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Adaptive Image Steganography based on Transform Domain via Genetic Algorithm

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Abstract: This paper presents a novel approach for data hiding in frequency domain with the use of genetic algorithm. At first, cover images are mapped to a proper frequency domain using the concepts of adaptive wavelet transform and genetic algorithm. In the obtained space, using a model based on Kieu and Chang, encrypted information will be embedded in the frequency coefficients that represent edges of the image in spatial domain. So the cover image will change the least and have the most compatibility with human visual system. Simulation results show that our proposed method outperforms recently published works in terms of PSNR and PSPNR factors.

Keywords : Steganography, Genetic algorithm, adaptive wavelet transform, PSNR,PSPNR

I. INTRODUCTION

With the rapid increase of internet users and their joint use of public communication channels for transmitting digital data, data security has become an inseparable part of networks. To ensure data safety, various software level encryption methods such as DES [1] or RSA [2] can be used to transfer information in shared channels. Also there are some optical methods which encrypt images in a way that it will not be easy to retrieve original image without keys [3-5]. Nature of cryptographic algorithms which make information incomprehensible to unauthorized receptors may make some attackers more curious to get activated and break the encryption keys. If Attackers cannot retrieve the original information they may manipulate transmitted stream bits so authorized receivers cannot retrieve original secret information neither. Therefore, more intelligent data hiding methods such as steganography and watermarking have emerged in the field of data transmission in order to ensure data security. Steganography and watermarking algorithms have almost similar structures but totally different aims. In these approaches, secret information are hidden in a cover such as audio, video or image in a way that the attacker who is monitoring cover

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