Rapid Detection of Stego Images Based on Identifiable Features

Weiwei Pang**, Xiangyang Luo***, Jie Ren***, Chunfang Yang*** and Fenlin Liu***

**State Key Laboratory of Mathematical Engineering and Advanced Computing, Zhengzhou 450001, China;
***Zhengzhou Science and Technology Institute, Zhengzhou 450001, China;
****Science and Technology on Information Assurance Laboratory, Beijing 100072, China.
pangweiwei01@126.com, luoxy_ieu@sina.com, renjie@vip.126.com, chunfangyang@126.com, liufenlin@vip.sina.com

Abstract—An increasing number of images in the Internet brings forward a higher requirement on the speed of steganalysis. For the problem of real-time detection of stego images, a rapid images steganalysis method based on identifiable features is proposed, where the identifiable features are specific character sequences left in stego images by steganography tools. The stego and cover images are distinguished according to whether the identifiable features are found in the detected images. Meanwhile, for the case of that multiple identifiable features appeared on the same location of an image, the AC (Aho-Corasick) multi-features matching algorithm is applied to improve the detection speed. In experiments, the detection method is used to detect eight steganography tools such as Invisible Secrets, E-Show, BMP Secrets and so on. The results show that the proposed steganalysis method can achieve a nearly perfect detection precision, and the detection speed can be improved significantly comparing with traditional methods (matching bytes one by one).

Keyword—Steganalysis, Identifiable features, Steganography tools, AC algorithm, Stego image detection.

Weiwei Pang was born in Henan Province, China, in 1989. Pang got the B.S. degree from Zhengzhou University, Zhengzhou, China, in 2013. He is currently a M.S candidate in the State Key Laboratory of Mathematical Engineering and Advanced Computing at Zhengzhou Science and Technology Institute. His current research interest is in image steganography and steganalysis technique. In 2009, he became an undergraduate in Zhengzhou University and majored in computer science and technology. In 2013 he got the B.S. degree and became a M.S candidate in the State Key Laboratory of Mathematical Engineering and Advanced Computing at Zhengzhou Science and Technology Institute. His current research interest include image steganography and steganalysis technique, focus on steganalysis of steganography tools.

Xiangyang Luo was born in Hubei Province, China, 1978. Luo received the B.S. degree, the M.S. degree and the Ph.D. degree from Zhengzhou Science and Technology Institute, Zhengzhou, China, in 2001, 2004 and 2010, respectively. He is now a researcher at Science and Technology on Information Assurance Laboratory. He is the author or co-author of more than 70 refereed international journal and conference papers. He is also a guest editor for “International Journal of Internet” and “Multimedia Tools and Applications”. His current research interests include Networking and Information Security.

Jie Ren was born in Anhui Province, China, 1977. He received the B.S.and M.S degrees from the Zhengzhou Science and Technology Institute in 1999 and 2007, respectively. Currently, he is now a researcher at Science and Technology on Information Assurance Laboratory. His current research interest is Information Security.
Chunfang Yang was born in Fujian Province, China, 1983. He received the B.S., M.S., and Ph.D. degrees from the Zhengzhou Science and Technology Institute in 2005, 2008, and 2012, respectively. Currently, he is now a researcher at Science and Technology on Information Assurance Laboratory. His current research interests include image steganography and steganalysis technique.

Fenlin Liu was born in Jiangsu Province, China, 1964. He received his B.S. from Zhengzhou Institute of Science and Technology in 1986, M.S. from Harbin Institute of Technology in 1992, and Ph.D. from the Eastnorth University in 1998. Now, he is a professor of Zhengzhou Institute of Science and Technology. His current research interests include Networking and Information Security.