

图形、图像、模式识别

基于回归型支持向量机的小波域盲水印算法

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摘要 以回归型支持向量机 (Support Vector Regression, SVR) 理论为基础, 提出了一种新的基于SVR的小波域盲水印算法。算法核心思想是先对图像进行小波分解, 然后利用图像小波分解后的子图系数之间的关系和图像局部相关性获得SVR训练模型, 并利用SVR训练模型在小波域嵌入和提取水印。该算法以保证鲁棒性和透明性的良好平衡为前提, 实现了数字水印的盲检测。仿真实验表明, 该文算法不仅具有较好的透明性, 而且对JPEG压缩和一般的图像处理具有很强的鲁棒性, 其整体性能明显优于现有基于SVM的空间域上的水印算法。

关键词 [数字水印](#) [回归型支持向量机](#) [小波域](#) [盲检测](#) [透明性](#) [鲁棒性](#)

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Blind watermarking algorithm in wavelet domain based on SVR

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Abstract

A new blind image watermarking algorithm based on Support Vector Regression (SVR) is proposed. Firstly, the image is decomposed through wavelet transform. Then the SVR train model can be obtained by applying the relationship between the selected coefficient and its neighboring coefficients and the local correlation of digital image. The watermark is adaptively embedded in wavelet domain and can also be extracted by the well trained SVR model. The proposed scheme can extract the digital watermark without the help of the original digital image. Experimental results show that the proposed method's performance has a good transparency of embedded watermark image and is better than the one based on SVM in spacial domain in the high robustness to the common image processing and JPEG compression.

Key words [digital watermark](#) [Support Vector Regression \(SVR\)](#) [wavelet domain](#) [blind detecting](#) [imperceptibility](#) [robustness](#)

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