短文与研究通讯

基于谱方法和松弛标记的非刚性点匹配算法

夏东, 李吉成, 沈振康

国防科技大学电子科学与工程学院

摘要：

谱方法是点模式匹配中一种重要的方法，但该方法对于点模式中噪声与出格点较为敏感，为克服了传统谱匹配方法存在问题，提出了一种运用谱方法和松弛标记的非刚性点模式匹配算法。该方法首先提取点模式中点的KL特征获取点与点的匹配概率，然后运用松弛标记法得到点集间明确的匹配关系；同时，为保证算法的鲁棒性，给松弛标记法定义一个匹配的目标函数，在函数的优化框架下迭代的计算匹配的最优解。本文主要从三方面对传统谱方法进行了改进:首先运用基于KL的匹配概率计算方法提高了原谱图方法抗噪方面的性能，进而在松弛标记方法框架中运用谱方法进行匹配，使算法对出格点具有更好的鲁棒性，最后融合的运用了点的谱图特征和空间分布特征，使算法在较大形变情况下仍能实现有效匹配。文章实验验证了算法的有效性。

关键词： 点模式匹配　谱匹配　KL特征　松弛标记　非刚性形变

A novel algorithm based on spectral method and relaxation labeling for non-rigid point matching

XIA Dong, LI Ji-Cheng, SHEN Zhen-Kang

Institution of Electronic Science and Technology, National University of Defense Technology

Abstract:

Spectral correspondence finding is an important method for point pattern matching. But it's sensitive to noise and outliers. In order to overcome the traditional spectral correspondence finding method's problem, a new algorithm is proposed for non-rigid point pattern matching by using spectral graph analysis combining with relaxation labeling. The algorithm first compute the matching probability by KL features of the points, then use the relaxation labeling method to get the correspondences between the point sets. At the same time, an objective function on matching is defined for the relaxation labeling method, and the algorithm find the optimal solution for matching under the iterative optimal frame. There are three improvements made to the traditional spectral correspondence finding method in this paper. First, KL correspondence probability method is used to improve the algorithm's ability for standing the noises. Secondly, the spectral method is embedded in the relaxation labeling framework to get the method more robust while outliers appear. Thirdly, two kinds of information are utilized for correspondence finding, namely spectral information, and space distribution information, . These makes the algorithm be able to handle with large deformation.

Keywords: Point pattern matching Spectral correspondence KL feature Relaxation labeling Non rigid deformation

通讯作者:

作者简介:

作者Email: xiadongtsh@sohu.com

参考文献：

本刊中的类似文章

1．赵键 孙即祥 李智勇 陈明生.基于相对形状上下文与概率松弛标记法的点模式匹配算法[J]. 信号处理, 2011,27(5): 664-671