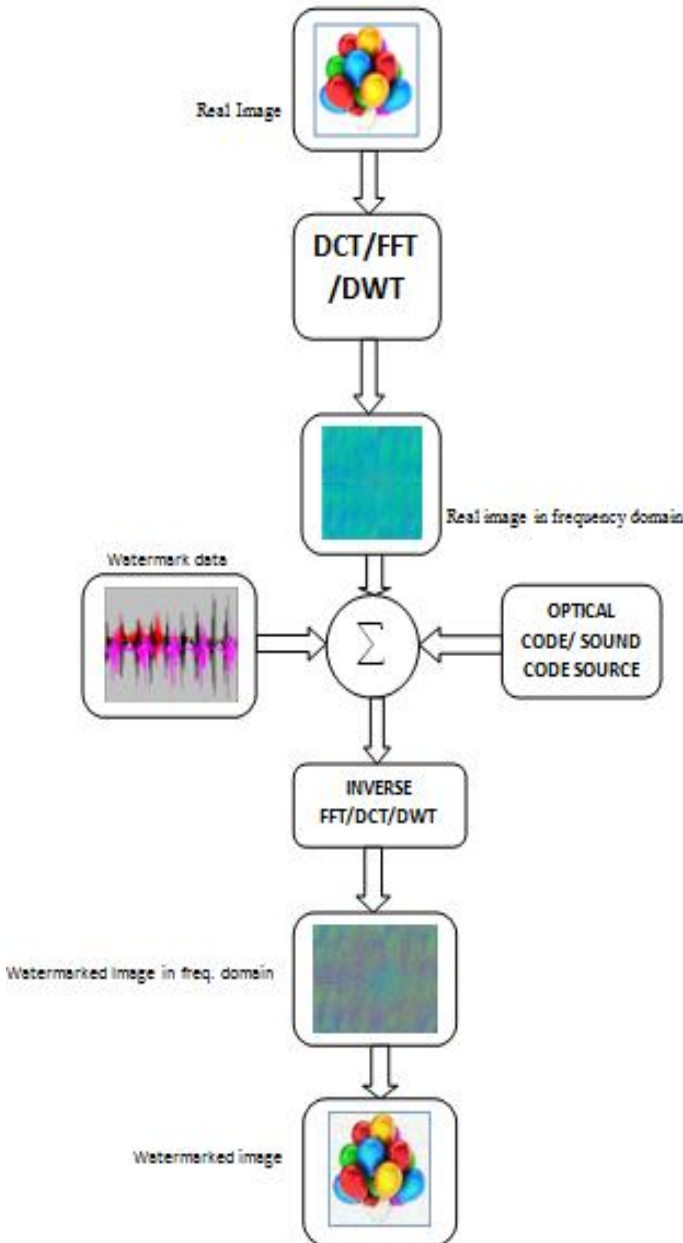

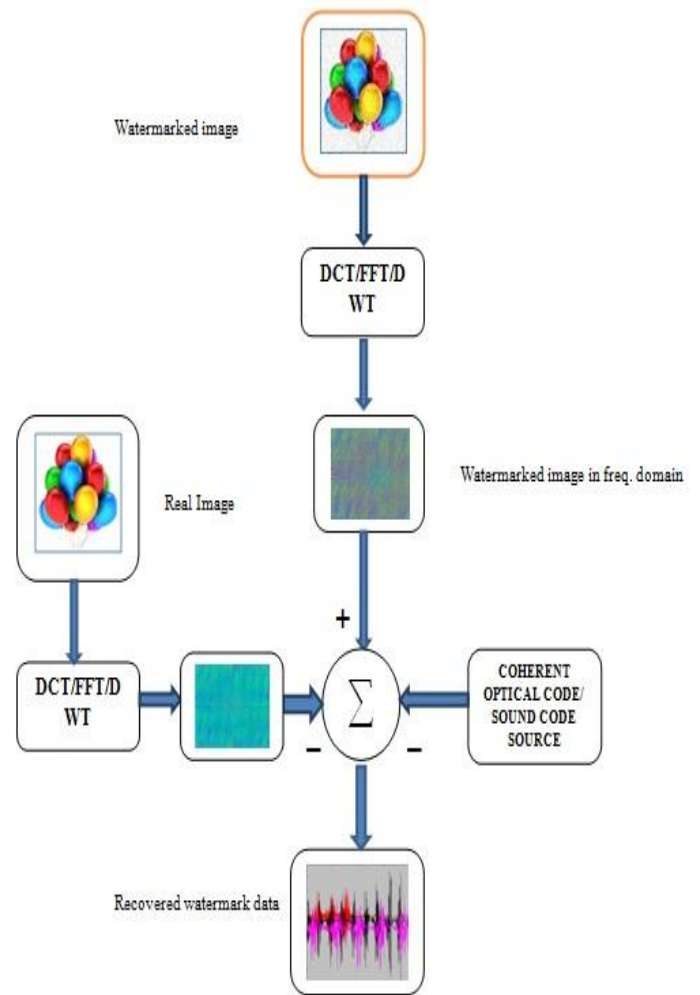Fig. 4 block representation for watermarking embedding OPTICAL CODE/SOUND CODE as a security key

Fig. 5 block representation for watermarking extraction OPTICAL CODE/SOUND CODE as a security key

A. DWT/DCT/FFT

There are several transforms that brings an image into frequency domain. Among most common of those, are mentioned: Discrete Wavelet transform (DWT), Discrete Cosines Transform (DCT) and Fast Fourier Transform (FFT). In frequency domain, coefficients are slightly modified. This will make some unnoticeable changes in the whole image and makes it more robust to attack compared to what we have in spatial methods. Discrete Wavelet transform (DWT), Discrete Cosines Transform (DCT) and Fast Fourier Transform (FFT) is applied on the given real image as shown in Fig.5
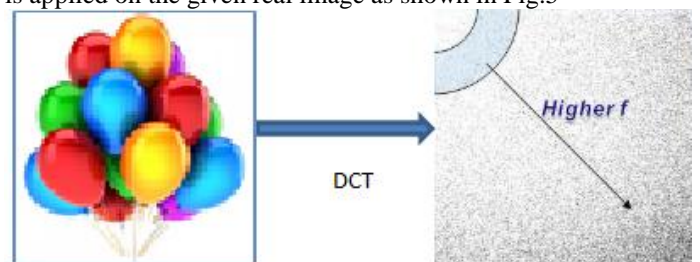

Fig. 5 DCT

Fortunately, there is a direct command for obtaining DCT coefficients of images. Wavelet transform decomposes an image into a set of band limited components which can be reassembled to reconstruct the original image without error. DWT have large advantage over Fourier & cosine transform.

B. *Optical Code Source /Sound Code Source*

In this proposal we use optical light of particular wavelength, frequency & amplitude. On the basis of which that code source generates a security key for watermarking which added in the watermarked image during the process of watermark embededding. Similarly at the time of watermark extraction the same code should be generated by Optical Code Source to extract the watermark data from watermarked image. If the same code is not generated at the time of extraction then that watermark data will not extract from the watermarked image. Similarly for the sound code there will be an sound wave of particular wavelength, frequency, amplitude which generates an code for watermark embededding & at the watermark extraction same sound code needed to get watermarked data.So, finally we get that it is necessary to have a co-herent optical /sound code source.

III.   Possible Changes

Cropping is simply cutting off parts of the image as shown in Fig. 6. At the place of making complete picture watermark we can crop the image, watermarked the cropped part of the image & again add the cropped part to the remaining real image as shown in Fig. 7. By this possible change we may bring back watermark data from the original image for a better recovery of the message
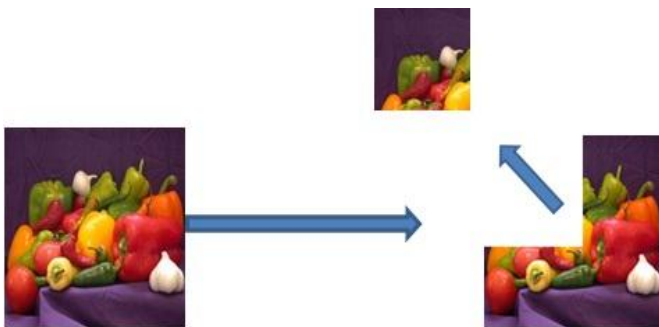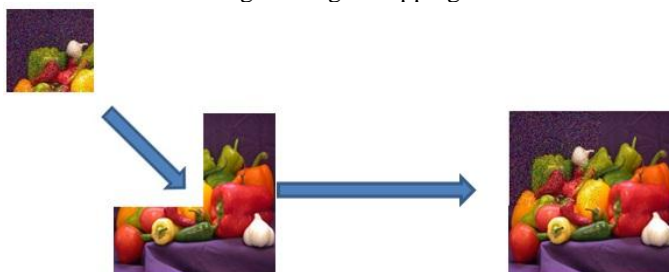

Fig. 6 Image Cropping

Fig. 7 Adding watermarked cropped image to real image

By this possible change we may bring back watermark data from the original image for a better recovery of the message

IV.   Conclusion and Future Work

In this paper, Digital watermarking technique based on DWT/DCT/FFT with OPTICAL CODE/SOUND CODE as a security key. But in the real sense such system does not developed yet so, development of this type of security key system in Digital watermarking technique with optical & sound signal processing provides a big scope for research & development.

References

[1] Yusnita Yusof and Othman O. Khalifa, "Digital Watermarking For Digital Images Using Wavelet Transform," Malaysia International Conference on Communications, 14-17 May 2007, Penang, Malaysia.

[2] Xiang Peng , Lingfeng Yu and Lilong Cai, "Digital watermarking in three-dimensional space with a virtual-optics imaging modality" Received 10 July 2003; received in revised form 15 August 2003; accepted 21 August 2003 in Optics Communications 226 (2003) 155–165, www.elsevier.com/locate/optcom.

[3] Aidan Mooney and John G. Keating, "Optical and Digital Technique for Watermark Detection" Department of Computer Science, NUI Maynooth, Maynooth, Co. Kildare, Ireland.

[4] Satendra Kumar, Jaydeep Kishore and Nitin Arora, "Enhanced Digital Image Watermarking Scheme based on DWT and SVD" International Journal of Computer Applications (0975 – 8887) Volume 57– No.11, November 2012.

[5]   Samir Kumar Bandyopadhyay, Tuhin Utsab Paul and Avishek Raychoudhury, "Invisible Digital Watermarking Through Encryption" International Journal of Computer Applications (0975 – 8887) Volume 4– No.8, August 2010.