

LiveTV: Real-time Total Variation Regularization Using Haar Wavelets

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Haar tensor wavelet analysis enables sparse representation of locally constant data. This can be exploited when compressing very large computed tomography (CT) scans: Even when keeping just a small percentage of the original wavelet coefficients, high image quality is preserved.

Now, for multi-dimensional data, we consider only coefficients created by applying one wavelet and one or two scaling functions for the two-dimensional or three-dimensional case, respectively. Properly weighted, this provides us with local gradient estimates. Moreover, thresholding these particular coefficients can at the same time approximately reduce the total variation (TV) norm. Finally, we present results for two-dimensional image data and three-dimensional CT data.

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