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论文与技术报告

一种针对多通道GMTI的SAR复图像精确配准方法

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摘要：

提出了一种针对多通道GMTI的SAR复图像精确配准算法。首先，系统分析了配准误差对干涉相位的影响，推导出了对应配准误差的干涉相位Cramer-Rao界，并利用Monte Carlo仿真数据对配准误差的影响进行了量化。在此基础上，通过对待配准图像进行二维精确插值处理，生成模板图像库和相应的相关系数库，以适合多通道GMTI的复图像的相位相关为准则，找出模板图像库和相关系数库中与参考图像具有最大相位相关值的图像作为配准图像，从而实现多通道SAR复图像之间的精确配准。对基于所提算法的实测三通道SAR复图像进行慢动目标检测实验，结果表明所提算法能够提供多通道GMTI所需要的配准精度，证明了该算法的有效性和实用性。

关键词： 合成孔径雷达； 地面动目标指示； 复图像； 配准

A Novel Complex SAR Image Registration Method Aiming at Multi-channel GMTI

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Abstract:

The paper proposes a novel complex SAR image registration method aiming at multi-channel GMTI. Firstly, the influence of registration error to the interferometric phase is systemically discussed, which include deducing the Cramer-Rao bound corresponding to interferometric phase’s standard deviation and utilizing the Monte Carlo simulation data to quantify the registration error. Based on that, according to the processing of two-dimensional interpolations to the input image, the database of template images and correlation coefficients are obtained. Adopting the phase correlation of complex images as the matching criterion, which is agreement with multi-channel GMTI, and finding the image contained in the template database with the maximum value of phase correlation as the registration image, then the precise registration among the multi-channel complex SAR images can be accomplished. By the experiments performed on three-channel real complex SAR images, almost all the moving targets are successfully detected based on the proposed registration method, which proves that the proposed method can provide the needed registration precision for multi-channel GMTI and confirms the effectiveness and practicality of the method.

Keywords: Synthetic Aperture Radar (SAR) Ground Moving Target Indication (GMTI) Complex Images Registration

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