

ABSTRACT

Sawn wood was a basic material to produce various types of products. However, industries engaged in wood processing still carry out the classification process manually. This because humans still rely on sense of sight and instinct to detect and classify an object. This condition can reduce productivity time and increases errors in classification. Therefore, deep learning was one of the solutions for the wood industry to detect wood defects automatically.

Overall, this study aims to produce real time object detection and convincing predictive results on the pine wood dataset, and the rubber wood dataset. To achieve this goal, this study proposes a defect detection system in wood using the Convolutional Neural Network (CNN) method with a modified YOLOv4 model. The YOLOv4 architecture was simplified using Mish activation, and added a Spatial Attention Module (SAM).

The results of the YOLOv4 modification, compared to the original YOLOv4 architecture, there is an increase in system performance when the input image sizes are 320, 512, and 608. The first improvement was mAP, by 1.10%, 0.70%, and 0.41% for the pine wood dataset, and by 1.33%, 1.28%, and 0.61% for the rubber wood. The second increase was FPS, by 17.6, 11.3, and 8.2 for pine wood, and by 17.1, 10.8, and 8.0 for rubber wood.

Keywords: *CNN, Modified YOLOv4, Activation Mish, Spatial Attention Module, Defect Detection System*