SEGMENTATION OF RICE PLANTHOPPERS IN RICE FIELDS BASED ON AN IMPROVED LEVEL-SET APPROACH

/ 基于改进水平集方法的农田稻飞虱图像分割

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ABSTRACT

With the wide application of machine-vision technology in detecting agricultural plant diseases and insect pests in the field, this paper proposed an innovative approach for performing automatic segmentation of rice planthopper images. First, to weaken background interference, the Otsu approach was adopted to accomplish the preliminary segmentation. Then, a steerable filter was employed to improve the segmentation results of the feet and tentacles. Finally, by adding priori gray-level information, our proposed method improved the approximation capability of level-set-based evolution curves to targets. Results indicated that the approach adopted in this paper could clearly segment the contour of rice planthoppers.

摘要

随着机器视觉技术在农业病虫害识别领域的广泛应用，基于图像的稻飞虱害虫诊断成为有效地手段，本文提出一个新颖的方法来完成稻飞虱的自动分割问题。首先，为了消弱背景的干扰，利用大津法方法完成稻飞虱的初步分割。然后利用方向滤波器改善稻飞虱足和触角分割效果。最后融入先验灰度信息，提高了水平集演化曲线对于目标的逼近能力。结果表明，本文采用的方法可以清晰地分割稻飞虱的边缘轮廓，准确定位害虫区域。