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Digital Watermarking And Modulation Techniques Used By CTS For Secure Transmission of Bank Cheques Images.

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Abstract— **Data Communication is the exchange of data between the two devices via some form of transmission medium such as a wire cable. However in 21st century, Data communication can be done by using various networks such as, LAN, MAN, WAN etc. The Information may be in any form i.e. text, audio, vedio or in image form. To transmit the data in different format for long distance, it is going to use modulation Technique and its security can be provide by using various techniques such as Steganography,Encryption and Decryption, Digital Watermarking etc. In this paper, it is going to discuss with *"combination of Modulation and Digital Watermarking Technique used for Secure Transmission of Bank Cheques Images."***

***Keywords*—transforms, modulation techniques, watermark, digital watermarking techniques.**

I. Introduction

The development of personal computer brought about tremendous changes for business, industry, science and education. Technological advances are making it possible for communications links to carry more and faster signals. As signals are of different types such as Analog signals, Digital signals, discrete signals, random signals, Deterministic signals, Non-Deterministic signals, etc. Which are being used to transmit the information in various different formats such as audio, vedio, text, message, or in image format from one station to another station [14, 15, and 18].

As, in William Stalling,3rd edition of cryptography and network security explains various types of security techniques such as encryption and decryption with the help of different algorithms like RSA,Data Encryption Standard, Advanced Encryption Standard etc.for the security of digital data.

Taub's 3rd edition of Principle of Communication System explains the different techniques that can be used for communication in communication systems like Modulation Techniques, different transform techniques used for transmission and reception of digital data, Information Theory and coding etc used for data transmission. The working of digital communication system that is being used while transmission of digital data is as show below:

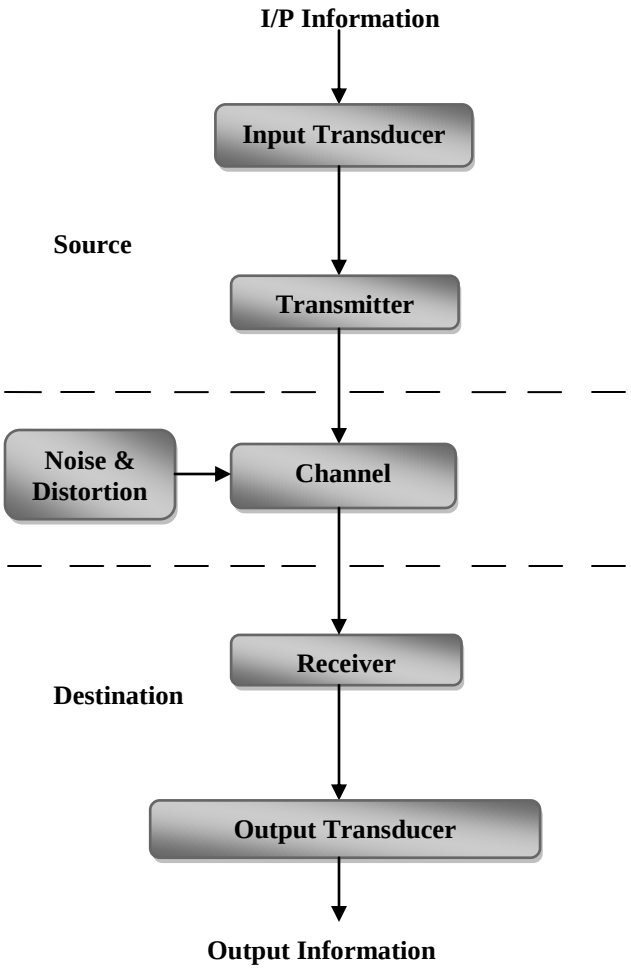

Figure 1:-Working of digital communication system.

This digital communication system is consisting of various parts like input tranducer, transmitter, channel, receiver and output transducer. To transmit the data for a long distance it is dealing with modulation technique and to provide the security to the data it deals with watermarking technique. In this paper, it is going to discuss the combination of digital watermarking and modulation techniques used for the secured transmission of bank cheques images [18].

II. Different types of Modulation Techniques.

A. *Analog Modulation*

Modulation is the addition of information (or the signal) to an electronic or optical signal carrier. Modulation can be applied to direct current, to alternate current and to optical signals. There are three types of analog modulation techniques. Such as A.M, F.M and P.M, etc[11,12,13,14and18].

B. *Digital Modulation*

Digital Modulation is the process of varying one or more parameter of a carrier wave as a function of two or more finite and discrete status of a signal. Digital modulation uses binary code to transfer a digital signal over an analog system such as a phone line, which is the case with modem. Some digital modulation techniques are amplitude shift keying (ASK), frequency shift keying (FSK) and phase shift keying (PSK).Different types of modulation techniques are as shown in figure[11,12,13,14,and18].

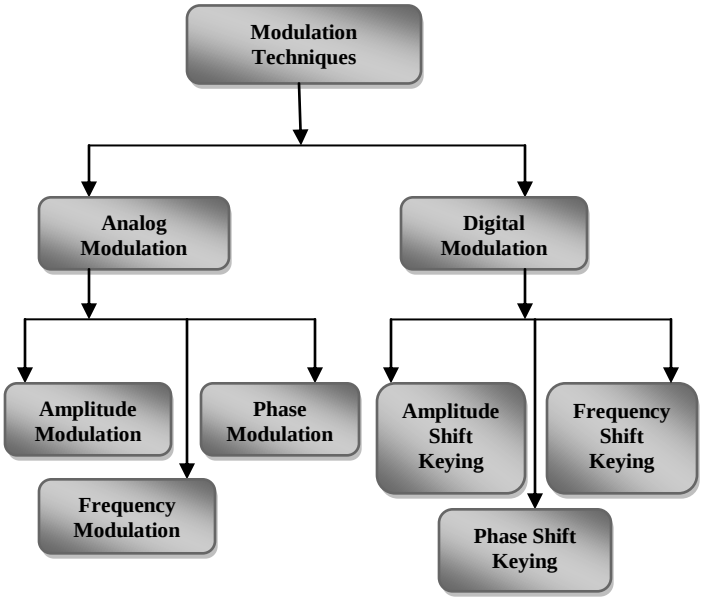

Figure 2: Types of Modulation Techniques

III. Different Types of Watermarks.

A watermark can be define as a pattern of bit that is used to embedded in to file which is used to identify the source of illegal copies. Watermark are used for indexing, copyright protection, data authentication, data hiding, broadcast monitoring, fingerprint,etc and other documents to prevent counterfeiting. There are different types of watermark are as follows[1,6,7 and 8]:

A. *Visible Watermark*

Visible watermarks are an extension of the concept of logos. Such watermarks are applicable to images only. These logos are inlaid into the image but they are transparent. Such watermarks cannot be removed by cropping the centre part of the image. Further, such watermarks are protected against attacks such as statistical analysis[1,2,5,710].

B. *Invisible Watermark*

Invisible watermark is hidden in the content. It can be detected by an authorized agency only. Such watermarks are used for content and/or author authentication and for detecting unauthorized copier[1,2,5,7,10].

C. *Public Watermark*

Such a watermark can be read or retrieved by anyone using the specialized algorithm. In this sense, public watermarks are not secure. However, public watermarks are useful for carrying (IPR) information. They are good alternatives to labels[1,2,5,7,10].

D. *Perceptual Watermark*

A perceptual watermark exploits the aspects of human sensory system to provide invisible yet robust watermark[1,2,5,7,10].

E. *Private Watermark*

Private watermarks are also known as secure watermarks. To read or retrieve such a watermark, it is necessary to have the secret key[1,2,5,7,10].

F. *Fragile Watermark*

Fragile watermarks are also known as tamper-proof watermarks. Such watermarks are destroyed by data manipulation.

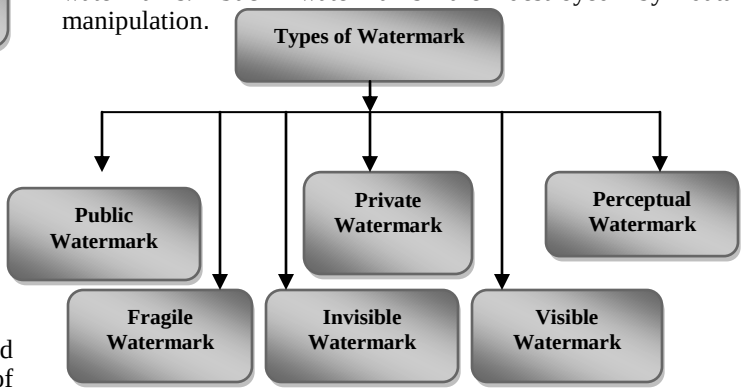

Figure 3: Different Types of Watermark

Above Figure shows that the different types of watermark that can be used for different applications of digital watermarking.

IV. Different Types of Watermarking Techniques.

a. Spatial Domain.
b. Frequency Domain

V. Block Diagram of Proposed Algorithm

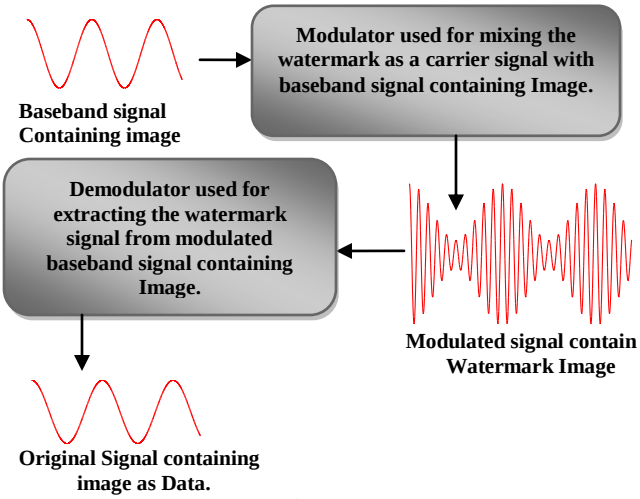

Figure 4: Block diagram of combined digital watermarking and modulation technique.

VI. Proposed Algorithm

The following are the steps of algorithm that has been proposed for the combination of digital watermarking and modulation technique.

1. Take a signal containing a cheque image data which act as an input to communication system.

2. Call the procedure A.

3. Transmit the signal contain watermarked cheque image through channel containing noise and distortion.

4. Receive the signal contain watermarked cheque image at receiver side

5. Call procedure B.

6. After execution of procedure B, pass the signal to the output device.

7. Finally, output information containing image is display.

A. *Procedure A*

a. Select signal containing cheque image data which act as baseband signal.

b. Insert a watermark image as carrier signal to do modulation of the baseband signal that has to be transmitted.

c. Obtained modulated signal contain watermarked cheque image.

B. *Procedure B*

a. Receive the watermarked cheque image through channel.

b. Apply the demodulation process in which the watermark used for image as carrier signal is extracted.

c. Obtain the original cheque image.

VII. Conclusion.

There are various modulations and watermarking method that has been explain above depending upon transform and watermark used as carrier signal . One can provide the security to the signal containing cheque images of bank which are used to transmit over long distance by providing the combination of digital watermarking and one of the modulation techniques. The future scope of this technique is that one can used for transmitting secure signal in military application and can also be used for secure broadcasting.

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