PineSORT: A Simple Online Real-time Tracking Framework for Drone Videos in Agriculture

Supplementary Material

7. Ablation Studies

Table 3. Ablation study on PineSORT, evaluating the impact of different components on tracking performance. Metrics include IDF1, HOTA, AssA, IDSW, ML, and MT. Higher values are better for IDF1, HOTA, AssA, and MT, while lower values are better for IDSW and ML

Configuration	IDF1 ↑		HOTA ↑		AssA ↑		$\mathrm{IDSW}\downarrow$	$ML\downarrow$	$MT\uparrow$
	μ	σ	μ	σ	μ	σ	Total	Total	Total
PineSORT (baseline)	0.836	0.064	0.636	0.056	0.711	0.039	131	428	4169
w/o third association w/o OCM w/o overlap management w/o camera compensation	0.767 0.836 0.811 0.824	0.088 0.064 0.062 0.065	0.571 0.636 0.623 0.630	0.066 0.056 0.055 0.055	0.661 0.712 0.694 0.702	0.042 0.039 0.039 0.040	145 127 1026 561	646 429 418 474	2796 4168 4191 4050

Table 3 presents an ablation study on PineSORT using vertical video data, evaluated over five folds. We report the mean (μ) and standard deviation (σ) of key tracking metrics across four configurations: (1) without the third association step, (2) without the OCM module from OC-SORT [8], which introduces the angle direction cost in the first association step, (3) without overlap management, and (4) without camera compensation using ORB.

Removing the third association step lowers IDF1, HOTA, and AssA scores, as partially visible objects near frame boundaries may fail to match the Kalman filter's predictions in earlier association stages despite a high IoU. Eliminating overlap management significantly increases ID switches (IDSW), leading to frequent identity reassignments due to redundant detections. Similarly, removing camera compensation results in higher IDSW, likely due to frame misalignment. In contrast, excluding the OCM module has little to no effect on overall performance, suggesting the angle direction cost contributes minimally in this pipeline.

8. Code Availability

Our method explained in Sec. 3 and shown in Fig. 1 is available at github.com/imagine-laboratory/ pinesort. Please contact us if you find any trouble visualizing our repository.

9. Dataset

We facilitate a small dataset so other users can use it. The dataset can be accessed at: https://drive.google. com / drive / folders / 1CBaUbE6sJpKIu7 _ 5FxhMCnMFmtt5j7tI?usp=sharing. Contact us if you find any problem accessing this dataset.