

Image Reconstruction Method Based on L0 Norm

Authors : Jianhong Xiang, Hao Xiang, Linyu Wang

Abstract : Compressed sensing (CS) has a wide range of applications in sparse signal reconstruction. Aiming at the problems of low recovery accuracy and long reconstruction time of existing reconstruction algorithms in medical imaging, this paper proposes a corrected smoothing L0 algorithm based on compressed sensing (CSL0). First, an approximate hyperbolic tangent function (AHTF) that is more similar to the L0 norm is proposed to approximate the L0 norm. Secondly, in view of the "sawtooth phenomenon" in the steepest descent method and the problem of sensitivity to the initial value selection in the modified Newton method, the use of the steepest descent method and the modified Newton method are jointly optimized to improve the reconstruction accuracy. Finally, the CSL0 algorithm is simulated on various images. The results show that the algorithm proposed in this paper improves the reconstruction accuracy of the test image by 0-0.98dB.

Keywords : smoothed L0, compressed sensing, image processing, sparse reconstruction

Conference Title : ICICCP 2023 : International Conference on Intelligent Computer Communication and Processing

Conference Location : Istanbul, Türkiye

Conference Dates : April 24-25, 2023