

## A Comparison of YOLO Family for Apple Detection and Counting in Orchards

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**Abstract :** In agricultural production and breeding, implementing automatic picking robot in orchard farming to reduce human labour and error is challenging. The core function of it is automatic identification based on machine vision. This paper focuses on apple detection and counting in orchards and implements several deep learning methods. Extensive datasets are used and a semi-automatic annotation method is proposed. The proposed deep learning models are in state-of-the-art YOLO family. In view of the essence of the models with various backbones, a multi-dimensional comparison in details is made in terms of counting accuracy, mAP and model memory, laying the foundation for realising automatic precision agriculture.

**Keywords :** agricultural object detection, deep learning, machine vision, YOLO family

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