



Artificial Intelligence in Forage Research: A case study in creating AI standards

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Outline

- What is AI
- Where is it used in plant research
- Case study 1: Root imaging
 - Lessons learned
- Case study 2: Stem imaging
 - Lessons learned
- Case study 3: Stem cross section imaging
 - Lessons learned
- Where do we go as a community?

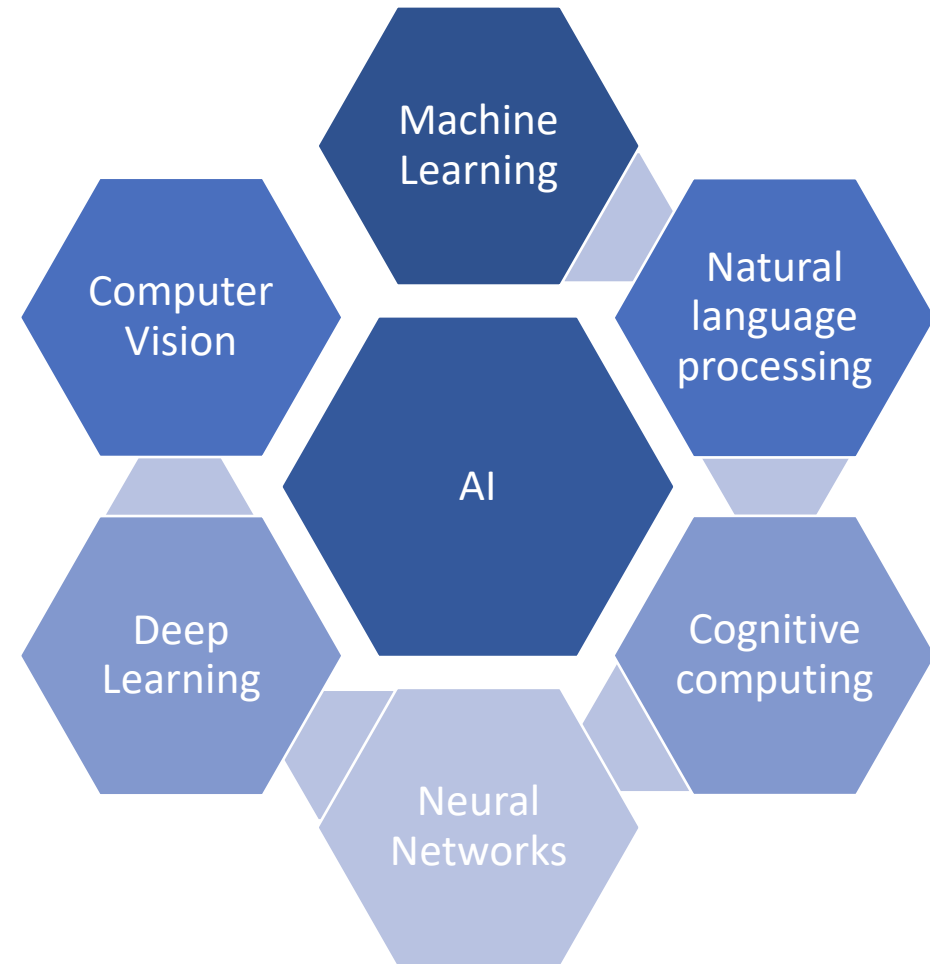




WHAT IS A.I.?

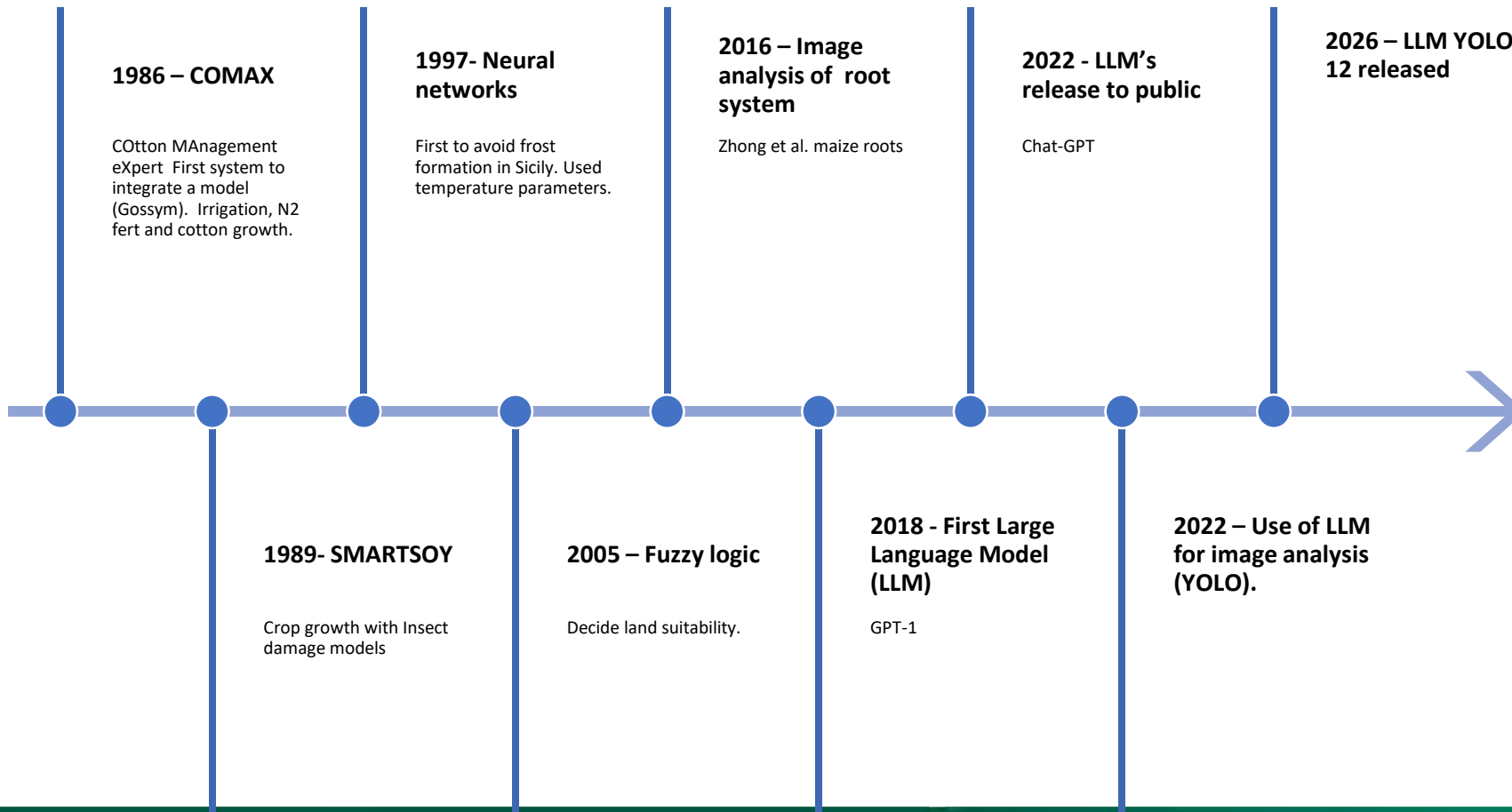
- Use of computers to mimic human intelligence using similar human methodology.
 - If-then, logic, decision trees, and machine learning.
 - Make assumptions!

The technology is **MOVING FAST!!!**

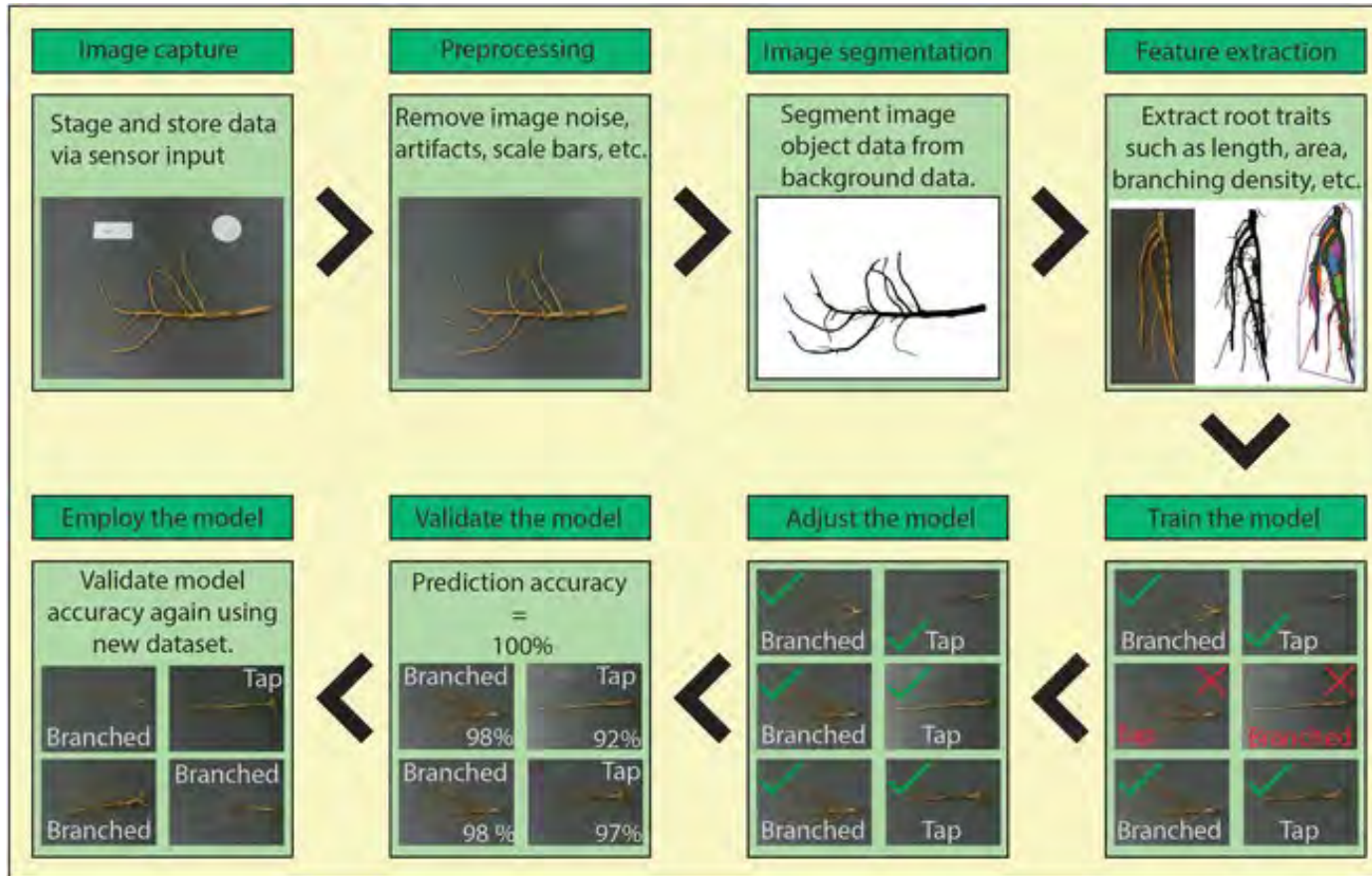




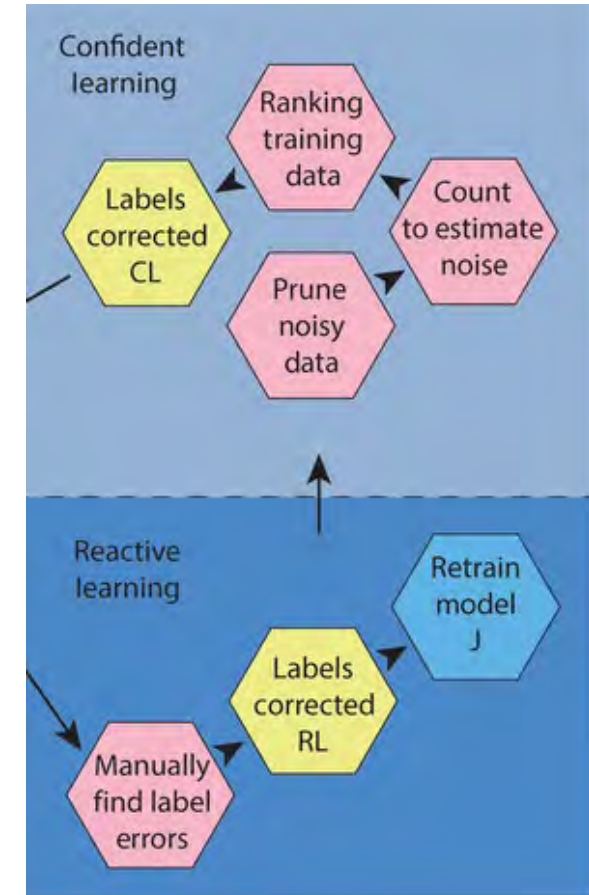
A.I. in Ag



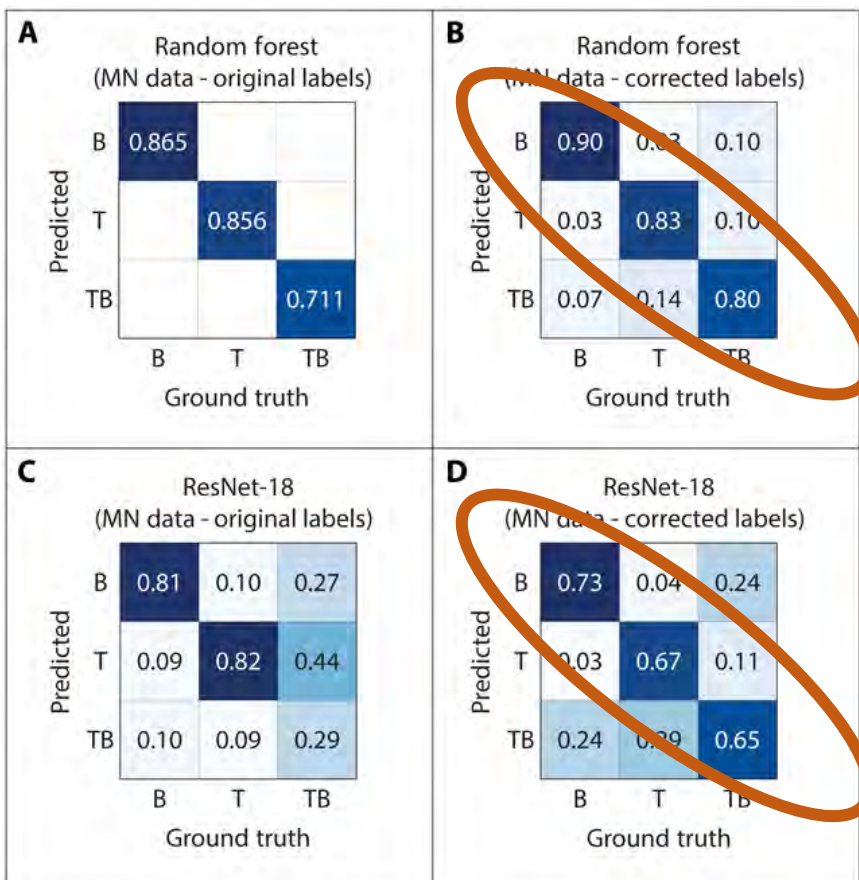
CASE STUDY 1: Root Imaging



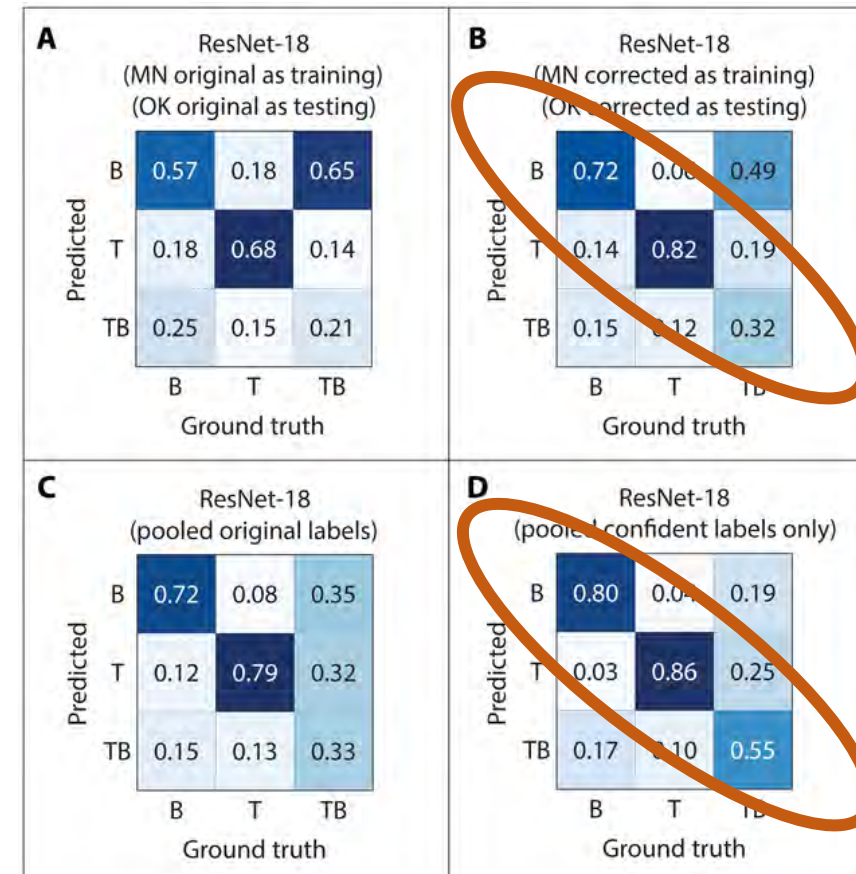
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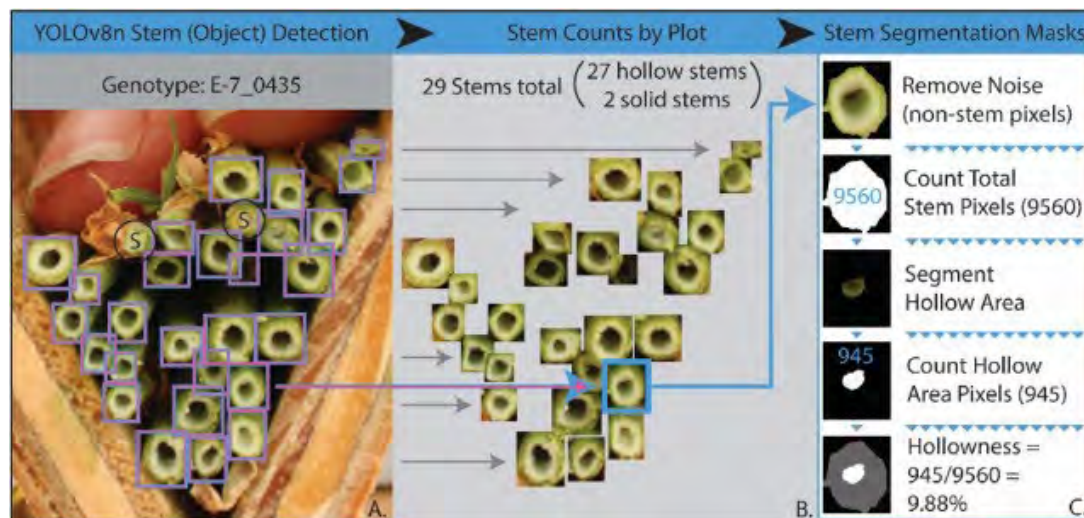
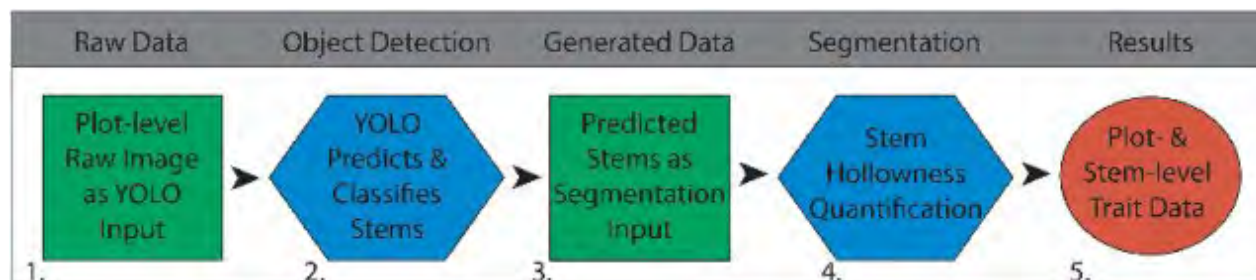
Weihs et al. 2024 Plant Phenome



- Determining intermediates is difficult
- Testing with alternative populations is important



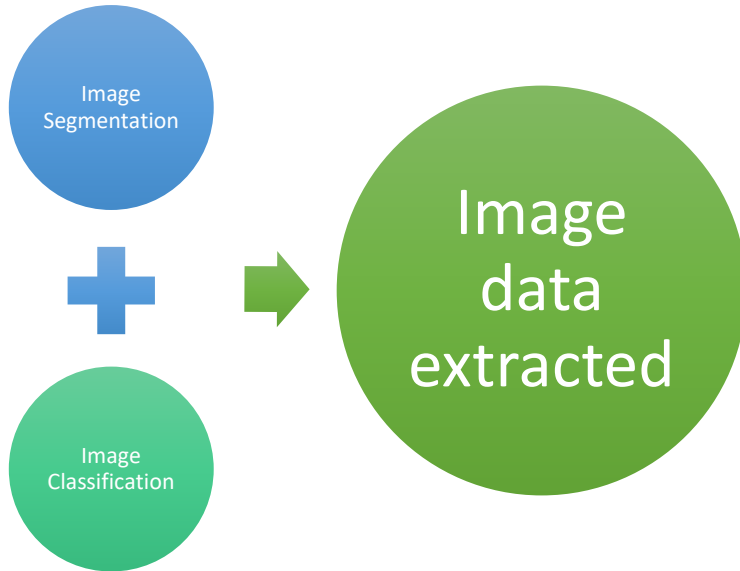
CASE STUDY 2: Stem Imaging



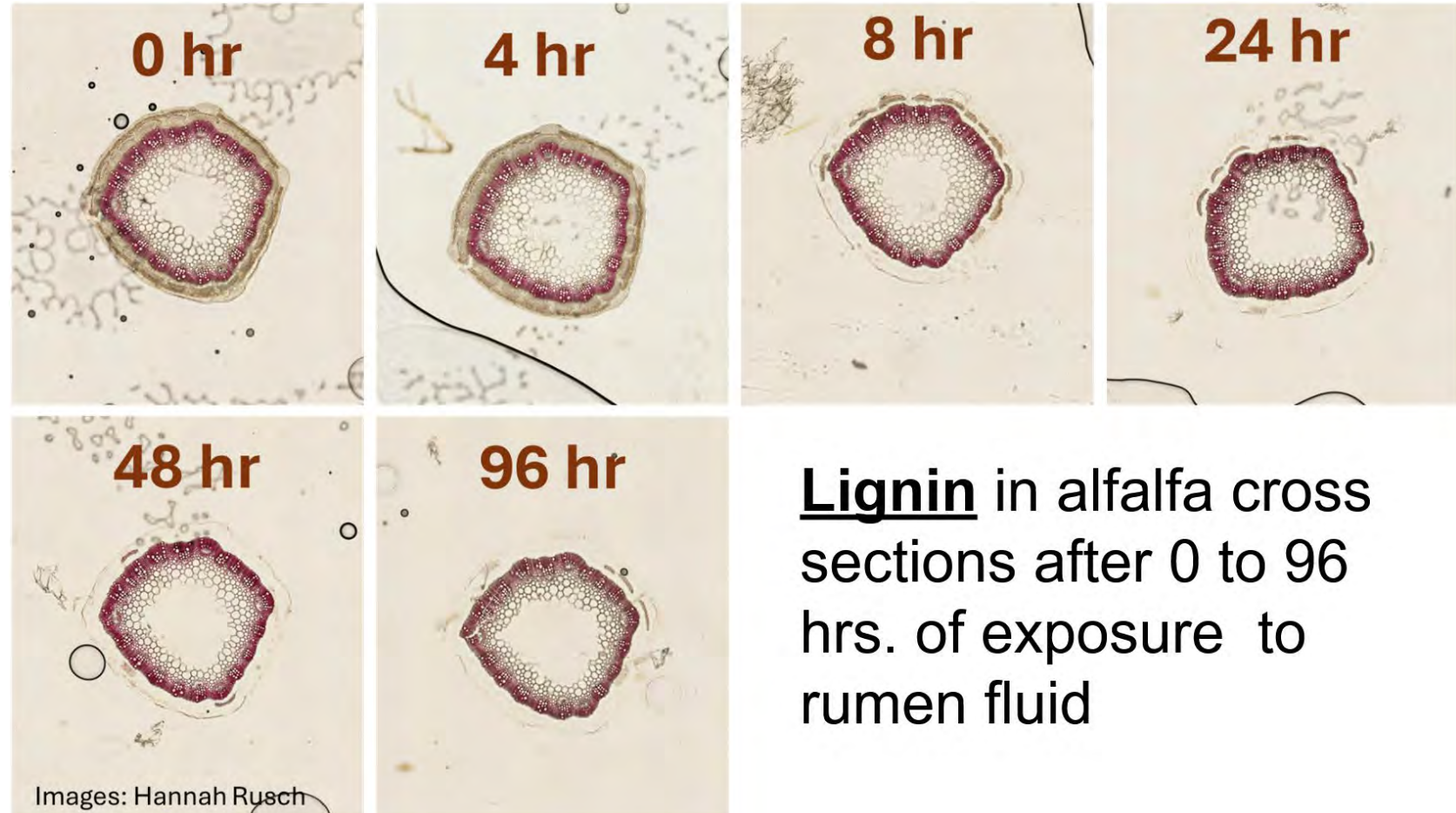
Predicted \ Ground Truth	HS	SS	BG
	0.90 1026	0.10 58	0.48 23
SS	0.03 34	0.70 402	0.52 25
BG	0.07 81	0.20 115	0 0

- A “non” category assisted with better character recognition
- Model (LMM) are RAPIDLY changing

Weihs et al. 2025, Smart Ag Tech



- LLM need images that have been “seen” before
- Quality and scale of images is important



Lignin in alfalfa cross sections after 0 to 96 hrs. of exposure to rumen fluid



Thoughts -

- Moving FAST!
- Accuracy vs relevance
- Reproducibility? Computer science has publishing standards (how to describe models).
- Data sharing, credit?
- Who makes the decisions? User or programmer?



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