

A Neural Network Classifier for Estimation of the Degree of Infestation by Late Blight on Tomato Leaves

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Abstract : Foliage diseases in plants can cause a reduction in both quality and quantity of agricultural production. Intelligent detection of plant diseases is an essential research topic as it may help monitoring large fields of crops by automatically detecting the symptoms of foliage diseases. This work investigates ways to recognize the late blight disease from the analysis of tomato digital images, collected directly from the field. A pair of multilayer perceptron neural network analyzes the digital images, using data from both RGB and HSL color models, and classifies each image pixel. One neural network is responsible for the identification of healthy regions of the tomato leaf, while the other identifies the injured regions. The outputs of both networks are combined to generate the final classification of each pixel from the image and the pixel classes are used to repaint the original tomato images by using a color representation that highlights the injuries on the plant. The new images will have only green, red or black pixels, if they came from healthy or injured portions of the leaf, or from the background of the image, respectively. The system presented an accuracy of 97% in detection and estimation of the level of damage on the tomato leaves caused by late blight.

Keywords : artificial neural networks, digital image processing, pattern recognition, phytosanitary

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