Features Selection and Recognition of Potato Typical Insect Pest Images in Wavelet Domain

In recent years, China's potato planting area has increased year by year, and potato has become an important food crops.However, due to the complex and changeable planting environment, potato is vulnerable to a variety of insect pests in the growth process.

At present, pest monitoring, classification and statistics are mainly done by manual work, with high labor intensity, high labor cost and low work efficiency. As a result, pests can not be prevented and dealt with in time, resulting in potato yield reduction and economic damage. Therefore, real-time monitoring of potato growth status and accurate and rapid identification of pest categories become an urgent requirement,Domestic and foreign scholars have done a lot of research on crop pest identification by using machine vision technology.Based on the neural network classifier, vanhara et al. Used 16 morphological features to identify the parasitic flies of dance species, and the recognition rate was above 88%,Larios developed an automatic classification system for stone flies. The system uses three layout feature detection methods to detect the target feature points. Through analysis and comparison, it selects the SIFT method to detect the features, and classifies four stone flies with an accuracy of 82%.

However, the automatic detection and recognition technology of plant diseases and insect pests at home and abroad is still in the development stage, most of the research on the accuracy and speed of pest recognition can not be taken into account, therefore, this paper will use the natural environment of potato pest image, using two-dimensional Otsu method, and morphological methods to separate the background and pest, extract pest image wavelet domain helm, texture features and spatial domain Hu, moment shape features, and carry on the research SVM, pest classification, and then improve the accuracy of potato pest identification.

In order to recognize potato typical insect pests accurately and quickly, a new feature extraction and recognition method based on wavelet and space domain was proposed. The processing object in the method was the segmented image of insect pests separated from complex background by the two-dimensional Otsu method and morphological method. Aiming at the processing object, totally 12 invariant texture features of high frequency covariance matrix eigenvalues and low frequency lower order moments ( HELM) were extracted from the high frequency images in the horizontal, vertical and diagonal directions, forming a Gaussian space model, and from low frequency image decomposed by sym 8 wavelet function. Meanwhile, 4 Hu moments with invariant shape features were extracted from the binary image of the processing object.Meanwhile, compared with ANN and Bayes recognition rates, rates, the proposed SVM recognition rate was 97. 5%, increasing at least 6 percentage points.