

论文

基于自动筛选的POLARSAR图像快速相干斑抑制算法

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摘要:

针对现有POLARSAR图像相干斑抑制算法存在的问题, 本文提出了一种基于像素筛选的快速类多视平均相干斑抑制新算法。该算法以一个矩形滑动窗对POLARSAR图像进行逐点扫描, 对每一个当前测试像素, 首先判断它是否为点、线目标, 若是则直接进入下一个测试像素; 其次, 若不是, 则对当前滑动窗内像素进行筛选; 最后, 利用筛选出的与当前测试像素的主散射机制相同的均匀区像素来对当前测试像素进行LLMMS滤波。由于该算法基于最大似然(ML)纹理筛选均匀区像素, 降低了相干斑噪声的影响; 采用目标散射相似性对均匀区像素进行散射机制鉴别, 保持了目标主散射机制。理论分析和实测数据的实验结果均验证了本文算法在兼顾算法运算效率、相干斑抑制效果和边缘纹理、小线目标、目标主散射机制等目标信息保持方面的有效性。

关键词: POLARSAR图像 相干斑抑制 散射相似性

A Fast Speckle Filtering Based on Automatic Censoring for POLARSAR Image

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Abstract:

A fast algorithm based on the automatic censoring is proposed to filter the speckle in POLARSAR image. Firstly, a rectangle widow is sliding through each pixel of POLARSAR imagery. For each current pixel, a global threshold is used to determine whether the current pixel is a point target. If not, then the homogeneous pixels of the same main scattering mechanism with this current pixel are censored automatically in the current sliding-window. Finally, the locally linear minimum mean-squared error (LLMMSE) estimator is used to filter this pixel with the selected pixels. The selection of homogeneous pixels based on the ML texture reduces the effect of speckle; the selection of the same main scattering mechanism pixels based on scattering similarity preserves the main scattering mechanism. The experiment results of a typically actual POLARSAR scene and theoretical analysis show that the proposed algorithm has the well theoretical and actual performance in speckle filtering, texture preservation and target main scattering preservation.

Keywords: Polarimetric SAR imagery, Speckle filtering, target scattering similarity

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