ABSTRACT

Orchid is one of the ornamental plants that is widely cultivated. Each genus of orchids has a different cultivation method, so orchid cultivators who are just starting to be informed about the orchids they will cultivate in advance. However, not a few beginners who try to cultivate orchids without sufficient knowledge and experience, so the cultivated orchids do not grow and flower optimally. In addition, there are still very few orchid experts that can be found on a daily basis, and the existing literature is not very practical to bring when it comes to cultivating orchids. Therefore, in this study a system was built to classify the image of the orchid genus. The selected genus of orchid plants is the most commonly cultivated, first as an ornamental plant, namely the genus *Cattleya*, *Dendrobium*, *Oncidium*, *Phalaenopsis* and *Vanda*.

Image classification is carried out by utilizing one of the deep learning technologies, namely the *Convolutional Neural Network* (CNN) method. Where the image of the orchid as input data will be extracted to obtain its features, then the classification process is carried out, then the output is in the form of a label from the appropriate genus. This classification process is carried out through a training and testing scheme, where the training stage produces a CNN model along with the weights that have been changed (updated), then the testing phase uses the model to be tested against new image data. *K-Fold Cross Validation* is used at the training stage, then to evaluate a CNN model after testing, the *Confusion Matrix* is used. In addition, this research uses custom CNN architecture and MobileNetV2. Finally, from the total model produced, the best model is obtained with a test accuracy score from the field of 90.44% and a test accuracy score from the internet of 80.54%, and the highest F1-score of 98% from the genus *Dendrobium*.

Keywords: *orchid, image classification, convolutional neural network, k-fold cross validation, confusion matrix.*