

## **Abstract**

Wood identification is generally performed manually by observing the anatomy of wood such as colour, texture, fibre direction, and other characteristics. The manual process could take quite a long time, especially when identification work is required at high quantity. By considering this condition, the convolutional neural networks (CNN) based program is applied to improve the image classification results. The research focuses on the algorithm accuracy and efficiency, and the dataset limitations handling. Therefore, it is proposed to do the sample selection process or only take a small portion of the existing image. Still, it can be expected to represent the overall picture to maintain and improve the generalization capabilities of the CNN method in the classification stages. The experiments yielded an incredible F1 score average up to 93.4% for medium sample area sizes (200 200 pixels) on each CNN architecture (VGG16, ResNet50, MobileNet, DenseNet121, and Xception based). Whereas DenseNet121-based architecture is the best architecture in maintaining the generalization of its model for each sample area size (100, 200 and 300 pixels). The experimental results show that the proposed algorithm can be an accurate and reliable solution.