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A Randomized Hiding Technique in Skin tone based Images

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ABSTRACT

Skin tone based steganography refers to a steganography technique where the secret information is inserted in the skin tone area of images. Skin tone area of an image provides an excellent place for data hiding. In traditional image steganography, a user can insert covert information anywhere in a picture, while in biometric-based steganography skin tone area is chosen as the biometric highlight. To apply skin tone based steganography we select the skin tone zone in digital images that it gives an incredible zone to concealing data. In this work, a DWT based image steganography technique is suggested that conceals information in the discrete wavelet coefficients of blocks that are selected arbitrarily. In the proposed approach, two ideas are incorporated. Initially, the skin region is partitioned into blocks and secret information is embedded on arbitrarily picked blocks to oppose steganalysis. Second, the inserting limit is expanded by concealing several secret images and text in various blocks at the same time. The proposed approach is tested by placing secret images and text within twenty different skin tone cover images. The experimental findings indicate that in terms of imperceptibility and quality measures, the system developed offers remarkable improvements to prevailing works.

Key words: Blocking, DWT steganography, Randomized hiding, Skin tone region, Skin tone detection.

1. INTRODUCTION

Steganography, also known as covered writing, is the practice of covert communication so that it is not possible to detect the presence of a message [1]. The steganography technique aims to hide a secret message or file in a carrier file such that it can be later retrieved by the intended recipient and no one else can see the secret communication between the two parties [2]. With the increase in usage of Internet and digital media, new techniques have been developed to communicate secretly between parties. In recent years, there exists a threat that terrorist groups can communicate using these techniques to hide data.

Section 2 covers the related works done in DWT based steganography. Section 3 describes the proposed randomized steganography model. Section 4 presents the experiment results and their analysis. Finally, conclusion is given in Section 5.

2. RELATED WORKS

Steganography is an area where active research is carried out for the past few decades. Various steganography methods have been developed to hide data in a cover medium and transmit it securely. These methods can be realized either in spatial domain or in transform domain. Least Significant Bit (LSB), in which information is covertly placed in LSB of the image pixels, is the most well-known steganography technique in the spatial domain and many works are published in this field. The drawback of this method is that it is easily detectable and no robust to statistical attacks. In transform domain, the data hiding methods are based on Discrete Cosine Transform, Discrete Wavelet Transforms etc.

Abbas Cheddad et.al [4] [5] developed a novel color space method for skin tone detection in which clusters of human skin were well classified with carefully selected borders. The encrypted data was embedded in the cover image by an object oriented embedding procedure. In [7] [8], Anjali et. al proposed a method using wavelet transform in which data to be hidden is embedded in skin region of images. The skin region was detected using HSV color space and data was embedded in two ways, with cropping and without cropping of skin part. It was concluded that both methods provide security. In [9] [10] [11], the authors implemented a method in which the skin detection was performed on the input image using HSV color space. Next, from the cover image, the skin region is cropped and is transformed into frequency domain using Haar-wavelet transform. In one of the high frequency bands, the secret information is incorporated. Since the embedding is done only on a selected region of the image, it provides security. Swathi Kumaravar proposed a method using DWT and LSB matching algorithm. The author has performed skin detection using HSV color space and then the cropped image is converted into frequency domain using 2D DWT. Then LSB matching method is used to insert the covert image into the cropped image. In addition, optimum