

ABSTRACT

The manual, subjective, and inconsistent classification of tea types in Indonesia has prompted the development of an automated classification system. This study proposes a system based on Computer Vision and Deep Learning that combines YOLOv8-seg to localize the brewed tea/tea leaves area and Convolutional Neural Network (CNN) to classify green tea, black tea, and white tea in ROI images. Image data was collected from brewed tea and tea leaves, focusing on visual characteristics (color, texture). In controlled test data, the CNN module demonstrated high performance with an accuracy of 99.33% (brewed tea) and 100% (tea leaves). However, testing the system as a whole in complex scenarios (multiple objects, lighting/background variations) revealed weaknesses where some objects were not detected, tea water was incorrectly labeled as tea leaves, and tea type classification became inconsistent. These findings indicate that the first objective of analyzing the influence of visual characteristics has been achieved, while the second objective of developing a reliable classification system for practical use has not yet been fully achieved in multi-object and varying lighting scenarios. Therefore, the system requires improvements to the detection module, lighting normalization in the region of interest (ROI), expansion of data diversity, and separate validation of YOLO before it can be practically applied.

Keywords: YOLOv8-seg, CNN, Instance segmentation, Object detection, Tea type classification, Brewed liquor, Tea dregs.