

ABSTRACT

The sengon tree as a high economic value forestry commodity requires a straight trunk and minimal branching to meet industry standards. But naturally, this tree tends to experience excessive lateral branching which causes a decrease in wood quality due to the formation of knots and stem deformation. The manual pruning technique that has been used often detects branch growth too late, so that the branches are already too large when pruned and interfere with the growth of the main trunk. To overcome this problem, this research develops an Artificial Intelligence (AI)-based branch detection system using You Only Look Once version 4 (YOLOv4) architecture. This system aims to detect the growth of sengon tree branches automatically, so that the pruning process can be done earlier. The test results show that the YOLOv4 model with a learning rate configuration of 0.01, batchsize 64, and subdivisions 32 is able to achieve 99% precision and 99% recall. In real-time tests, the system successfully detected branches with perfect accuracy (100%) at a distance of 1-1.5 meters, although the accuracy decreased as the distance increased.

Keywords: Artificial Intelligence (AI), Object Detection, Sengon Tree, You Only Look Once (YOLO).