

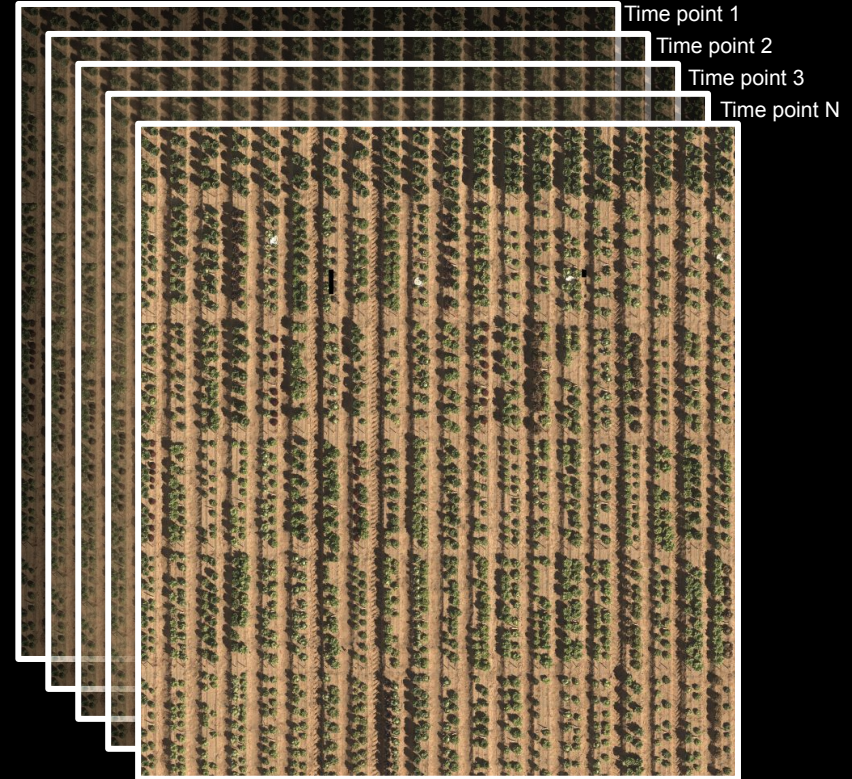


As easy as 1-2-3: Machine learning in real-world projects

ACIC 2021

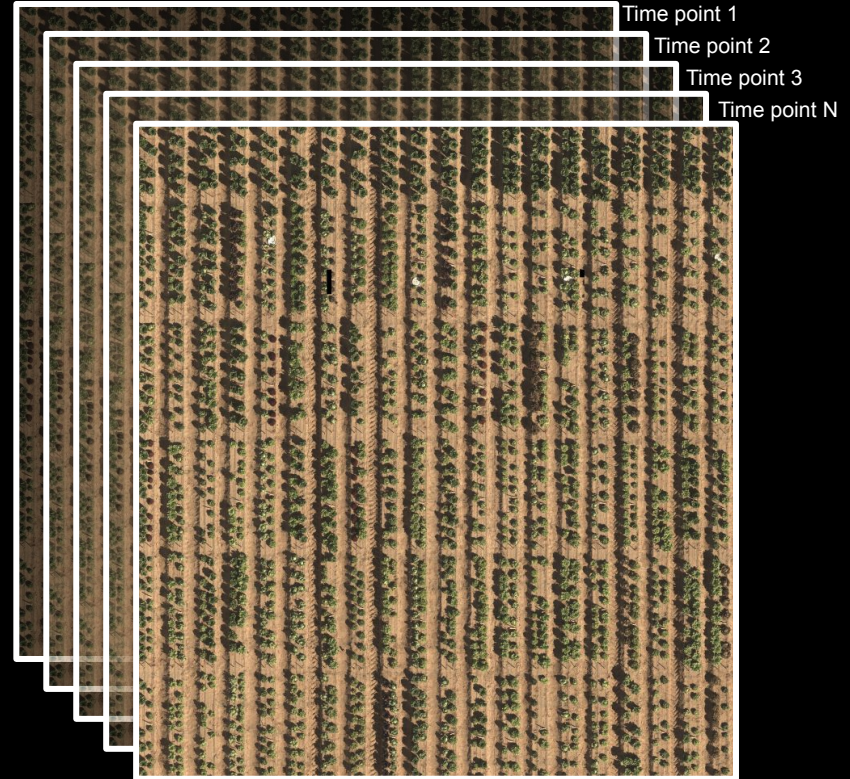
Problem Framing: Tracking thousands of plants

- **Plant Science** perspective
 - Interested in assessing phenotypic variation
 - Can we use our data to predict yield ?
 - Can we use our data to improve crop performance?
 - What other data and/or ML approaches will allow us to understand plant growth?

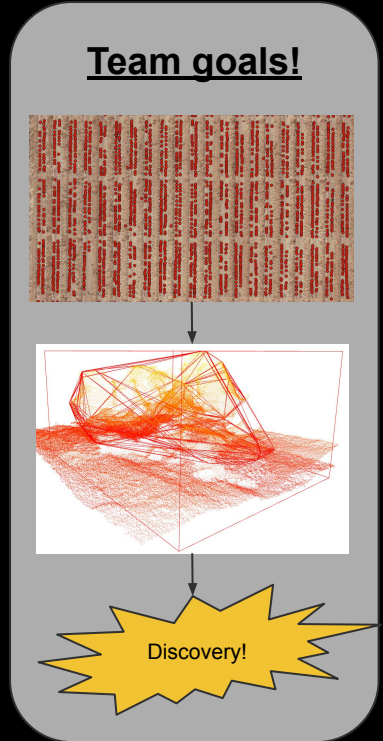
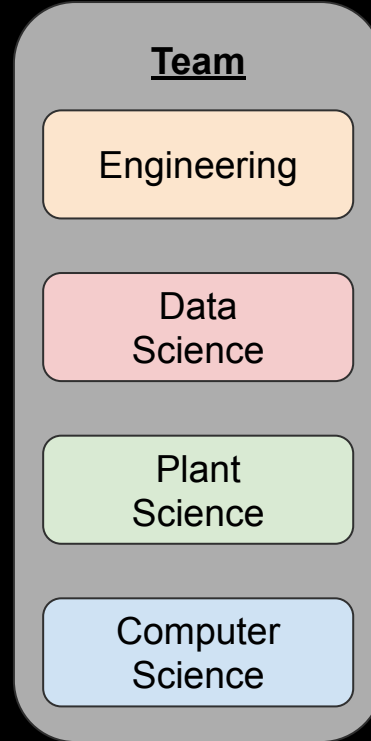
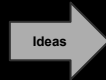
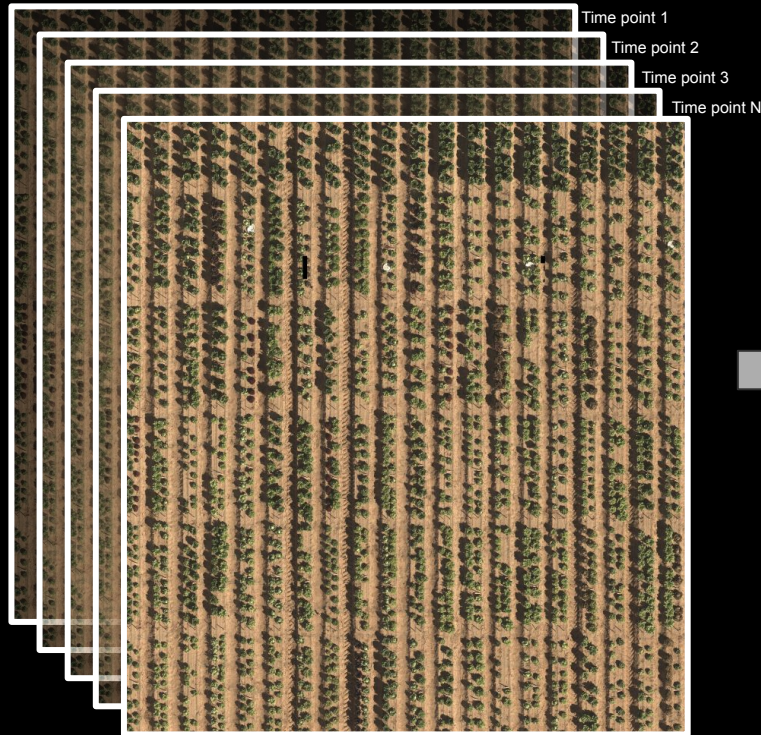


Problem Framing: Tracking thousands of plants

- **Data Science** perspective
 - Multiple data time points throughout growing season
 - Lots of training data = good!
 - Image processing techniques have been unsuccessful
 - Shift to ML methods



Problem Framing: Tracking thousands of plants

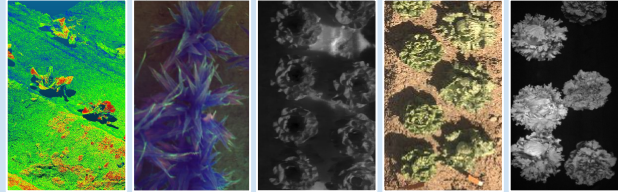


Data Collection: Converting raw data into gold

Collection method



Data management



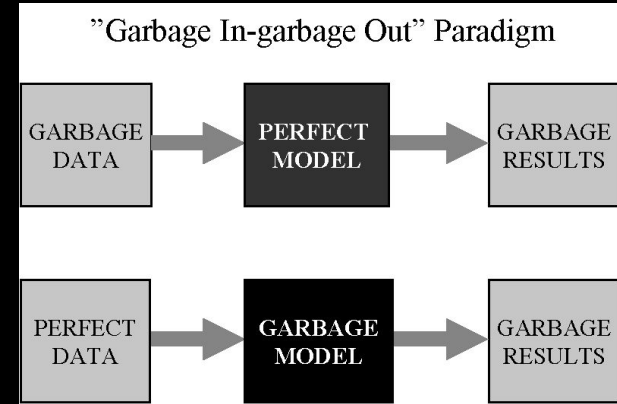
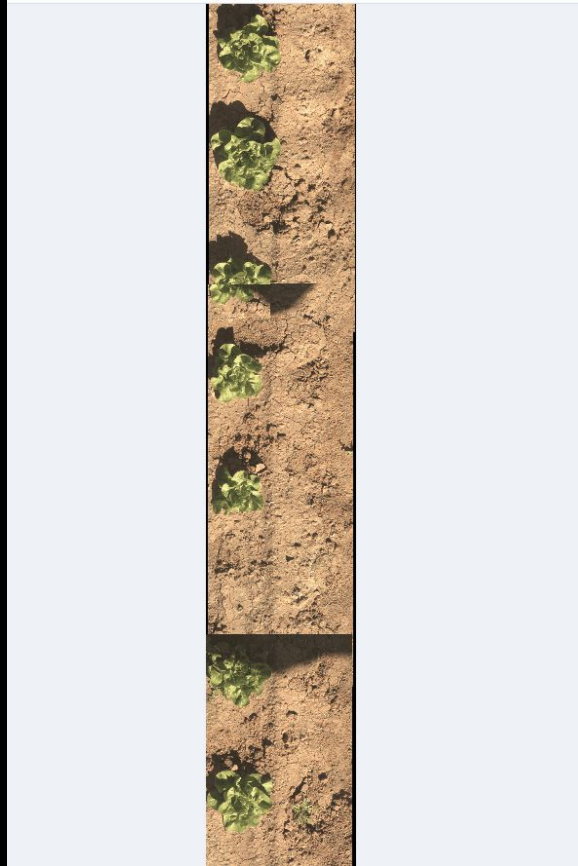
Data volume:

- Max: 10 TB/day
- Typical: 1.5 TB/day

Data curation

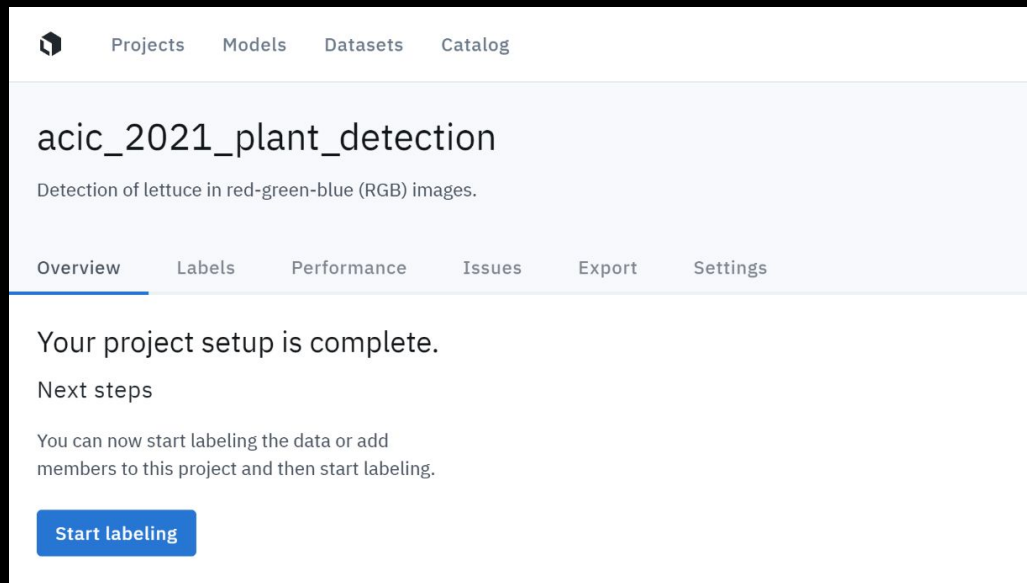


Data Preparation: Garbage in, garbage out



Data Preparation: Garbage in, garbage out

Let's label some images: [Labelbox](#)



The screenshot shows the Labelbox web interface for a project named 'acic_2021_plant_detection'. The project description is 'Detection of lettuce in red-green-blue (RGB) images.' The 'Overview' tab is selected, showing a completion message and a 'Start labeling' button.

Projects Models Datasets Catalog

acic_2021_plant_detection

Detection of lettuce in red-green-blue (RGB) images.

Overview Labels Performance Issues Export Settings

Your project setup is complete.

Next steps

You can now start labeling the data or add members to this project and then start labeling.

[Start labeling](#)

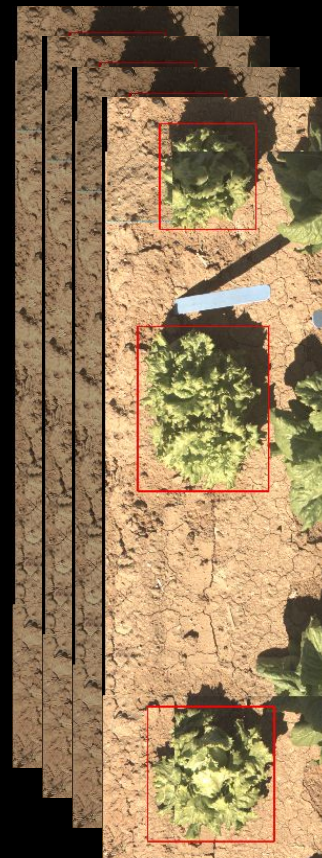
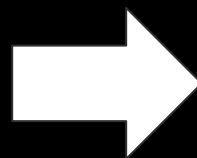


Data Preparation: Garbage in, garbage out

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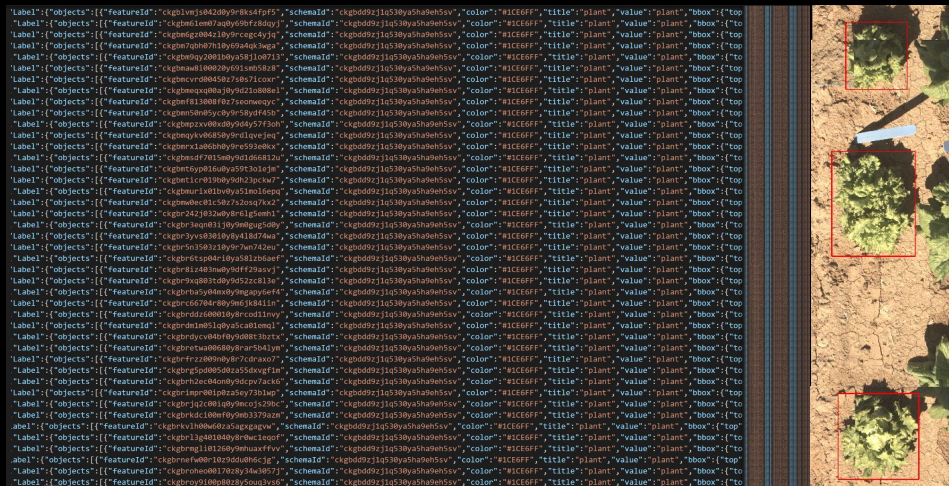
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```



In groups of 4-5:

- Export labels
- Convert JSON file to XML
- Visualize labels for quality control



Model training: The relatively easy part

Launch Notebook: [Google Collab](#)



python™



Model training: The relatively easy part

Labeling

- [Labelbox](#)

Machine learning

- [Detecto](#)

Array/image manipulation

- [NumPy](#)
- [OpenCV](#)



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