Color Component Selection for Best Construction of Stego Images Using Wavelets

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Abstract— **Digital images are considered as one of several mediums which are used recently as unremarkable cover for hiding communication. This is known in literature as steganography. Images which contain hidden data and used as covers are known as stego images. In this research, we are using color images as stego images and by the means of the wavelet transform we find out the best selection of color component that produces the best image quality. Specifically, RGB-color images are used and each color component of the image is sliced into 8-bit planes. The message to be hided is represented as a binary bit stream and it is replaced in one of the 8-bit planes in the place of the original image's bits in order to decrease the ability of eavesdroppers to distinct the hidden information from the original image data. The image is then reconstructed using the 8-bit planes that contain the hidden information to form one stego image. This formed stego image is then analyzed using wavelet transform in order to measure the ability of the system to conserve the hidden contents.**

I. INTRODUCTION

Information hiding techniques have used recently and have received quite a bit of concern. Techniques for information hiding have become increasingly more sophisticated, widespread, and utilized in many fields. With the use of diversity and high quality mediums as carriers, detecting hidden messages has become considerably more difficult and complicated.

Steganography refers to the art and science of hiding communication among parties. It is different from cryptography, where a message is encoded using encryption or coding techniques and it is known a message is there but cannot understand it. The goal in the case of cryptography is to make the content of the communications inaccessible except to the intended parties. Eavesdroppers in this case know that a communication is taking place, while in the case of steganography they do not know about the communication.

A steganographic system thus embeds hidden information in a cover media, such as images, audio files, video clips, text files, or network packets, so as not to draw attention for the existence of the hidden content, in other words, the message's data becomes undetectable from the containing medium. The process in a steganographic system essentially starts by identifying a cover medium's redundant bits (those that can be modified without destroying that medium integrity) [1], [2]. The embedding process creates a stego medium by replacing these redundant bits with data from a hidden message [2].

Research community in this area has focused on existing steganographic systems and has presented recent research in detecting steganography via statistical steganalysis [2]-[4], or analysis using wavelet transform [5]. Other surveys focus on the general usage of information hiding or demonstrate an overview of detection algorithms[6], [7]. Another research demonstrated a hiding scheme for color images [8].

Information hiding techniques have recently become important and have appears in a number of applications. As an example of the application of information hiding, military communication systems make increasing use of traffic security techniques which, rather than merely concealing he content of a message using encryption, seek to conceal its sender, its receiver or its very existence [6]. Similar techniques are used in some mobile phone systems and schemes proposed for digital elections [6]. Criminals try to use whatever traffic security properties are provided intentionally or otherwise in the available communications systems, and police try to restrict their use. There are also other applications and utilizations for information hiding in which it can be used [6].

In this paper, we examined a set of color images constructed as stego images at different color components using a wavelet-based model. The wavelet transform is used to compute the wavelet coefficients of the stego color images that contain hidden information. The effect of the embedded information on the wavelet coefficients is studied and analyzed. Hidden message detection is searched and investigated under numerous circumstances. Several measures are used and worked out in the analysis of the stego color images