

论文

基于多结构元素形态滤波与自适应阈值分割相结合的红外弱小目标检测

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摘要:

针对低信噪比灰度图像中弱小目标检测的难题,分析了红外弱小目标成像的特点,提出了基于多结构元素形态滤波与自适应阈值分割相结合的目标检测算法.利用目标运动的连续性、规律性和噪音产生的随机性,结合数学形态学结构元素的特点,研究了一种多结构元素形态滤波的管道滤波方法,通过流水线管道检测目标运动轨迹.实验结果表明,该算法应用于复杂背景下低信噪比的红外弱小目标图像能够得到较理想的结果,并且目标检测概率高,速度快,虚警率低.

关键词: 目标检测 背景抑制 数学形态学 自适应分割 管道滤波

Infrared Dim Target Detection Based on Multi-Structural Element Morphological Filter Combined with Adaptive Threshold Segmentation

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Abstract:

Aiming at detection puzzle of small target in grayscale image with low SNR, the characteristics of infrared small targets were analyzed and a detection algorithm was put forward based on multi-structural element morphological filter combined with adaptive threshold segmentation. In view of the continuity and regularity of motion for target and the randomness of generation for noise, and considering the characteristics of structure element, the design of morphological filter and a technique via assembly line and pipe scheme were considered to detect target trajectory. Experiments show that the algorithm is able to obtain excellent results toward low SNR infrared image under complex background, and has high detection probability, high speed and low false alarm rate.

Keywords: Target detection Background suppression Morphology Adaptive segmentation Pipeline filter

收稿日期 2011-01-15 修回日期 2011-05-13 网络版发布日期 2011-07-25

DOI: 10.3788/gzxb20114007.1020

基金项目:

国家自然科学基金(No.61071172, No.60602056, No.60634030)、西北工业大学基础研究基金(No.JC200941)、航空科学基金(No.20105153022)、国防科技项目(No.9140C460205091303)和国防科技重点实验室项目资助

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