

基于遗传模糊神经网络的植物病斑区域图像分割模型 Image Segmentation Model of Plant Lesion Based on Genetic Algorithm and Fuzzy Neural Network

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关键词: 植物病害 遗传算法 模糊神经网络 病斑图像

摘要: 针对植物病斑区域图像边界的模糊性和不确定性因素, 利用模糊逻辑的推理规则和神经网络的自适应性, 提出全规则的自适应模糊神经网络模型作为植物病叶图像像素归属的决策系统, 并利用遗传算法对系统的可调整参数初始值进行全局优化, 提高了网络训练速度, 避免了传统BP算法的局部最小值。通过对马铃薯早疫病病斑图像分割的实验表明, 该模型速度快且稳定, 精度高且鲁棒性好, 简单易于实现。 Aiming at the ambiguity and uncertainty of lesion field image border, using inference rule of fuzzy logic and self-adaptive of neural network, the self-adaptive and fuzzy neural network model was proposed to be the decisionsystem for extracting the diseased spots, and the initial values of adjusting parameters were optimized by using genetic algorithm which enhanced the speed of network training, overcame the local minimum of traditional gradient descent method. The experimental result showed that model had many advantages including accuracy, convergence, stability, robustness, and was easy to implement when implied in extracting the diseased spots of potato early blight.

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