

## 基于提升Directionlet变换的零块嵌入图像编码算法

白静, 吴家骥, 卢山, 焦李成

1. 西安电子科技大学智能感知与图像理解教育部重点实验室 西安 710071

收稿日期 2009-4-1 修回日期 2010-5-20 网络版发布日期 接受日期

### 摘要

提出一种新的基于提升Directionlet变换的图像压缩算法, 能有效捕捉图像中的多方向各向异性特征, 并具备格形可分离的滤波和采样结构. 利用二叉树分块寻找局部最优的变换方向, 针对Directionlet变换系数分布构造了块集合分裂嵌入编码, 并通过改进链表排序方式和设计新的上下文算术编码器, 进一步提高压缩性能. 仿真实验结果表明, 与基于原始Directionlet变换的压缩算法和基于小波变换的SPECK, SPIHT, JPEG 2000等经典算法相比, 本文算法在性能参数和视觉效果方面均有较大提高, 且在低比特率下仍能较完整地保留图像中的边缘和细节信息.

**关键词** [Directionlet变换](#) [提升方案](#) [方向优化](#) [图像压缩](#) [零块嵌入编码](#)

分类号

## Zeroblock Embedded Image Coding Algorithm Based on Lifting Directionlet Transform

BAI Jing, WU Jia-Ji, LU Shan, JIAO Li-Cheng

1. Key Laboratory of Intelligent Perception and Image Understanding of Ministry of Education of China, Xidian University, Xi'an 710071

### Abstract

A new image compression algorithm based on lifting directionlet transform (LDT) is proposed. This transform captures the multi-directional anisotropic image features efficiently and processes the structure of lattice-based separable filtering and sampling. The quad-tree segmentation is designed for direction optimization of local region, and a set-partitioned embedded block algorithm for the statistic distribution property of transform coefficients is adopted. The coding performance is improved by designing the new chained list sorting and context-based arithmetic coder. The experimental results show that our proposed compression algorithm outperforms the standard wavelet-based SPECK, SPIHT, JPEG, 2000 and original directionlet-based methods both in terms of peak signal to noise ratio (PSNR) and visual quality. Especially at the low-rate, our algorithm can preserve better the detailed information.

**Key words** [Directionlet transform](#) [lift scheme](#) [direction optimization](#) [image compression](#) [zeroblock embedded coding](#)

DOI: 10.3724/SP.J.1004.2011.00283

**通讯作者** 白静 [baijing@mail.xidian.edu.cn](mailto:baijing@mail.xidian.edu.cn)

**作者个人主页** 白静; 吴家骥; 卢山; 焦李成

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF](#) (2102KB)
- ▶ [\[HTML全文\]](#) (0KB)
- ▶ [参考文献\[PDF\]](#)

#### 参考文献

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)

#### Email Alert

#### 相关信息

- ▶ [本刊中 包含“Directionlet变换”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [白静](#)
- [吴家骥](#)
- [卢山](#)
- [焦李成](#)