应用

基于改进先验形状CV模型的目标分割

韩洲, 李元祥, 周则明, 沈霁

上海交通大学航空航天学院

摘要：

由于空间目标姿态变化较大，且其灰度与地球背景差异较小，传统CV（Chan and Vese）模型难以获得理想的分割结果。针对目标被部分遮挡或部分信息丢失情况下CV模型不能正确识别问题，Chan和Zhu在CV模型基础上引入先验能量项，构建的先验形状模型只具有旋转、缩放和平移不变性。本文提出了一种先验形状约束的变分水平集改进模型，用于分割星空及复杂地球背景下的空间目标。在保持先验形状模型具有旋转、缩放和平移不变性的基础上，本文改进的变分水平集模型增加了X、Y方向拉伸以及剪切不变约束能量项，增强了先验形状对目标变化的自适应性。实验结果表明本文方法对复杂背景下姿态变化较大的空间目标，具有更好的分割效果。

关键词：　图像分割；　水平集；　先验形状；　仿射变换；　变分方法

Object segmentation based on improved prior shape and CV model

HAN Zhou, LI Yuan-Xiang, ZHOU Ze-Ming, SHEN Ji

School of Aeronautics and Astronautic, Shanghai Jiao Tong University

Abstract:

Owing to great attitude variation of spatial objects and little grey difference between objects and spatial background, traditional Chan and Vese model can hardly get desired segmentation result. In order to solve problems that Chan and Vese model can't segment correctly while some essential information is missed partly or some parts of the object are occluded, the integration of prior shape knowledge about the objects in the Chan and Vese model was given by Chan and Zhu. In this paper, a improved variational level set model with prior shape is presented to segment spatial objects under stars or cluttered earth background. The improved variational level set with prior shape constraint not only permits translation, scaling and rotation of the prior shape, but further introduces another two properties (shearing and different scaling of X and Y direction) in the energy functional model, which enhances prior shape's self-adaption towards varying objects. Experimental results demonstrate that our model can achieve good segmentation towards spatial objects with great attitude variation in cluttered background.

Keywords: Image Segmentation　Level Set　Shape Prior　Affine Transformation　Variational Model

通讯作者：

作者简介：

作者Email: hanzhou03@126.com

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