

融合粒子群与拓扑相似性的图像匹配算法研究

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摘要: 针对目前图像匹配中存在的计算量大、效率低等问题,提出了一种结合粒子群与拓扑相似性的图像匹配算法.在该算法中检测特征点,计算两幅图像的轮廓相似度,找出图像特征分布较明显的区域.在轮廓内进行拓扑结构相似度的计算,将图像中的特征使用粒子群算法进行优化,依次迭代,产生一对多或多对多的关系.利用拓扑约束将复杂关系简化为一对一的简单关系.通过与 DPSOHM 的实验对比发现新提出的算法在匹配精度上有了很大的提高,可以有效地解决效率低、误差大的问题,较大减少了错误的匹配点数.

关键词: 粒子群算法; 轮廓相似度; 拓扑相似度; 拓扑约束; 图像匹配

Matching Algorithm of the Image Based on Particle Swarm

Optimization and Topological Similarity

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Abstract: To solve the problem-great amount of calculation and poor efficiency in present image matching, we proposed a new algorithm combined particle swarm and Topological similarity. In this algorithm we test the characteristic points, compute the contour similarity, and then find out the areas where the image characteristic values distribute obviously. Computing the Topological similarity in the image edge, and optimizing the characteristic values with the particle swarm algorithm, until it iterates successively and produce many-one or many-many relationship. Then transform these complex relationships into one-to-one relationship utilizing the Topological constraint. Compared with the experiment of DPSOHM, the Matching precision greatly improves in this algorithm which resolves the poor efficiency and large error, and greatly reduces the error of the matching points.

Key words: particle swarm optimization; contour similarity; topological similarity; topological constraints; image matching

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