

***Estimation of Nutritional Content of Indonesian Food Based on Object
Detection Using YOLOv8 and XGBoost***

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ABSTRACT

Nutrition plays an important role in growth and development, yet nutritional imbalances still frequently occur due to a lack of public knowledge. This study developed a system for food type detection and nutrition estimation using the YOLOv8 and XGBoost methods, implemented through a Telegram bot. Experimental results show that YOLOv8 achieves very high accuracy in container detection, reaching 95–97% and 91–97% in scenarios with one or two containers per image, respectively, but experiences a decrease to 27% accuracy in the three-container scenario, especially for oil paper containers, with an average accuracy of 88.1%. For segmentation, the model can recognize objects such as fried rice, fried chicken, fried tofu, fried tempeh, and fried egg with accuracies above 92%, but experiences decreased accuracy for objects with irregular shapes or low contrast against the background. The average segmentation accuracy is 91.22% in scenarios where objects are combined in a single container. For weight prediction, the XGBoost model achieved an MAE of 21.138 grams, an RMSE of approximately 50.10 grams, and an R^2 value of 0.7838, with the largest errors found in fried rice (-155.97 grams) and fried chicken (+17.31 grams) due to variations in shape and food composition.

Keywords: food detection, YOLOv8, segmentation, XGBoost, nutritional estimation