Enhancing Mechanical Harvesting Systems

Increasing Fruit Recovery

Reza Ehsani
Assistant Professor
Citrus Research & Education Center

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Fruit Recovery Improvement

- Fruit removal
- Fruit collection
  - Catch frame efficiency
- Fruit pick-up

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Fruit Removal

- Using mesh sensor network to measure acceleration and force on the fruit
- Study the shaking pattern throughout the canopy

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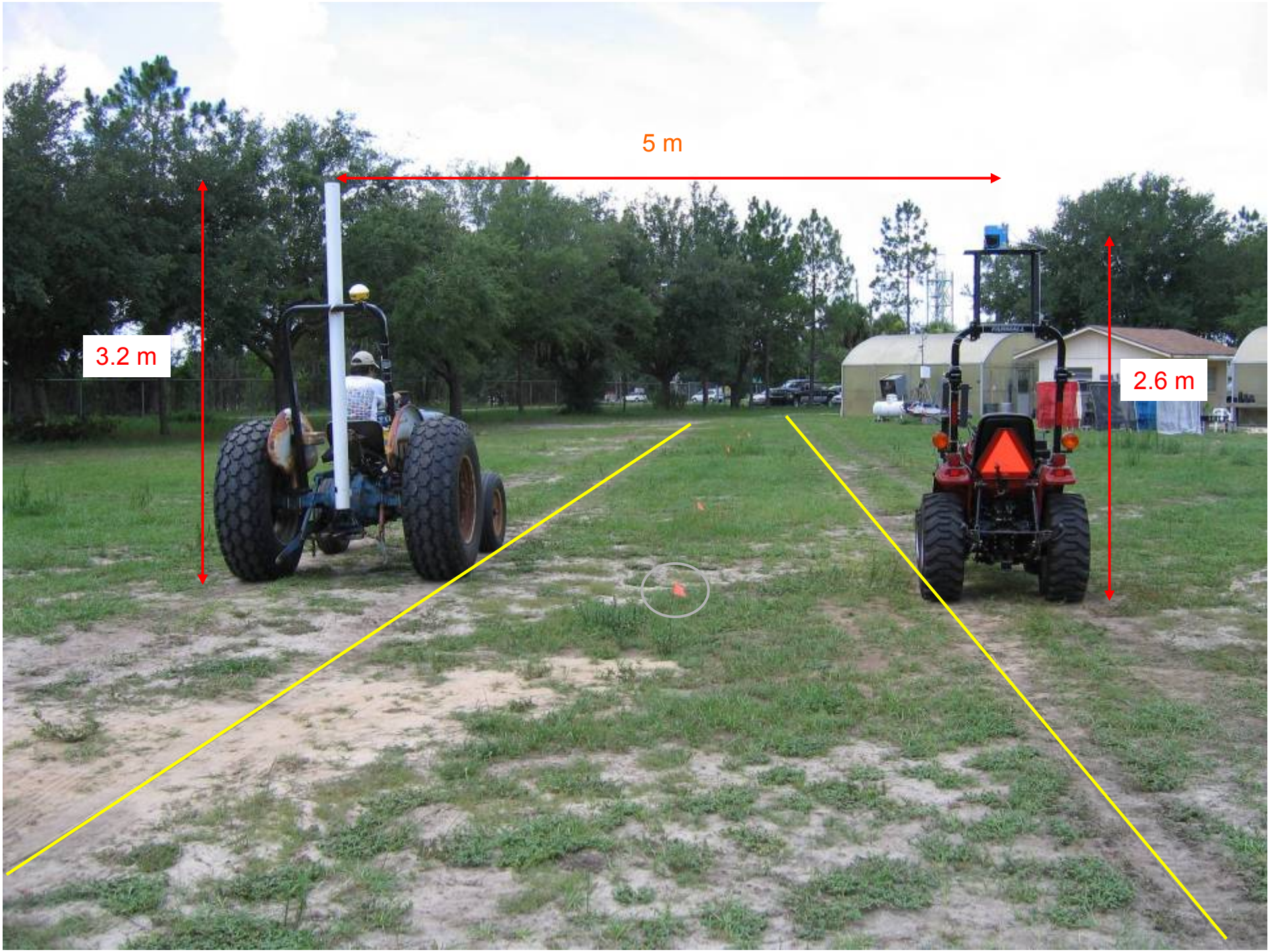
Catch Frame Efficiency


5 m
3.2 m
2.6 m

Conclusion

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- The control system developed in this study successfully synchronized movement of the paired vehicles.
- The mean error at constant speeds was in the range of 3 to 4 inches.
- The mean error at the ramp speed pattern was 5.6 inches.

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New Harvesting Alternative

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Pick-Up Machine Objective

- To evaluate the pick-up machine for its:
  - Picking rate
  - Picking efficiency
  - Field capacity
  - Fruit injury
  - Trash removal
  - Microbial load
    - Control group was hand-harvested oranges - Group 1
    - Looked at MH fruit, hand PU (indicates effect of MH) – Group 2
    - Looked at MH/PU fruit (indicates effect of entire system) – Group 3

Summary

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- The average picking rate was 354 lb/min on ridge, 214 lb/min in bed, 207 lb/min at swale
- The picking efficiencies were 80 to 97%
- Field capacity was 0.35 ac/hr
- Damaged fruits were about 0.53%
- Picking up of damaged fruits and hard objects like glass bottles needs to be rectified

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Summary

- No indication that fruit that has been in contact with ground is consistently and significantly higher in surface contamination
- Weather conditions during this season (dry, sunny) may have contributed to these encouraging results
- Caveat: We have only looked at two sampling sites

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Thanks and Questions