EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Data Management Systems (4)

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A SUB-PIXEL SAR AND OPTICAL IMAGE REGISTRATION METHOD

Abstract

Automatic method of image registration is always important because the amount of data acquired and processed is increasingly heavy. For SAR and optical sensor images, it is important to conquer the difference between multi sensors for image registration. Considering the difficult task of extracting and matching features in SAR and optical images, a template match strategy is used in this paper. A similarity measurement might be difficult to develop and implement which is robust in all usual sceneries covered in remote sensing images. High pixel-resolution image is an invertible and essential tendency nowadays in the field of remote sensing, for it can offer more information about the observed ground. Thus sub-pixel image registration methods have been researched, and many methods can achieve 1/50 pixel accuracy successfully in matching single-sensor images. In this paper, we have investigated the performance of 2D Gaussian fitting for low correlated synthetic images, and real satellite images acquired by RadatSAT-2, COSMO and TerraSAR-X satellites in Section 2. Considering the low correlated coefficient and corrupted shape of neighborhood around the peak, three algorithms for sub-pixel locating have been utilized. The results shows 2D Gaussian fitting is efficient despite the terrible situation of coefficient maps. Then, we proposed a sub-pixel image registration method for SAR and optical images. We use NGC algorithm to solve the problem of different intensity property at first, and combine 2D Gaussian fitting to relocate matched points at a sub-pixel level. Experiment results have shown that proposed method has enough capabilities of handling the difference between images from different sensors. Considering computation load, the proposed approach has been found to be simple and efficient in implementation. And the most important, the results presented here have achieved pixel accuracy under 1pixels.