A LSB STEGANOGRAPHY APPROACH AGAINST PIXELS SAMPLE PAIRS STEGANALYSIS

XIANGYANG LUO, FENLIN LIU
Zhengzhou Information Science and Technology Institute
Zhengzhou 450002, P. R. China
xiangyangluo@126.com; liufenlin@vip.sina.com

PEIZHONG LU
Department of Computer Science and Engineering
Fudan University
Shanghai 200433, P. R. China
pzlu@fudan.edu.cn

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Abstract. Through dynamic compensation of pixel values of the LSB (Least Significant Bit) embedded image, this paper presents a novel LSB information hiding method against pixels Sample Pairs Steganalysis (SPA), a powerful steganalysis method proposed by Dumitrescu et al. with high precision. This approach embeds messages in the LSB plane of the carrier image randomly via a chaotic system, then makes a dynamic compensation on the stego-image. Even when the embedding ratio is near 100%, such dynamic compensation can lead SPA steganalysis to an incorrect judgment review because of getting a very small estimate value close to 0. Moreover, the initial value of the chaotic system and the selection parameters of the compensation can be used to improve the security of steganography approach. Experimental results show that this method can also resist some others steganalysis methods, such as RS analysis, DIH method, and various improved versions of SPA and RS steganalysis.

Keywords: Steganography, LSB embedding, Sample pairs steganalysis, Chaotic system, Dynamic compensation

1. Introduction. Steganography is one of the important research subjects in the field of information security. It enables secret communication by embedding messages in the texts, images, audio, video files or other digital carriers. Among all the image information hiding methods, LSB embedding is widely used for its high hiding capacity, and simpleness to realize. Many public steganographical softwares, such as S-Tools, EZStego and Steganos apply this technique. Therefore, it’s with great significance to detect the images with hidden messages produced by LSB embedding effectively, accurately and reliably. And many experts made efforts on the LSB steganography and steganalysis research over the years.

Fridrich et al. [1] developed a steganalysis method for detection of LSB embedding in 24-bit color images (the Raw Quick Pairs –RQP method), which is based on analysis of close pairs of colors created by LSB embedding. It works reasonably well as long as the number of unique colors in the cover image is less than 30% of the number of pixels. The