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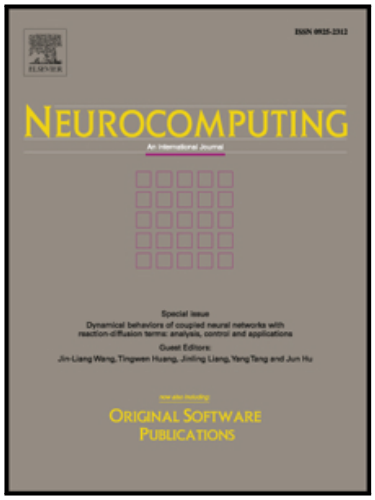

Feature-Preserving Ultrasound Speckle Reduction via L_0 Minimization (revised version)

Lei Zhu, Weiming Wang, Xiaomeng Li, Qiong Wang, Jing Qin, Kin-Hong Wong, Kup-Sze Choi, Chi-Wing Fu, Pheng-Ann Heng

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Highlights

- We present a sparsity prior for speckle reduction of ultrasound image based on the observation that the GAP values in the despeckled image is sparser than that in the speckled image.
- We propose a norm regularized global optimization framework to seek for the GAP sparsity. During the pursuit of the sparsity, the proposed minimization can eliminate speckle noise in ultrasound images and better preserve features than previous despeckling techniques.
- We propose an efficient and robust solver to minimize the proposed objective function by first splitting the intractable problem into tractable sub-problems with half-quadratic splitting method, followed by the decomposition of the non-convex sub-problem into linear systems using iteratively re-weighted least squares.

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