

ABSTRACT

Strawberry (*Fragaria x ananassa*) is a high-value agricultural commodity with continually increasing market demand, both nationally and internationally. This rise in production is accompanied by serious challenges from plant diseases such as Angular Leafspot, Blossom Blight, Gray Mold, Leaf Spot, Powdery Mildew, and Calcium Deficiency, which can significantly reduce harvest quality and quantity. Conventional detection methods, which rely on visual observation, are subjective, time-consuming, and inefficient, often leading to delayed intervention and substantial economic losses. Therefore, the primary problem is the absence of a system capable of detecting strawberry diseases rapidly, accurately, and in a manner easily accessible to farmers to minimize these adverse impacts.

To address this issue, "BerryCare" has been developed—an innovative mobile application designed to detect diseases on strawberry leaves. This solution is implemented leveraging the lightweight and efficient MobileNetV2 deep learning architecture, making it ideal for mobile devices. The system employs a Hybrid Processing technology that integrates on-device processing (Edge AI) for rapid offline diagnosis with cloud-based processing (Cloud Computing) for more in-depth analysis when an internet connection is available, thereby offering maximum user flexibility.

The evaluation results indicate that the MobileNetV2 classification model successfully achieved an accuracy level of 98% with an average F1-Score of 0.98 in identifying six types of strawberry crop diseases. The system's response time for detection and classification was targeted at less than 3 seconds per image. This model was trained using a dataset of 1200 strawberry crop images, which was partitioned into 840 images for training, 120 for validation, and 240 for testing. The accuracy and F1-Score values were derived from the evaluation on the testing dataset, which was not utilized during the training process, to measure the model's generalization capability on new data. Furthermore, usability testing conducted with 30 respondents using the System Usability Scale (SUS) method yielded an average score of 84. This score falls into the "Excellent" category, indicating high user acceptance and ease of use. Consequently, the BerryCare application is proven to be an effective, accurate, and user-friendly solution to assist farmers in the early detection of strawberry diseases.

Keywords: Cloud Computing, Deep Learning, Disease Detection, MobileNetV2, Strawberry