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遥感影像检索中高维特征的快速匹配

陈慧中*①② 陈永光③ 景宁① 陈荦①*

①(国防科学技术大学电子科学与工程学院 长沙 410073) ②(西南电子电信技术研究所上海分所 上海 200434)
③(军械工程学院 石家庄 050003)

Fast High-dimensional Feature Matching for Retrieving Remote Sensing Images

Chen Hui-zhong①② Chen Yong-guang③ Jing Ning① Chen Luo①*

①(College of Electronic Science and Engineering, National University of Defense Technology, Changsha 410073, China)
②(Shanghai Branch, Southwest Electronic and Telecommunication Research Institution, Shanghai 200434, China)
③(Ordnance Engineering College, Shijiazhuang 050003, China)

摘要 提高特征点匹配效率是将高维局部特征运用于遥感影像检索的关键，该文提出一种新的压缩优先过滤(CPF)索引算法。该算法通过量化特征向量构建近似向量空间上的高维索引结构，利用优先队列过滤得到近似近邻候选集，精确计算候选实际特征向量得到最终近邻。在CPF算法基础上提出了基于快速鲁棒性特征(SURF)的遥感影像快速检索算法。实验及分析表明，与经典的最佳桶优先(BBF)算法相比较，CPF降低了磁盘读写(I/O)和浮点运算次数，特征点数目较大时，查询效率和总体查询精度均有显著提高，基于SURF特征的遥感影像快速检索算法能快速返回正确目标与相似目标影像。

关键词： 遥感影像检索 特征向量匹配 高维k近邻(kNN)查询 最佳桶优先(BBF)算法

Abstract： The key point in applying high-dimensional local features to remote sensing image retrieval is to improve the efficiency of feature matching. A new Compressed Priority Filter (CPF) algorithm is investigated that quantizes the feature vectors to compress the search space, constructs a high-dimensional index, searches candidates via priority queue, and calculates the exact feature vectors to get nearest neighbors. Then, a fast remote sensing image retrieval algorithm based on Speeded Up Robust Feature (SURF) features is proposed based on CPF. It is proved by experiments and via analysis that CPF can reduce disk I/O and float-pointing calculation. When the number of features is big, it is much faster and more precise than the classical BBF algorithm. It is obvious that the fast remote sensing image retrieval algorithm based on SURF can return to the correct related target image from the gallery quickly, together with similar images.

Keywords： Remote sensing image retrieving Feature matching High-dimensional k-Nearest-Neighbor (kNN) search Best-Bin-First (BBF) algorithm

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通讯作者: 陈慧中 Email: chen_huizhong@yahoo.cn

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