

AI Based Product Detection and Sorting

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Abstract: *Fruits and vegetables (especially, tomatoes) healthy detection are important tasks for smart agriculture. Several works have been published in tomato detection, however, there is little research on using explainable AI to detect, classify and count tomato fruit status. In this work, we propose a Tomatoes Health Check System by evaluating MobileNet models based on the physiological tomato dataset. Our research conducts experiments to evaluate the accuracy of the MobileNets, MobileNetV2 and MobileNetV3 models based on the evaluation metrics; the highest accuracy of 96.69% proposed method we suggest is to utilize Grad-CAM++ for a visual explanation of predictions made by models belonging to the MobileNets family. Subsequently, we calculate Intersection over Union metrics at various thresholds (0reliability, Grad-CAM++ is used to explain and evaluate reliability, with MobileNetV2 achieving the highest values at 100.00%YOLOv8 and MobileNetV2 algorithms using the Simple Online and Real-time Tracking (SORT) algorithm to detect, classify, and count tomatoes based on physiological characteristics in videos. Finally, the research results are utilized to develop an application system.*

Keywords: AI Based Sorting, Product Detection, AI Classification, Real Time Product Detection, YOLO Algorithm, CNN Algorithm