

基于动态失真补偿量化索引调制的可逆数据隐藏算法

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A Reversible Data Hiding Algorithm Based on Dynamic Distortion-Compensated Quantization Index Modulation

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摘要 不同于传统的失真补偿量化索引调制, 该文提出了动态失真补偿量化索引调制的概念。两者的区别在于量化步长和失真补偿参数是否可变。首先推导出动态失真补偿量化索引调制可逆性的成立条件, 然后推导出失真补偿参数的可允许范围, 最后利用可逆性设计一个具体的可逆数据隐藏算法。在只执行一遍时, 它的数据隐藏率高达1 bit每像素, 高于其他可逆数据隐藏算法。另外, 算法的动态特性有利于防止参数泄露。实验结果表明: 不管初始条件如何, 该算法既能正确解码出秘密信息, 又能准确恢复原始载体。

关键词: 信息隐藏 动态失真补偿量化索引调制 可逆数据隐藏 数据隐藏率

Abstract: The concept of dynamic Distortion-Compensated Quantization Index Modulation (dynamic DC-QIM) is proposed, which differs from the conventional DC-QIM in whether or not quantization step size and DC parameter are changeable. Firstly, the condition satisfying the reversibility of dynamic DC-QIM is deduced. Then, the allowable range of DC parameter is derived. Finally, the procedure of reversible data hiding algorithm based on dynamic DC-QIM is designed. Its data hiding rate can achieve as high as 1bpp in a single iteration, higher than its former counterparts. Furthermore, the use of dynamic characteristic is in favor of preventing its parameters from being disclosed. Experimental results show that it not only accurately decodes the secret information, but also perfectly restores the original cover, regardless of initial conditions.

Keywords: Information hiding Dynamic Distortion-Compensated Quantization Index Modulation (dynamic DC-QIM) Reversible data hiding Data hiding rate

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