

A Robust Color Image Watermarking Scheme Using Discrete Wavelet Transformation

Kaiser J. Giri

Islamic University of Science & Technology, J&K India 192122
kaiser.giri@islamicuniversity.edu.in

Mushtaq Ahmad Peer and P. Nagabhushan

University of Kashmir, J&K, India, 190006 and University of Mysore, 570006
drpeerma@yahoo.com, pnagabhushan@hotmail.com

Abstract—Information hiding in digital media such as audio, video and or images in order to establish the owner rights and to protect the copyrights commonly known as digital watermarking has received considerable attention of researchers over last few decades and lot of work has been done accordingly. A number of schemes and algorithms have been proposed and implemented using different techniques. The effectiveness of the technique depends on the host data values chosen for information hiding and the way watermark is being embedded in them. However, in view of the threats posed by the online pirates, the robustness and the security of the underlying watermarking techniques have always been a major concern of the researchers. This paper presents a secure and robust watermarking technique for color images using Discrete Wavelet Transformation. The results obtained have shown that the technique is robust against various common image processing attacks.

Index Terms—Watermarking, Transformation, Copyright, Payload, Robustness, Accuracy Rate, Discrete Wavelet Transform.

or monochrome digital content, however since most of the organizations and business concerns nowadays mostly use color data such as logos, tags and labels, which demands the equal focus towards the design of schemes for color data as well. This paper presents a novel watermarking technique for color images by properly analyzing the image data to identify the significant portion of the image for embedding the watermark. The paper is organized as follows:

1. Section II presents the overview of the Digital Watermarking.
2. Section III provides a brief about Discrete Wavelet Transformation and its relevance in the context of watermarking
3. Section IV provides a review of recent techniques used in Digital Watermarking for color images using wavelets.
4. Section V discusses the proposed watermarking algorithm.
5. Section VI presents the experimental results.
6. Finally the conclusion is presented in section VII.

I. INTRODUCTION

The digital storage and distribution mechanism of multimedia data has revolutionized the world. Besides many other advantages, it is easy to manipulate and reproduce the data using the fast computing devices having the computing capacity far more than the humans. However, the main threat that refrains the proprietors and content providers to share and disseminate their digital property such as images, audio or video is the copyright violation of their digital property from various online pirates which leads to huge financial losses. In order to establish the ownership rights on the digital property, the concept of watermarking was introduced and strongly advocated by the researchers. The field of watermarking has undergone through research over the last few decades and lot of work has been reported in the literature [1-7]. However the pace at which the multimedia data is increasing, there is definitely a need to have more secure & robust watermarking algorithms & techniques. The techniques presented so far are mostly utilizing gray scale

II. DIGITAL WATERMARKING

The concept of hiding or concealing some additional information (watermark) in the host data such as images, audio, video, text or combination of these to establish the ownership rights is known as watermarking [8]. The entire process has to be carried in such a manner that it qualifies certain criteria's such as imperceptibility & robustness so that the watermarked data can replace the original one for all practical purposes. Moreover the watermark has to be embedded in such a manner so that it is inseparable from the host data and can later be extracted to make an assertion of the digital data. Mainly the watermarking is done for the purpose of authentication and copyright protection of digital property. There are two principle domains in which watermarking is being carried these are the spatial and the transform (frequency) domains. In the former one the host data pixels are modified as per the watermark pixels, while in the later the host data is initially subjected to some reversible transformation and then the transformed