

基于改进 Camshift 的无人机目标跟踪算法研究

沈思源, 李震霄, 孙 伟

(中国矿业大学 信息与控制工程学院, 江苏 徐州 221008)

摘 要: 无人机在对地面目标进行跟踪时, 传统 Camshift 算法易受相似颜色背景/目标、遮挡等干扰. 本文提出一种改进 Camshift 的目标跟踪方法. 通过提取跟踪目标的色度、饱和度和 LBP 纹理特征分量建立基于三维联合直方图的跟踪模板, 并采用自适应加权策略来调整三种特征分量的权重值, 提高算法的跟踪准确度; 在跟踪目标受到遮挡干扰时, 引入 Kalman 滤波机制, 增强算法的鲁棒性. 实验结果表明, 改进后的算法能够满足无人机对目标跟踪准确性与实时性的要求.

关键词: 无人机; 目标跟踪; Camshift 算法; LBP 纹理特征; Kalman 滤波

Research on target tracking of UAV based on

improved Camshift algorithm

SHEN Si-yuan, LI Zhen-xiao, SUN Wei

(School of Information and Control Engineering, China University of Mining and Technology,
Xuzhou 221006, China)

Abstract: When UAV tracks the ground target, the classic Camshift algorithm is susceptible to similar color background/target, occlusion, etc. The target tracking method based on improved Camshift is proposed. A tracking template based on three-dimensional joint histogram is established by extracting the Hue, Saturation and LBP texture features of the tracking target, and the weighting values of the three feature components are adjusted by the adaptive weighting strategy to improve the tracking accuracy of the algorithm. When the tracking target is blocked, Kalman filtering mechanism is introduced to enhance the robustness of the algorithm. The experimental results show that the improved algorithm can meet the requirements of target tracking accuracy and real-time for UAV.

Key words: UAV; target tracking; Camshift algorithm; LBP texture features; Kalman filter

作者简介:

沈思源 男, (1993-), 硕士研究生. 研究方向为图像处理、模式识别.

李震霄 男, (1995-), 硕士研究生. 研究方向为图像处理.

孙 伟 (通讯作者) 男, (1963-), 教授, 博士生导师. 研究方向为图像处理、智能控制、模式识别. E-mail: neuqssy@163.com