Drones in agriculture at UC Davis



Travis Parker Plant Biology Graduate Group LASER, January 31, 2019

Why drones in ag?

-need for increased agricultural production
-consumer demand for responsible farm management
-farm labor concerns
-agriculture will need to rapidly evolve... and
drones are a powerful, rapidly evolving tool

What can drones do in agriculture?

- Research
 - Plant breeding
 - Improving agronomic practices
- Precision agriculture
 - Eye in the sky for farmers
- Application of sprays
 - Fewer recent advances than other sectors?





Typical UAS workflow for agricultural science:

1. Develop flight plan

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Typical UAS workflow for agricultural science (cont'd):

2. Collect data







3. Transfer imagery



Typical UAS workflow for agricultural science (cont'd):

4. Construct models









Typical UAS workflow for agricultural science (cont'd):

5. Export to other programs (e.g. QGIS)



Example: Alfalfa

- Old method: Handcut, dry, bag, weigh each plot individually
- New method: Fly drone, extract data from all plots simultaneously



Predicted Dry Weight (g)

Prediction of Alfalfa Yield

Takeaway: A few years ago, these results would have been impossible

Sensors and vegetation indices

Project Edit

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View

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Coordinate 758462.1,4025045.7 🛞 Scale 1:500

Rotation 0.0

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Settings Plugins Vector Raster Database Web Processing

Help

Health predicted by infrared and true color

(different camera)

+shapefiles for data extraction



Drones as an educational tool







Drones as an educational tool



Field day demonstration flights with farmers

PLS 198 student training

PLS 198 students flying



Unmanned Aerial Vehicles (UAVs) in Agriculture





PLS 198-32, Spring 2019, 2 units CRN: 87027





M 11am-12pm, W 1pm-4pm Instructor: Travis Parker trparker@ucdavis.edu Instructor of record: Paul Gepts



Education and outreach PLS 198 student groups







KPBS: "A Growing Passion"

Travis **Parker** UC Davis Researcher

Heirloom (at left) and new variety (right)

The future of farming...











Summary

- Agriculture will need major advances in coming decades
- Drones are useful for many different agricultural applications
- Drones collect highly precise, highthroughput data, which was out of reach just a few years ago
- Drones are an excellent tool for engaging the next generation of innovators





Thanks!









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