

ABSTRACT

Indonesia is known as one of the countries with the highest levels of biodiversity in the world, including herbal plants used in traditional medicine. However, many people still have difficulty visually identifying types of herbal plants, especially due to the similarities in shape and leaf characteristics among species. This condition has the potential to cause errors in the utilisation of medicinal plants and become an obstacle to education and conservation processes based on natural materials.

This research aims to build an automatic identification system for herbal plants based on leaf images using the YOLOv8 object detection method. A total of 35 classes of herbal leaves were used as a manually annotated dataset and trained using the Google Colab platform. The model was then converted to TensorFlow Lite format and integrated into an Android application called HéjoLens, which supports two detection modes: real-time via camera and through uploads from the gallery. Evaluation was conducted on the model's performance using metrics such as precision, recall, F1-score, mAP50, and mAP50:95, as well as testing computational efficiency and user assessment through the Mean Opinion Score (MOS).

The test results indicate that the model has an average precision of 0.972, recall of 0.953, F1-score of 0.954, mAP50 of 0.981 and mAP50:95 of 0.946. The application can be run with an average inference time of 1–4 seconds and a maximum memory consumption of 341 MB on mid-range devices. The assessment from 15 respondents resulted in a MOS score of 4.91, indicating that the system is well-received in terms of ease of use, speed, and interface. Thus, the HéjoLens system can be used as an accurate and efficient tool for identifying herbal plants in real environments and has the potential to be further developed to support the education and preservation of medicinal plants.

Keywords: *herbal plant identification, YOLOv8, object detection, Android application, leaf image processing*