

ABSTRACT

The abundance of various herbal plants in Indonesia often creates difficulties in identifying the different types of herbal leaves. This is due to the similarities that exist among these plants, especially their leaves. Therefore, a solution is needed to overcome this challenge, which can be achieved through a technology capable of understanding the patterns found in herbal leaves based on information stored in a database.

In this research, a mobile application system called "HerbCam" has been developed using deep learning technology to detect and classify herbal plants in real-time. The system utilizes the YOLOv5 method, known for its accuracy and speed in plant identification. HerbCam application comes with a camera feature that allows users to instantly detect herbal plants in real-time. Additionally, the application provides an option to identify herbal leaf images from the gallery or by taking direct pictures, accompanied by comprehensive descriptions of each herbal plant, including scientific names, regions, contents, and benefits.

The system's evaluation is conducted by measuring precision, recall, F1-score, accuracy, mAP50, and mAP50-95 to assess the detection and classification quality. The test results show that the system achieves a precision score of 0.987, recall score of 0.984, and F1-score of 0.985, indicating a high level of accuracy in object detection. The overall accuracy reaches 0.999, indicating an extremely low error rate. Moreover, the mAP50 and mAP50-95 reach 0.984 and 0.850, respectively, demonstrating the system's capability to perform well in detecting various objects and variations, highlighting its excellent detection quality. As for the application testing, it involves distance and lighting assessments, and the results show that the application can successfully detect herbal plants at an ideal distance ranging from 15 cm to 20 cm with a high success rate. Furthermore, the application effectively identifies objects under lighting conditions above 46 lux.

Keywords: herbal leaves, deep learning technology, YOLOv5, mobile application, system testing, application testing.