Multi-Task Cascaded Convolutional Networks based Intelligent Fruit Detection for Designing Automated Robot

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Abstract— Effective and efficient fruit detection is considered crucial for designing automated robot (AuRo) for yield estimation, disease control, harvesting, sorting and grading. Several fruit detection schemes for designing AuRo have been developed during the last decades. However, conventional fruit detection methods are deficient in real-time response, accuracy and extensibility. This paper proposes an improved multi-task cascaded convolutional network (MTCNN) based intelligent fruit detection (InFD) method. This method has the capability to make the AuRo work in real-time and with high accuracy. Moreover, based on the relationship between the diversity samples of dataset and the parameters of neural networks evolution, this work presents an improved augmented method. A procedure that is based on image fusion to improve the detector performance. The experiment results demonstrated that the proposed detector performed immaculately, both in terms of accuracy and time-cost. Furthermore, the extensive experiment also demonstrated that the proposed technique has the capacity and a good portability to work with other akin objects conveniently.

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