

基于特征优化和LS-SVM的棉田杂草识别 Weed Identification Based on Features Optimization and LS-SVM in the Cotton Field

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摘要: 为了提高杂草识别的精度和效率, 提出了一种基于特征优化和最小二乘支持向量机 (LS-SVM) 技术的棉田杂草识别方法。在对原始图像灰度化、滤波去噪和阈值分割等处理的基础上, 提取植物叶片的6个几何特征和7个Hu不变矩, 用粒子群优化 (PSO) 算法对形状特征进行优化选择, 缩减LS-SVM训练样本数据, 然后用训练好的分类器进行杂草识别。实验结果表明, 该方法在有效缩减形状特征的同时, 能够保持高于原始特征集的认识率, 平均正确识别率达到95.8%。 In order to improve the accuracy and efficiency of weed identification, a method for cotton-weed recognition was proposed by using the combination technique of features optimization and least squares support vector machine (LS-SVM). After a series of image processing such as graying, filtering and threshold segmenting, six geometric shape features and seven Hu moment invariants were extracted from the single plant leaf. Then, using particle swarm optimization (PSO) algorithm, the extracted features were optimized in order to reduce the size of the training data sets. Finally, the weed was identified by using the trained classifier. The experimental results indicate that this method can effectively compact feature subset and maintain a higher accuracy than using the original feature set, the average correct identification rate is 95.8%.

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