

ABSTRAK

Penyortiran buah tomat berdasarkan tingkat kematangan secara manual masih memiliki keterbatasan dari segi konsistensi dan efisiensi. Penelitian ini bertujuan untuk membandingkan kinerja algoritma YOLOv8 dan Real-Time Detection Transformer (RT-DETR) dalam mendeteksi tingkat kematangan tomat berbasis citra digital dengan enam kelas kematangan. Metode penelitian meliputi pengumpulan dan anotasi dataset citra tomat, pelatihan model, serta evaluasi kinerja menggunakan data uji. Hasil training menunjukkan bahwa konfigurasi terbaik diperoleh pada YOLOv8 dengan 100 epoch dan RT-DETR dengan 25 epoch, ditandai dengan stabilitas metrik evaluasi dan penurunan nilai loss. Pada pengujian pertama, YOLOv8 memperoleh nilai akurasi 57,00%, presisi 63,70%, dan recall 71,60%, sedangkan RT-DETR memperoleh akurasi 63,04%, presisi 55,10%, dan recall 70,44%. Pada pengujian sistem kedua, YOLOv8 menghasilkan akurasi 50,7%, presisi 64,8%, dan recall 70%, sementara RT-DETR menunjukkan performa lebih tinggi dengan akurasi 70%, presisi 80,8%, dan recall 84%. Berdasarkan hasil tersebut, YOLOv8 unggul dalam kecepatan inferensi, sedangkan RT-DETR memberikan ketelitian deteksi yang lebih baik.

Kata kunci: *Deep Learning*, YOLOv8, RTDETR, Tomat, Deteksi

ABSTRAK

Manual sorting of tomatoes based on ripeness levels still has limitations in terms of consistency and efficiency. This study aims to compare the performance of the YOLOv8 and Real-Time Detection Transformer (RT-DETR) algorithms in detecting tomato ripeness levels based on digital images with six ripeness classes. The research methods included collecting and annotating a tomato image dataset, training models, and evaluating performance using test data. The training results showed that the best configuration was obtained in YOLOv8 with 100 epochs and RT-DETR with 25 epochs, marked by the stability of the evaluation metrics and a decrease in loss values. In the first test, YOLOv8 obtained an accuracy of 57.00%, precision of 63.70%, and recall of 71.60%, while RT-DETR obtained an accuracy of 63.04%, precision of 55.10%, and recall of 70.44%. In the second system test, YOLOv8 produced an accuracy of 50.7%, precision of 64.8%, and recall of 70%, while RT-DETR showed higher performance with an accuracy of 70%, precision of 80.8%, and recall of 84%. Based on these results, YOLOv8 excels in inference speed, while RT-DETR provides better detection accuracy.

Keywords: Deep Learning, YOLOv8, RT-DETR, Tomato, Detection.