

基于加权Boosting的核偏最小二乘图像超分辨率重建

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Image Super-resolution Reconstruction Based on Kernel Partial Least Squares and Weighted Boosting

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摘要 核偏最小二乘(KPLS)算法对每个图像块选用全部主元成分进行图像重建,导致图像超分辨率算法的计算量大。兼顾图像重建质量和时间效率,该文提出一种加权Boosting的图像超分辨率重建算法。为自适应地选取每个图像块主元成分的最佳数目,利用加权Boosting原理对KPLS回归预测量进行补偿,推导出补偿权重系数的数学表达式。讨论不同Boosting阈值 δ 情况下的重建性能,在合适 δ 的下,选取出主元成分的最佳数目 m 更好地满足KPLS回归模型的精度要求。实验结果表明,该文算法的超分辨率重建质量优于传统算法。

关键词: 图像超分辨率重建 加权Boosting 核偏最小二乘(KPLS) Boosting阈值 主元成分

Abstract: The Kernel Partial Least Squares (KPLS) method has a large calculation since it uses all the principal components for each image block. To consider reconstruction quality and time efficiency, a weighted Boosting based algorithm is proposed in this paper. To choose adaptively the best number of principal components for each image block, the estimator in KPLS prediction model is performed for compensation. The weight coefficient expression of compensation is deduced. The reconstruction effects in different Boosting threshold are discussed. With an appropriate threshold, the chosen best number of principal components can better satisfy KPLS regression model accuracy. Experimental results demonstrate that the proposed method outperforms the conventional methods in super-resolution reconstructed quality.

Keywords: Image super-resolution reconstruction Weighted Boosting Kernel Partial Least Squares (KPLS) Boosting threshold Principal component

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