基于稀疏表示的图像超分辨率重建算法设计

石翠萍，王　晴

（齐齐哈尔大学 通信与电子工程学院，黑龙江 齐齐哈尔 161000）

摘　要：为解决一般重建方法效果欠佳的问题，使重建后的图像具有良好的清晰度，本文依据稀疏表示原理等内容，设计了一种新的超分辨率重建算法，实现了超分辨率最优解问题.对一幅低分辨率图像，分割后进行特征提取，得到的图像特征块可在字典的低分辨率部分生成一组权重系数.在字典的高分辨率部分，用高分辨率特征块乘以所得系数，可以重新构造出高分辨率图像块，并将它们组合起来得到一幅完备的高分辨率图像.实验结果表明，与双三次插值方法相比，本文算法重构的高分辨率图像具有更好的质量.

关键词： 超分辨率重建；稀疏表示；字典学习；图像

Design of image super-resolution reconstruction algorithm based on sparse representation

SHI Cui-ping， WANG Qing

（College of Communication and Electronic Engineering，Qiqihar university，Qiqihar，151006，China)

Abstract：In order to solve the problem of high complexity and poor reconstruction effect of traditional reconstruction methods and make the super-resolution reconstruction images have good clarity， a new super-resolution reconstruction algorithm based on learning is studied based on sparse representation principle. The super-resolution optimal solution is realized. By inputting a low-resolution image， the corresponding image feature block can be obtained by bicubic interpolation. A set of sparse representation coefficients can be obtained in the low resolution part of the dictionary (DL). According to the set of sparse representation coefficients，the high resolution image blocks are reconstructed by reverse projection on the high resolution dictionary (Dh)， and the complete high resolution images are obtained by combining them together. The simulation results show that compared with the bicubic interpolation method，the reconstructed image of this algorithm has better quality.

Key words： super resolution reconstruction; sparse representation; dictionary learning;image