

一种基于湿纸编码和图匹配理论的直方图保持隐写算法

刘九芬* 韩涛 张卫明 陈嘉勇*

信息工程大学信息工程学院 郑州 450002

A Histogram-preserving Steganography Based on Wet Paper Coding and Graphic Matching Theory

Liu Jiu-fen Han Tao Zhang Wei-ming Chen Jia-yong*

Institute of Information Engineering, Information Engineering University, Zhengzhou 450002, China

摘要

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摘要 该文结合隐写码、湿纸码和图匹配理论提出一种具有高嵌入效率的且可保持载体图像一阶直方图的双层嵌入隐写算法。首先构造出一条新的四进制的隐写信道，然后在该信道的LSB(Least Significant Bit)层和次LSB层分别使用二元隐写码和湿纸码嵌入秘密消息，这样即可确定出需要修改的元素，接着构造出一个图，最后使用图论中匹配算法寻找一种减小失真且保持直方图的修改方式。性能分析和实验结果表明：在嵌入相同长度秘密消息的情况下，新算法的PSNR、嵌入效率和保持一阶直方图效果均优于隐写软件Steghide。

关键词： 隐写术 隐写码 湿纸码 图匹配理论 嵌入效率

Abstract: This paper presents a novel double-layered embedding steganographic algorithm based on steganographic codes, wet paper codes and graphic matching theory, which can achieve high embedding efficiency and preserve the first-order histogram of the cover image. At first, a new 4-ary steganographic channel is constructed. Then the secret message is embedded in the LSB (Least Significant Bit) layer of this channel using binary steganographic codes and in the second LSB layer using wet paper codes, and the elements that need to be changed, are obtained. Afterwards, a graph is constructed. Then a changing manner of the cover image is found to decrease the distortion and preserve the histogram, using the matching algorithm in graph theory. The performance analysis and experimental results show that PSNR, the embedding efficiency and the ability to preserve the first-order histogram of the proposed algorithm are better than the steganographic software Steghide, when the same amount of secret message is embedded.

Keywords: Steganography Steganographic codes Wet paper codes Graphic matching theory Embedding efficiency

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通讯作者: 刘九芬 Email: jiufenliu@163.com

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