Automated Seedling Inventory Update

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Progress

Feb. 2020
1st prototype test
Late-stage seedlings

Consumer action cameras

1) Varying outdoor lighting affects image quality and seedling detection.

2) Active illumination is needed.

Nov. 2020
2nd prototype test
Late-stage seedlings

Industrial-grade cameras
strobe lights

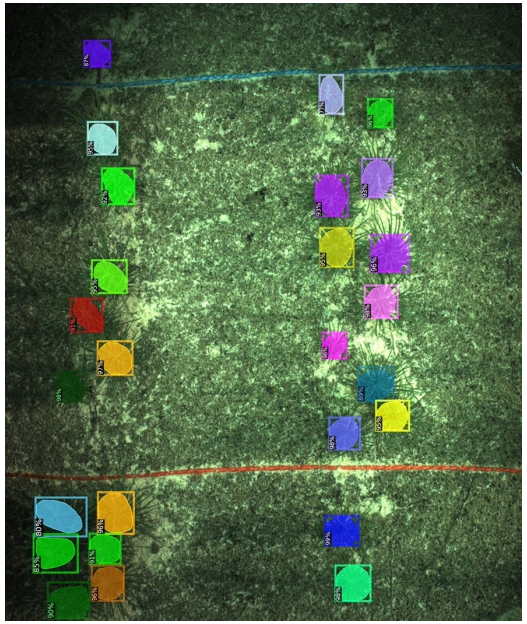
Progress

June 2021
3rd prototype test
Early-stage seedlings

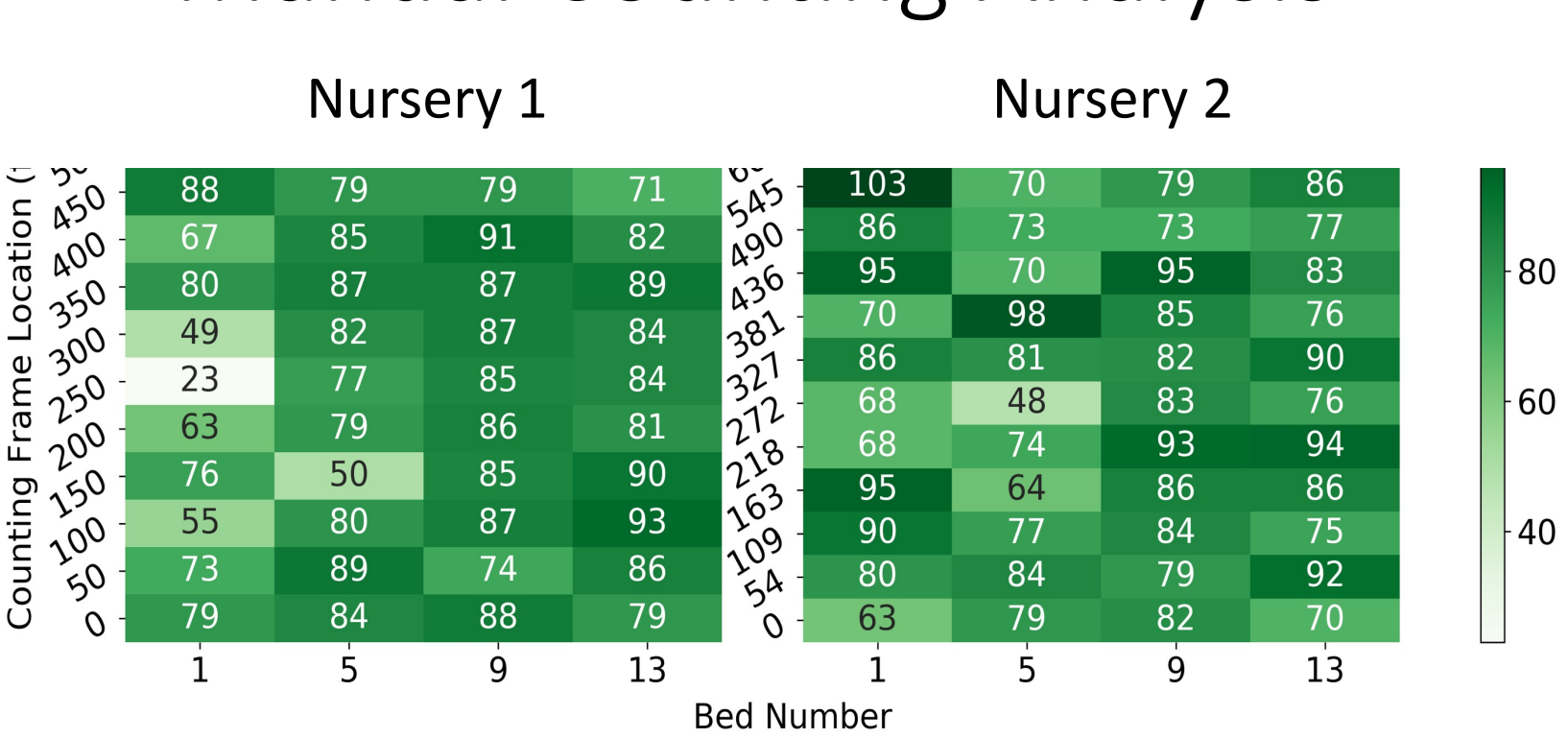
Data collection
at 2 nurseries

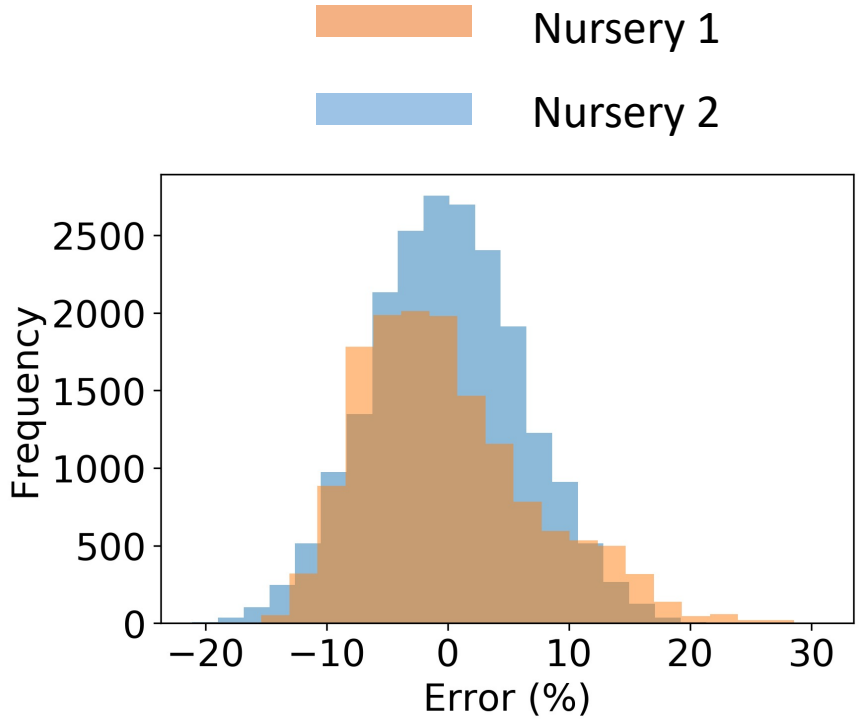
Extensive manual counting

Seedling detection
with
Artificial Intelligence



Manual Counting Analysis





11 or 12 9inch x 1foot counting frames per bed
4 beds across 1.5 units

Pick 1 counting frame from each bed to estimate the total count per bed

Coefficient of Variation	17%	14%

Mean Absolute Percentage Error

Nursery 1	Nursery 2
5.7%	5%

Machine Counting Accuracy (Early Stage)

Nursery 1	
Manual Count	854
Machine Count	796
Error	-58 or -6.8%

Nursery 2	
Manual Count	926
Machine Count	908
Error	-18 or -1.9%

1. Doubles/triples may cause errors.
2. Growth stage can influence counting accuracy.

Acknowledgements

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