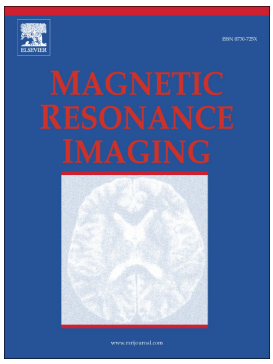

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Content-Aware Compressive Magnetic Resonance Image Reconstruction

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Abstract

This paper describes an adaptive approach to regularizing model-based reconstructions in magnetic resonance imaging to account for local structure or image content. In conjunction with common models like wavelet and total variation sparsity, this content-aware regularization avoids oversmoothing or compromising image features while suppressing noise and incoherent aliasing from accelerated imaging. To evaluate this regularization approach, the experiments reconstruct images from single- and multi-channel, Cartesian and non-Cartesian, brain and cardiac data. These reconstructions combine common analysis-form regularizers and autocalibrating parallel imaging (when applicable). In most cases, the results show widespread improvement in structural similarity and peak-signal-to-error ratio relative to the fully sampled images. These results suggest that this content-aware regularization can preserve local image structures such as edges while providing denoising power superior to sparsity-promoting or sparsity-reweighted regularization.

Keywords: magnetic resonance imaging; image reconstruction; compressed sensing

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