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光电信息获取与处理

光电成像系统超分辨成像技术方法研究

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摘要：

提出一种提高现有光电观瞄系统成像空间分辨率的新方法。在不改变阵列探测器件像元尺寸和不移动探测器的前提下,利用双光楔的较大移动使像平面发生微小位移，实现对探测器各相邻像元和不感光间隔目标进行微位移采样,提高目标信息的采样率，通过超分辨重建技术来提高系统的分辨能力，达到提高光电观瞄系统空间分辨率的目的。实验结果表明：该方法绕开了微小位移探测器需要克服的技术难题，同时避开了直接减少像元尺寸的工艺问题，且成像分辨率高。

关键词： 阵列探测器 超分辨率 光楔调制 位移采样

ASuper-resolution imaging technology for optical imaging system

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Abstract:

A new method to improve the spatial image resolution of electro-optical sighting system is proposed. The movement of the optical double wedge was used to change the position of the imaging plane slightly. The micro-displacement sampling of the adjacent pixels and the targets in blind areas were realized without decreasing the size of the detection pixel or moving the target. The sampling rate was increased and the resolution of this system is improved using the super-resolution reconstruction technique. The experiments indicate that the method is simple and feasible, and the spatial image resolution is improved.

Keywords: detector array super-resolution modulation optical wedge micro-displacement sampling

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参考文献：

［1］TSAI R Y,HUANG T S.Multiframe image resolu-tion and registration［J］. Advances in Computer Vision and Image Processing,1984,1(1):317-319.［2］卓宁,孙华燕,张海江.一种新的提高CCD成像分辨率的方法［J］.光学学报,2005,25(6):777-778. ZHUO Ning, SUN Hua-yan, ZHANG Hai-jiang. A new approach for improvement of CCD imaging resolution［J］. Acta Optica Sinica, 2005,25(6):777-778.(in Chinese with an English abstract)［3］周春平,田越,季统凯,等.一种提高CCD成像卫星空间分辨率的方法研究［J］.遥感学报,2002,6(3):179-182.ZHOU Chun-ping,TIAN Yue,JI Tong-kai et al.A way to improve the satellite spatial resolution of CCD imaging［J］. Remote Sensing Sinca,2002,6(3):179-182.(in Chinese with an English abstract)［4］周春大.张岩.基于微位移技术提高CCD分辨率的方法［J］.光子学报,2006,35(12):1969-1974.ZHOU Chun-da,ZHANG Yan. Based on micro-displacement technology to improve the resolution of CCD［J］.Acta Photonica Sinica，2006,35(12):1969-1974. (in Chinese with an English abstract)［5］王红敏.折射棱镜最小偏向角论证及其在光学仪器中的应用［J］.山东理工大学学报：自然科学版,2004,18(3):92-94.WANG Hong-min. Demonstration about refractive prism's minimum deflecting angle and its application in optical instruments［J］.Journal of Shandong University of Technology:Sci. & Tech.,

2004,18(3):92-94. (in Chinese with an English abstract)

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