SUPPLEMENTARY II

CLASSIFICATION PERFORMANCE OF THE DEEP LEARNING BASED CLASSIFICATION MODELS AND THE PROPOSED METHOD

Fig. S1 illustrates the performance scores, including precision and recall, of the common deep learning (DL) models (i.e., EfficientNetB7, ResNet152V2, VGG19, and MobileNetV2) and the object detection models (i.e., Fast-RCNN, Faster-RCNN, and YOLOv5) with MVB in the classification of three common apple leaf diseases. Fast-RCNN and Faster-RCNN with MVB achieve greater precision and recall than the others in classifying all apple leaf diseases. When compared to the common DL models in the classification of apple leaf diseases, only Fast-RCNN and Faster-RCNN with MVB can reach precisions of 100% in classifying all apple leaf diseases, as shown in Fig. S1 (a). Similar to precision scores, only Fast-RCNN and Faster-RCNN with MVB can reach recall scores of 100% in all classes of apple leaf diseases, as shown in Fig. S1 (b). In addition, Fast-RCNN and Faster-RCNN with MVB can improve precision scores of the previous works (Thapa's model and Liu's model) for the black rot and cedar apple rust classification.
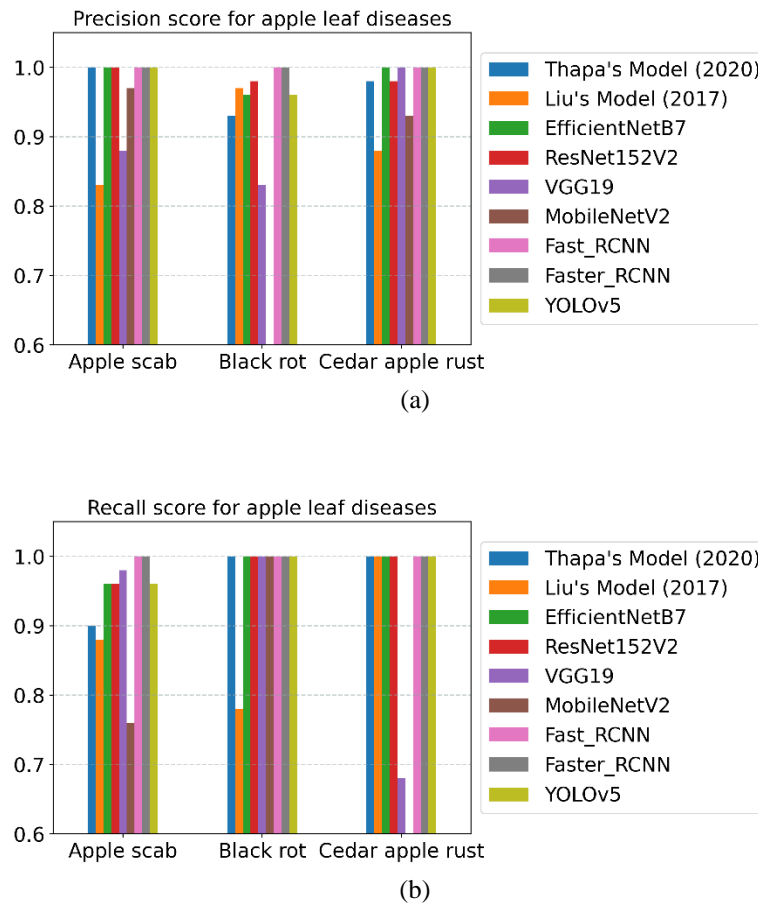

(a)

(b)

Figure S1. Performance scores of the DL-based classification models and object detection models with MVB in predicting each apple leaf disease. (a) Precision. (b) Recall.

Fig. S2 illustrates the performance scores, including precision and recall, of the DL-based classification models and the object detection models with MVB in classifying each skin disease. According to precision scores (Fig. S2 (a)), YOLOv5 with MVB, Faster-RCNN with MVB, and EfficientNetB7 reach the maximum precision in classifying acne, dermatitis, and psoriasis, respectively. In case of recall scores, both EfficientNetB7 and ResNet152V2 reach the maximum recall in classifying acne. However, Faster-RCNN with MVB and Fast-RCNN with MVB achieve the maximum recall in predicting dermatitis and psoriasis, respectively. In summary, most of the best models in classifying each skin disease are the object detection models with MVB. This leads the proposed method can reach the highest performance scores in the classification of skin diseases when compared to the common DL models and the models of the previous works (i.e., the Bajwa's model).
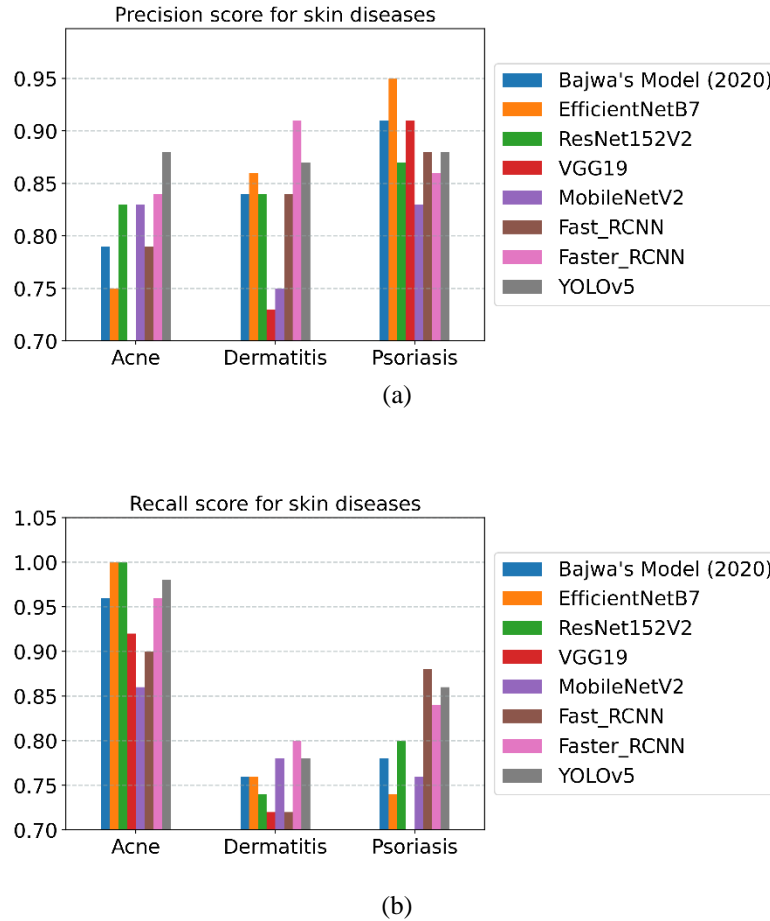

Figure S2. Performance scores of the DL-based classification models and object detection models with MVB in predicting each skin disease. (a) Precision. (b) Recall.