

Chapter 28

2D and 3D Intelligent Watermarking

Mourad R. Mouhamed

Helwan University, Egypt & Scientific Research Group in Egypt (SRGE), Egypt

Ashraf Darwish

Helwan University, Egypt & Scientific Research Group in Egypt (SRGE), Egypt

Aboul Ella Hassanien

Cairo University Egypt & Scientific Research Group in Egypt (SRGE), Egypt

ABSTRACT

These days the enormous advancement in the field of data innovation and the wide employments of the web made the security of the information confront a major issue to accomplish the information assurance. The authentication and the copyright of the information is a critical piece of this issue. Scientists started to discover answers for this issue, watermarking and cryptology two of these solutions. Digital watermarking refers to the process of embedding imperceptible information called a digital watermark into a cover multimedia object so that the information may be detected or extracted later for security purposes. Cover multimedia object used to hide watermark information can be any digital media that we used in our daily life for data distribution such as: audio, 2D images, 3D images, and video. The problem that face the researchers in developing a watermarking techniques that the trade of between the impeccability and the robustness of the watermark this chapter focus on how the intelligent algorithms can help in this issue. This chapter surveys the watermarking techniques in 2D and 3D techniques. We conclude that watermarking technique are efficient for different areas of applications.

INTRODUCTION

New techniques rise regular to keep the network and computer security frameworks up with the expanding multifaceted nature of attacks Intrusion detection systems have been around for a long while, like a device to recognize outside and inside interruptions and endeavors. Being like the biological immune system, specialists are motivated by various instruments and capacities carried on by the immune

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system parts to secure the body. The previous decade, there have been extraordinary improvements in communication technology and computer that have enabled digital multimedia contents such as audio, 2D image, 3D image, and video to be reproduced and distributed with ease. On the other hand of these advantages are provided by the technology, it also enables illegal attacks in these materials such as duplication, modification and forgery. Due to that, protection of multimedia data has become a very crucial and urgent matter for data owners and service providers. Many strategies have been proposed in order to guarantee the protection against copyright forgery, misuse or violation such as Digital Rights Management (DRM) (Gaber, T. & Zhang, N., 2011; Gaber, T., & Zhang, N. (2012); Gaber, T., 2013, Gaber, et al. (2013)). Among the strategies, digital watermarking techniques are the most generally utilized. The design of watermarking optimization system for a given application always involves a trade-off between set of contending criteria. Thus, watermarking issue can be planned as an optimization problem [Mona 2013]. This chapter aims to provide a brief review of essential concepts and definitions digital media watermarking. It additionally give a study of the late research work in the field of watermarking security for both 2D mesh watermarking and 2D image watermarking as both are the main watermarking cover media concern of the work proposed in this chapter. This Chapter makes a focus on watermark Bio-Inspired optimization schemes for both cover media used.

In general, any watermarking scheme (algorithm) consists of three parts, such as Watermark, Encoder [process of insertion watermarking] and Decoder [process of extraction] and Comparator [process of validation]. Watermarks and watermarking techniques can be divided into various categories. The watermarks can be applied either in spatial domain or in frequency domain. It has been pointed out that the frequency-domain methods are more robust than the spatial-domain techniques. On the other hand, the spatial domain watermarking schemes have less computational overhead compared with frequency-domain schemes. According to human perception, the digital watermarks can be divided into four categories: (1) Visible, (2) Invisible-robust, (3) Invisible-fragile, (4) semi fragile [2].

Visible watermark is a secondary translucent overlaid into the primary image. The watermark appears visible to a casual viewer on a careful inspection. The invisible-robust watermark is embedded in such a way that alternations made to the pixel value are perceptually not noticed and it can be recovered only with appropriate decoding mechanism. The invisible-fragile watermark is embedded in such a way that any manipulation or modification of the image would alter or destroy the watermark. Watermark can be in spatial or transform domain.

Any digital watermarking technique to be effective needs to be robust against all intentional and unintentional attacks. It should be imperceptible to the human visual system (HVS). A watermarking technique should consider the HVS to make a balance between imperceptibility and robustness to shape the watermark perceptually according to the contents of the cover image [R.C. Motwani et al.]. For perceptual shaping, Watsons Perceptual Model (WPM) is mostly used [Zhen Liu et al.]. For better imperceptibility and robustness, there should be an optimum watermarking strength for each and every coefficient of the cover image.

3D INTELLIGENT WATERMARKING

In the last decade, digital watermarking become an active research area and many watermarking techniques have been proposed for audio [P. Cano et al.], [D. Kirovski et al.] images [M. Barni et al.], [A. Tremau et al.] and videos [H. Cheng], [R.B.Wolfgang]. The conventional 1D/2D digital data watermarking are

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