

A Modification of Odd and Even Digital Watermark Technique

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Abstract: This study presents a modification of odd and even watermark technique. Suggested modification is based on optimizing the selection of pixels which values will be modified to be odd or even. Least frequent pixels in either odd or even values will be modified. However, the least the modifications of pixel's values, makes cover image more reliable. The process of embedding and extracting the hidden watermark is explained. Analysis of security achieved is performed.

Key words: Watermarking, steganography, embedding, extracting, pixels

INTRODUCTION

Information hiding is a general term that can be implemented using several techniques. The main goal is how we can conceal data inside media such as texts, images, audio and video (Linnartz *et al.*, 1998).

Now a days, two sciences of data hiding have been emerged, steganography and watermarking. Steganography is about concealing the very existence of hidden data in innocent computer files such as digital pictures or digital audio (Baran *et al.*, 2001). It comes from Greek steganos which means covered or secret and graphy which means writing or drawing, literally means covered writing. Watermarking is about hiding imperceptible and irremovable data in a cover media for intellectual property protection purposes thus it extends some information that may be considered attributes of the cover such as copyright (Smith and Comiskey, 1996).

Digital watermarking describes methods and technologies that allow to hide information for example a number or text, in digital media such as images, video and audio (Karzenbeisser and Perircolas, 2000). The embedding takes place by manipulating the content of the digital data that means the information is not embedded in the frame around the data. The hiding process has to be such that the modifications of the media are imperceptible. For images, this means that the modifications of the pixel values have to be invisible (Bender *et al.*, 1996; Niu *et al.*, 2000).

Digital watermarks have several desirable characteristics (Lu *et al.*, 2000). The watermark should be integrated with the image content so it cannot be removed easily. The watermark can be made invisible to the human eye but still readable by computer (http://en.wikipedia.org/wiki/Digital_watermarking).

MATERIALS AND METHODS

Odd and even technique

Embedding process: The watermark must be processed by converting it to binary image as shown in Fig. 1. While the image that will contain the hidden watermark will be converted to gray scale image as shown in Fig. 2. Then,

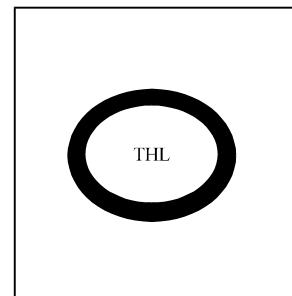


Fig. 1: Watermark to be hide



Fig. 2: Cover image

Sub area of coded image which have an odd values that represent the following letters (T, H and L)

210	212	212	212	212	212	210	210	212	212	210	212	212
210	210	210	210	210	212	210	210	212	212	212	212	212
210	211	213	211	210	211	210	213	212	219	212	212	212
212	210	213	210	210	211	210	211	212	219	212	212	212
210	212	213	210	210	211	211	213	212	217	212	212	212
210	212	211	212	212	213	212	211	212	219	212	212	212
210	212	209	212	212	213	212	217	212	219	217	219	212
210	210	210	212	210	212	212	212	210	210	212	212	212

modify all corresponding pixels under the watermark image to be even value and modify the values of pixels that corresponds to the watermark pixels only in gray scale image to be odd value. So, researchers indicate to the watermark by odd value pixels.

Extracting process: Appearing the odd values of the coded gray scale image as ones in binary image that will give the hidden text.

Modification of the previous technique: This modified technique based on most frequent odd or even of pixels value. This modification reduce the number of pixel's value which will be modified within cover image.

So, researchers must make a pre-calculation on cover image pixels before embedding process to find which of odd or even pixel's values are most frequent? if most of pixel's values are odd. Then, modify the values of least significant digit for all pixels to be odd and vice versa.

RESULTS AND DISCUSSION

Reducing the number of pixels which will modified will make the cover image more reliable. So, it is difficult to recognize the modifications by naked eye.

In this technique a watermark is to be hidden into gray scale image. Some techniques get the image size larger after embedding the text. However, this proposed technique keeps the same image size after embedding process.

CONCLUSION

The modification technique can be enrolled into the blind category because we don't need the original cover

image in extracting process. This technique is characterized by the spatial domain of its processing domain.

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