

ABSTRACT

Smart Farming 4.0 is a technological innovation in agriculture to optimize the quality of production. Indonesia is one of largest agrarian countries in the world must maintain the quality of agriculture, one of which is tea. Because tea is a drinks that is liked almost all over the world. But the attack of pests on tea leaves can affect the quality of tea leaves. One way to maintain the quality of tea is to care for and handle tea leaves from pest attacks. At present the only way to deal with tea leaf pests is to rely directly on the senses of vision which still allows misidentification. Therefore, Smart Farming 4.0 based on technology innovation is needed.

In this study, designed a system that could identify tea leaf pests by digital signal processing. The first stage is image acquisition, pre-processing, then the image extraction is done by Gray Level Co-Occurrence Matrix (GLCM) which produces the GLCM matrix. From the GLCM matrix, each training image is processed with a second-order statistical feature and stored as a database. Data from training images is being reference that used to identify tea leaf pests by Probabilistic Neural Network (PNN).

The system in this study aims to identify and classify 5 tea leaf pests there are Thrips, Empoasca, Red Mite, Helopeltis, and Caterpillar by dividing 100 images of training data with 20 images for each pest and 25 images of test data with 5 images for each type of pest. In this identification system the parameters that used is 61×61 pixels image size, 135° angle direction, second order statistical features contrast, correlation, energy, homogeneity, and mean, and also 0.01 spread value of PNN obtained 92% accuracy with 9.884 seconds computing time. The results of this study are expected to be able to help tea businesses in sorting tea leaf pests so that it produce the best quality tea.

Keyword : *Tea, Pest, Gray, Matrix, Probabilistic.*