

Image Steganalysis Based On Color Channels Correlation In Homogeneous Areas In Color Images

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Abstract: Steganography is the art of hiding information. Whereas the goal of steganography is the avoidance of suspicion to hidden messages in other data, steganalysis aims to discover and render useless such covert messages. In this article, we proposed a new method for steganalysis based on the color channels correlation in adjacent pixels while omitting the heterogeneous areas in color images. This method is designed independent of steganography method. The results of our proposed method shows that it has high accuracy in steganalysis. It also does better than well known WS, SP and RS steganalysis methods in low embedding rates.

Keywords: steganography, steganalysis, color channels correlation, homogeneous and heterogeneous areas

1 Introduction

Steganography is the art of hiding information. Despite cryptography that deals with immunizing information content not to be wiretapped, Steganography techniques are used to make messages undercover. Since the main goal of steganography is to communicate securely in a completely undetectable manner, an adversary should not be able to distinguish in any sense between cover-objects (objects not containing any secret message) and stego-objects (objects containing a secret message). In this context, steganalysis refers to the body of techniques that are conceived to distinguish between cover-objects and stego-objects [1],[2].

Digital images have high degree of redundancy in representation and pervasive applications in daily life, thus appealing for hiding data. As a result, the past decade has seen growing interests in researches on image steganography and image steganalysis. Some of the earliest work in this regard was reported by Johnson and Jajodia [3],[4]. They mainly look at palette tables in GIF images and anomalies caused there in by common stego-tools. A more principled approach to LSB steganalysis was presented in [5] by Westfeld and Pfitzmann. They identify Pairs of Values (PoVs),

which consist of pixel values that get mapped to one another on LSB flipping. Fridrich, Du and Long [6] define pixels that are close in color intensity to be a difference of not more than one count in any of the three color planes. They then show that the ratio of close colors to the total number of unique colors increases significantly when a new message of a selected length is embedded in a cover image as opposed to when the same message is embedded in a stego-image. A more sophisticated technique that provides remarkable detection accuracy for LSB embedding, even for short messages, was presented by Fridrich et al. in [7] and called RS method. Moreover; the other different methods of steganalysis such as WS [8] by Fridrich and M. Goljan and sample pair(sp) [9] by Dumitrescu, Xiaolin and Wang have been presented.

The most of recent steganalysis methods in color image are based on some independent process in each color channels. In this article, we proposed a new steganalysis method for detection stego-image, while we focused on existence correlation between color channels in homogeneous areas in color images.

This paper is structured as follows. In Section 2, we will introduce the principle and basic of proposed

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