

## **ABSTRACT**

*Fresh fruit has its own definition and characteristics. The separation of fresh fruit from unripe fruit is necessary so that the selected fruit does not lose the nutrients and vitamins contained in the fruit. Papaya plants are one of the tropical plants that are widely cultivated in Indonesia. This plant contains vitamin A, vitamin C, as well as minerals such as calcium, phosphorus, magnesium, and iron. Currently, manual methods in classifying fresh fruit are considered less effective. Manual identification of papaya fruit ripeness based on visual analysis of skin color is often ineffective due to visual limitations and human fatigue. Manual methods in classifying fresh fruit are considered less effective for large quantities of selection. Therefore, to overcome this problem, a deep learning method using Convolutional Neural Network (CNN) is applied to model complex image data. The YOLOv5 Architecture model was chosen for its advantages in speed and accuracy of object identification in photos, ideal for real-time use in video. This research aims to measure the extent to which combining CNN and YOLOv5 methods can improve the accuracy of identifying the ripeness level of papaya fruit in realtime. The batch size variations used were 10, 20, 30, 40, 50, 60 and epoch variations of 50, 100, 150, 200, 250, 300 with a distance range of 0 cm - 250 cm. The results show the highest mAP value of 0.982 with system performance accuracy reaching 94%.*

**Keywords:** Artificial Intelligence, Automated System, Convolutional Neural Network, Object Detection System, Papaya, YOLOV5.