Multiple Plant Tracking for Precision Agriculture Applications
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Introduction

Motivation:
- The steadily increasing global population.
- The decreasing availability of agricultural workers.
- Fertilization and yield prediction are critical tasks in agriculture.
- Plants and fruits should be sprayed or counted exactly once.

Context:
- The use of agricultural robots is still under-explored.
- Great part of the perception systems rely on computer vision.
- Modern computer vision makes use of deep learning models.
- Tracking in agricultural scenarios imposes additional challenges such as homogeneity of objects.

Case Study Dataset

LettuceMOT [1]
- Sequences: 8
- Navigation types: 3
- Instances: 707
- Frames: 5466
- Annotations: 42735

Baseline & Experiments

LettuceMOT [1]: Training with straight1 and straight3. Testing on the remaining sequences.
LettuceTrack [2]: Training with straight3 and straight4. Testing on the remaining sequences.

Approach


Quantitative Results

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<th>Method</th>
<th>HOTA</th>
<th>IDF1</th>
<th>Dataset</th>
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Conclusions

- The tracking-by-detection paradigm is well-suited for related agricultural tracking problems.
- The novel method for spatial association improves tracking performance as long as at least one object remains visible to the camera.
- The tracking paradigm offers a framework to convert detection datasets into tracking datasets.

References