

刁智华,王 欢,宋寅卯,王云鹏.复杂背景下棉花病叶害螨图像分割方法[J].农业工程学报,2013,29(5):147-152

复杂背景下棉花病叶害螨图像分割方法

Segmentation method for cotton mite disease image under complex background

投稿时间: 2012-06-04 最后修改时间: 2013-02-20

中文关键词: [棉花](#), [图像分割](#), [算法](#), [害螨](#), [复杂背景](#), [颜色特征](#), [面积阈值](#)

英文关键词: [cotton](#) [image segmentation](#) [algorithms](#) [mite disease](#) [complex background](#) [color features](#) [area thresholding](#)

基金项目:河南省教育厅项目(12B210027);国家农业智能装备工程技术研究中心开放基金项目(KFZN2012W12-012);郑州轻工业学院校内博士基金项目

作者	单位
刁智华	郑州轻工业学院电气信息工程学院, 郑州 450002
王 欢	郑州轻工业学院电气信息工程学院, 郑州 450002
宋寅卯	郑州轻工业学院电气信息工程学院, 郑州 450002
王云鹏	郑州轻工业学院电气信息工程学院, 郑州 450002

摘要点击次数: 54

全文下载次数: 50

中文摘要:

为提高棉花害螨图像分割的效果,根据棉花害螨图像的特点,该文提出一种在复杂背景条件下棉花害螨病斑的图像分割方法。首先利用超绿特征2G-R-B提取出复杂背景下彩色图像中的类病斑(具有相同红色的害螨病斑和茎秆)。然后对类病斑区域与非类病斑区域的灰度图像进行二值化处理。最后利用面积阈值法将类病斑中的害螨病分割出来。试验结果表明,该算法能有效的提取出棉花害螨病斑,准确率可达97.83%。该研究可为复杂背景下的害螨图像的分割提供参考。

英文摘要:

According to the properties of cotton disease image, we propose a segmentation method under the condition of complex background for improvement on segmentation precision of cotton mite disease image. The proposed algorithm is comprised of three main steps. First, we extract the analogous disease spots (disease spots and stems with red color) from gray-scale images by Excess green feature 2G-R-B, then some different gray-scale images would be obtained. Second, the targets would be extracted from the background by thresholding according to the double-peak feature presented in the gray Histogram of the gray-scale images. After this procedure, we can get the binary image that contained only analogous disease spots. According to the further amplification researches on the binary images of the large quantities of cotton mite disease image samples, we can find that the segmented images are constituted by a large number of independent 8-connected region, and the connected region of stems are larger than cotton mite disease spots'. On the basis of this feature, the image can be grouped into two categories in order to remove the stems from the whole analogous disease spots in the binary image: the one is small connected region composed by cotton disease spots; and the other is large connected region composed by cotton stems. Finally, compare the disease spots' area with stems' area and then segment the binary images by using area thresholding. By observing the segmentation results in different thresholding values, select a optimal one to eliminate stem regions that larger than the threshold value. On the contrary, the cotton mite disease area that smaller than the value will be remained. The experiment results show that this algorithm is of effective in segmenting cotton mite disease spot, and the correctness rate of the algorithm can reach 98.1%. At last, In order to test the validity and generality of this proposed method, 30 color images of cotton mite disease are picked out to segment by the proposed algorithm, a split plot with repeated measures in the error extraction rate was used as the experimental design. From the statistic analysis, we can know that the average error extraction rate of 30 color images of cotton mite-disease is 2.17%, the average correct extraction rate could reach 97.83%. This proposed algorithm combined 2G-R-B, single threshold and area thresholding to segment the disease spots from image with complex background plays well. It can lay a foundation for automatic identification of cotton mite disease.

[查看全文](#) [下载PDF阅读器](#)

关闭