ABSTRACT

Hydroponic cultivation is expected to grow every year. Curly lettuce (Lactuca sativa) is a high-value commodity that is often cultivated hydroponically. With a short harvest time, curly lettuce cultivation can be done 7-8 times per year. In the concept of smart agriculture, image processing technology is used to classify crops ready for harvest. This research aims to develop a curly lettuce harvest readiness classification system using Convolutional Neural Network (CNN) for its ability to recognize complex patterns in images. This technology can identify ready-to-harvest plants and predict harvest readiness accurately, supporting the automation of hydroponic curly lettuce cultivation in Indonesia. The best model was generated at the 30th epoch with the Adam optimizer, showing the highest accuracy value of 0.86, with precision 1.00 for the "Not yet" class and recall 1.00 for the "Harvest" class. This shows that the model is able to recognize both classes very well without significant errors. This proves that the classification system for harvest readiness of curly lettuce plants built using the CNN method can successfully distinguish plants that are ready to harvest and not ready with good performance.

Keywords: Hydroponics, Curly Lettuce, Smart Agriculture, Deep Learning, CNN.