

**PERANCANGAN SISTEM DETEKSI PENYAKIT XANTHOMONAS
CAMPESTRIS, CERCOSPORA CAPSICI, YELLOW LEAF CURL VIRUS,
DAN NUTRIENT DEFICIENCY BERBASIS CNN (ALEXNET)
MENGUNAKAN DEKSTOP APP**

Nama : Awang Dwi Jaya Sanjogi

NIM : 200431100109

Program Studi : Teknik Elektro

Dosen Pembimbing 1 : Monika Faswia Fahmi, S.Pd., M.T

Dosen Pembimbing 2 : Adi Kurniawan Saputro, S.Pd., M. T

ABSTRACT

*Paprika crop production in Indonesia is often disrupted by disease attacks such as *Xanthomonas campestris*, *Cercospora capsici*, Pepper Yellow Leaf Curl Virus, and nutrient deficiencies. Manual disease identification frequently leads to errors due to the need for specialized expertise and varying environmental conditions. Therefore, this study aims to design a paprika leaf disease detection system based on a Convolutional Neural Network (CNN) using the AlexNet architecture, integrated into a desktop application to facilitate automatic identification. The dataset used consists of 3,000 paprika leaf images divided into six classes, each containing 500 images. The research stages include image preprocessing (resizing, RGB conversion, normalization, augmentation, and tensor conversion), model training using an AlexNet architecture pretrained on ImageNet, and performance evaluation through a confusion matrix. The training results show that the leaf disease detection model achieves an average accuracy of 79.5%, precision of 0.79, recall of 1.00, and an F1-score of 0.83. The developed system is capable of classifying healthy leaves, *Xanthomonas campestris*, *Cercospora capsici*, Yellow Leaf Curl Virus, nutrient deficiency, and random images with high accuracy, while also displaying disease handling information through the designed desktop application. Thus, this system can serve as a decision-support tool for farmers and related stakeholders to perform early disease detection.*

Keywords: Paprika Leaf, Convolutional Neural Network, AlexNet, Desktop Application