

基于约束随机分块的NMF图像哈希算法

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NMF-Based Image Hashing Algorithm Using Restricted Random Blocking

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摘要

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摘要 基于非负矩阵分解(Non-negative Matrix Factorization, NMF)的图像哈希(image hashing)算法对图像有损压缩, 低通滤波、尺度拉伸等处理具有很好的稳健性, 但对图像旋转比较敏感。为此, 该文在对NMF哈希算法的分块模式进行深入研究的基础上, 提出一种可抗旋转攻击的NMF图像哈希算法。该方法通过对随机分块的区域进行限制, 并选择合适的分块尺寸来减轻旋转攻击对图像造成的不良影响, 从而提高了特征的旋转稳健性。实验表明, 所提出的图像哈希算法在保持原NMF哈希算法对其它攻击稳健性的同时, 能有效地抵抗旋转攻击。

关键词: 图像处理 图像哈希 非负矩阵分解 稳健性 旋转

Abstract: The NMF (Non-negative Matrix Factorization)-based image hashing is robust to common image operations (such as lossy compression, low-pass filtering, resolution scaling and etc.), but is sensitive to rotation operations. After carefully investigating the blocking strategy of the original NMF-based scheme, a rotation-resilient image hashing algorithm is proposed. The proposed algorithm reduces the undesirable effect induced by image rotation through constraining blocking range and adopting appropriate block size, and thus provides better robustness to image rotation. Experimental results demonstrate that the proposed hashing algorithm provides a satisfactory robustness to image rotation while keeping its performance to common image processing operations.

Keywords: Image processing Image hashing Non-negative Matrix Factorization (NMF) Robustness Rotation

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