

摘要: 针对多源遥感影像之间灰度值非线性变化导致特征点匹配率大幅度下降的问题, 提出了一种利用光谱信息的多源遥感影像特征点匹配算法。首先, 以光谱信息对遥感影像波段进行线性拟合, 使得匹配影像与参考影像之间的灰度值由非线性转变为线性或者近似线性变化。接着, 在拟合的遥感影像上采用改进的尺度不变特征变换(SIFT)算法进行匹配。最后, 采用随机抽样一致性算法剔除误匹配点对。与常用特征点检测算法(SIFT, 梯度位置朝向直方图(GLOH), RS-SIFT)的对比实验结果表明, 本文所用的ETM+影像全色与多光谱影像的特征点匹配率提高了4%左右, CBERS-02B和HJ-1B卫星多光谱影像的正确特征点匹配个数增加了8对。因此, 在多源遥感影像特征点匹配中, 本文所提算法优于其它检测算法, 可以极大地改善匹配效果。

关键词: 图像处理 特征点匹配 尺度不变特征变换(SIFT) 多源遥感影像 多光谱

SIFT feature matching algorithm of multi-source remote image

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Abstract: Many traditional feature point algorithms cannot handle more complex nonlinear brightness changes because the gray between multi-source remote sensing images is nonlinear changes. To cover the shortage, a Scale Invariant Feature Transform(SIFT) feature matching algorithm of multi-source remote sensing images was proposed. First, the approximate linear gray value between multi-source remote sensing images was achieved through linear fitting of the bands of the images. Then, an improved SIFT algorithm was adopted to match the fitted remote sensing images. Finally, the random sample Consensus algorithm was used to remove the false matching point pairs. In comparison with other feature matching algorithms (SIFT, Gradient Location Orientation Hologram(GLOH), RS-SIFT). The experimental results show that the feature matching rate increases by about 4% between ETM+ panchromatic and multispectral images and the number of correct matches of key points increases by about 8 point pairs between CBERS-02B and HJ-1B images. It concludes that the proposed method significantly outperforms many state-of-the-art methods under multi-source remote sensing images.

Keywords: Image processing Feature points matching Scale Invariant Feature Transform(SIFT) Multi-spectral Remote Image Multispectra

收稿日期 2012-12-18 修回日期 2013-03-19 网络版发布日期 2013-08-20

基金项目:

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