基于混沌和块能量关系的稳健零水印算法

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摘　要：为了解决传统稳健水印透明性和稳健性之间的矛盾，提出一种基于分块能量与载体图像平均能量之间大小关系的稳健零水印算法.首先，设计了带参数的 Logistic 映射、混沌加密和置乱算法来对原始版权图像进行预处理；其次，在空域直接对原始载体图像进行互不重叠的分块，通过计算整幅图像和各个分块平均能量间的大小关系来构造特征信号；最后，采用混沌加密和混沌置乱后的版权图像与特征信号进行异或运算来生成零水印信号.大量的仿真实验结果表明，该算法对常规的噪声、滤波、JPEG 压缩、旋转和缩放等攻击都具有较好的稳健性能，与同类算法相比具有计算复杂度低和稳健性强的特点.

关键词：零水印；混沌；块能量；关系；稳健性

Robust zero-watermarking algorithm based on chaotic and block energy relationship

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Abstract：In order to solve the contradiction of transparency and robustness of traditional robust watermarking, a robust zero-watermarking algorithm based on block energy relationship is proposed. Firstly, the logistics mapping with parameters, chaotic encryption and scrambling algorithm are designed to preprocess the original copyright image. Secondly, the proposed algorithm divides the cover image into blocks, and constructs a characteristic signal by calculating the average energy relationship between the entire image and each block. Finally, the encrypted copyright image and the characteristic signal are conducted XOR operation to generate a zero-watermarking signal. The experimental results show that the proposed algorithm has good robust performance against noise, filtering, JPEG compression, scaling and rotation attacks. Compared with similar algorithms, it has low computational complexity and strong robustness.

Key words：zero-watermarking; chaos; block energy; relationship; robustness

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