

## 航天电子技术

### 基于小区域滤波的快速星图弱小目标分割算法

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摘要:

时间序列帧星空图像中弱小目标的检测是天基监视地球同步轨道卫星需要解决的关键技术之一,星图中的背景杂波抑制与小目标分割对运动目标的检测与精确测量是至关重要的。针对这一问题,提出了一种基于小区域滤波的快速星图弱小目标分割算法。首先采用最小二乘拟合方法得到高斯背景均值和标准差;然后利用小区域滤波抑制背景杂波;最后利用固定阈值滤除灰度过小像素点。实验结果表明,该算法能够较好地保持恒星和运动目标的边缘,为恒星和运动目标的快速定位奠定了基础。

关键词: 天基监视 弱小目标分割 小区域滤波 背景杂波抑制

### Rapid segmentation algorithm based on small domain filter for small star map targets

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Abstract:

The detection of small targets in time sequence of orbit star images is a critical problem encountered in the space based surveillance for geosynchronous earth orbit satellites. The background clutter suppression and the small targets segmentation are significant for the detection and metric parameter estimation of moving targets. To solve this problem, a rapid segmentation algorithm based on small domain filter for small star map targets is proposed. Firstly, the mean and standard deviation of the Gauss background is gotten by adopting the least square fitting method. Then, a small domain filter is used to suppress the background clutter. Finally, the low pixel gray values are removed through a constant threshold. Simulation results show that the proposed algorithm can keep the total edges of stars and moving targets and is the foundation of the quick tracking of targets.

Keywords: space based surveillance small target segmentation small domain filter background clutter suppression

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