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光电工程

一种尺度自适应的小目标实时检测方法

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摘要
小目标检测是计算机视觉领域的一个研究热点。当仅对图像中不同尺度目标中的某些特定尺寸目标感兴趣时，传统方法将无法做出正确判断,而且当目标接近摄像机时图像上目标的尺度通常会发生较大变化，传统方法也难以适应。 针对这一问题，提出一种基于正负LOG[1]算子的小目标实时检测系统。新算法首先根据目标在短时间内所作的近似直线运动，利用Top-Hat[2]算法在初始几帧图像中检测出真正的目标点，然后根据目标特性确定正负LOG算子的参数，最后利用确定的正负LOG算子对后续帧图像进行连续检测，确定真实目标位置。实验证明，该检测方法在实时性、检测准确性及抗干扰性上均有较好的表现。

关键词 小目标 实时检测 图像处理 正负LOG算子

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Scale-adaptive real-time detection for small targets

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Abstract Small target detection is an interesting subject in computer vision. Traditional methods can not be used to detect specific target with interested size when there are many targets of different sizes in an image. Neither can they be used effectively to detect an approaching target whose image size become larger and larger. In order to solve these problems, a new method of small target detection is presented based on the positive and negative LOG (PNLOG) operator. With the new method, the true target is detected by the Top-Hat algorithm in several initial images based on the rough linear movement of the target in a short period of time. The parameters of PNLOG operator are defined based on the target features. The follow-up images is continuously detected by defined PNLOG operator to determine the position of the true target. The experimental results show that the new method has great capability in real-time detection, detection precision and anti-jamming.

Key words small target real-time detection image processing positive and negative LOG operator

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