

# 基于字典矩阵更新与最优相似度搜索的图像重构算法

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**摘要:** 提出了基于字典矩阵更新与最优相似度搜索的图像重构算法.通过分析图像信号的稀疏表示, 确定出目标信号与字典矩阵及系数向量的关系, 并定义相似度搜索机制, 以生成图像信息的字典矩阵; 通过估算相似度的线性组合最大值, 在字典矩阵选取最优原子, 从而确定其最优系数向量; 基于最优系数向量, 计算纹理相似度, 更新字典矩阵中的每一个原子, 生成新的字典矩阵; 最后, 对新的字典矩阵中的元素进行稀疏线性组合, 对重构像素块进行拟合, 通过最大化相似度值, 获得目标块的重构, 完成图像复原.实验结果显示: 在对大面积损坏图像重构时, 此算法具有更好的重构质量, 其输出图像的结构相似度更高, 有效消除了模糊效应及纹理不连续效应, 且拥有较高的重构效率.

**关键词:** 图像重构; 字典矩阵; 系数向量; 稀疏表示; 相似度搜索

## Image Reconstruction Algorithm Based on Dictionary

### Update and Optimal Similarity Search

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**Abstract:** An image inpainting algorithm based on dictionary update and optimal similarity search was proposed in this paper. by analysis sparse representation of signals, to find the relationship between the target signal and the dictionary matrix and the coefficient vector, define SSIM index used to generate a dictionary matrix; then, the maximum value of linear combination approximation based on SSIM index is calculated, used to select the optimal atom in dictionary matrix, and calculate the optimal coefficient vector, use the optimal coefficient vector calculate the sum of the SSIM index to becomes the highest, and update each atom in dictionary matrix, to generate a new dictionary matrix; finally, the target patch is approximated by a sparse linear combination of the atoms of the new dictionary matrix using, introduce the SSIM index as the approximation performance, the optimal reconstruction results maximizing the SSIM index can be obtained, to complete the image inpainting. The experiment results showed that: this algorithm had better visual effect and structural similarity, reduce the blurring effect, and overcome the discontinuous texture effect in inpainting of images with large area damaged image.

**Key words:** image reconstruction; dictionary matrix; coefficient vector; sparse representation; similarity search

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