Sensing, Data, and Robotics in Specialty Crop Production

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ICDS Virtual Symposium 2020

The Pennsylvania State University

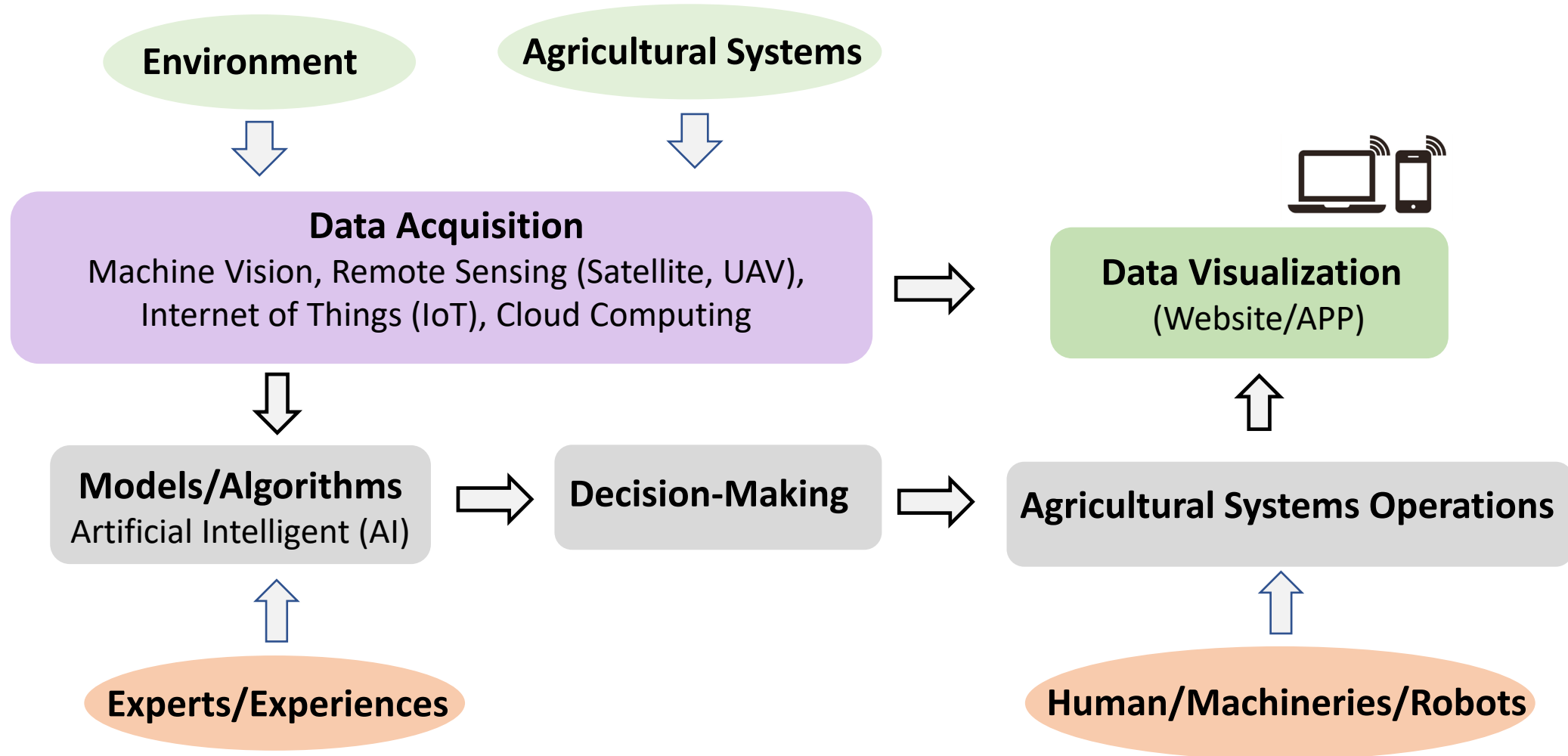October 21, 2020

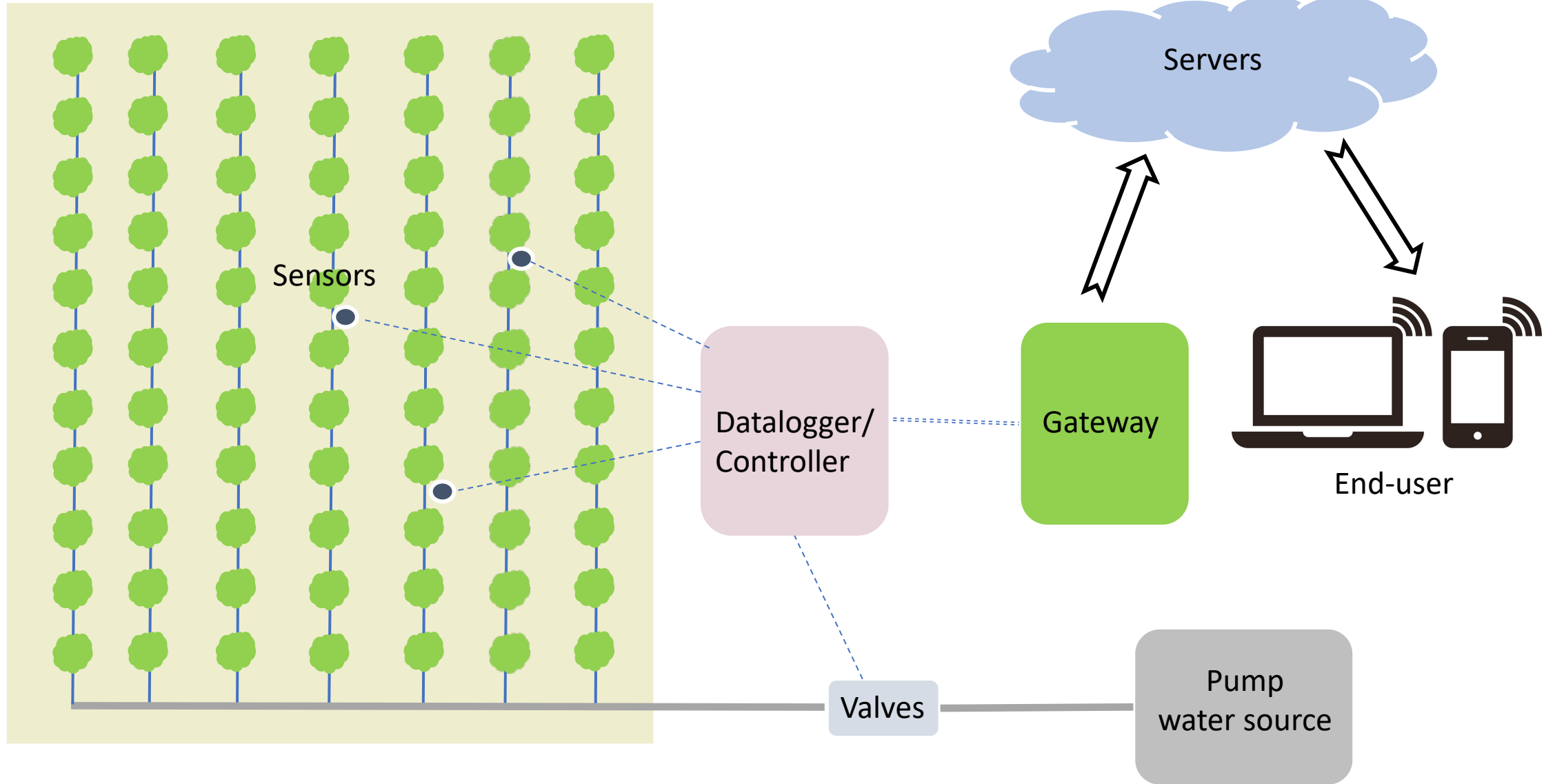# Advanced Agricultural Systems

Precision Irrigation Management

Precision Irrigation Management

LoRa Based IoT for Irrigation

Soil Moisture Sensor

Datalogger &Gateway

Valve Control

IoT Platform

Precision Irrigation Management

Precision Irrigation Management
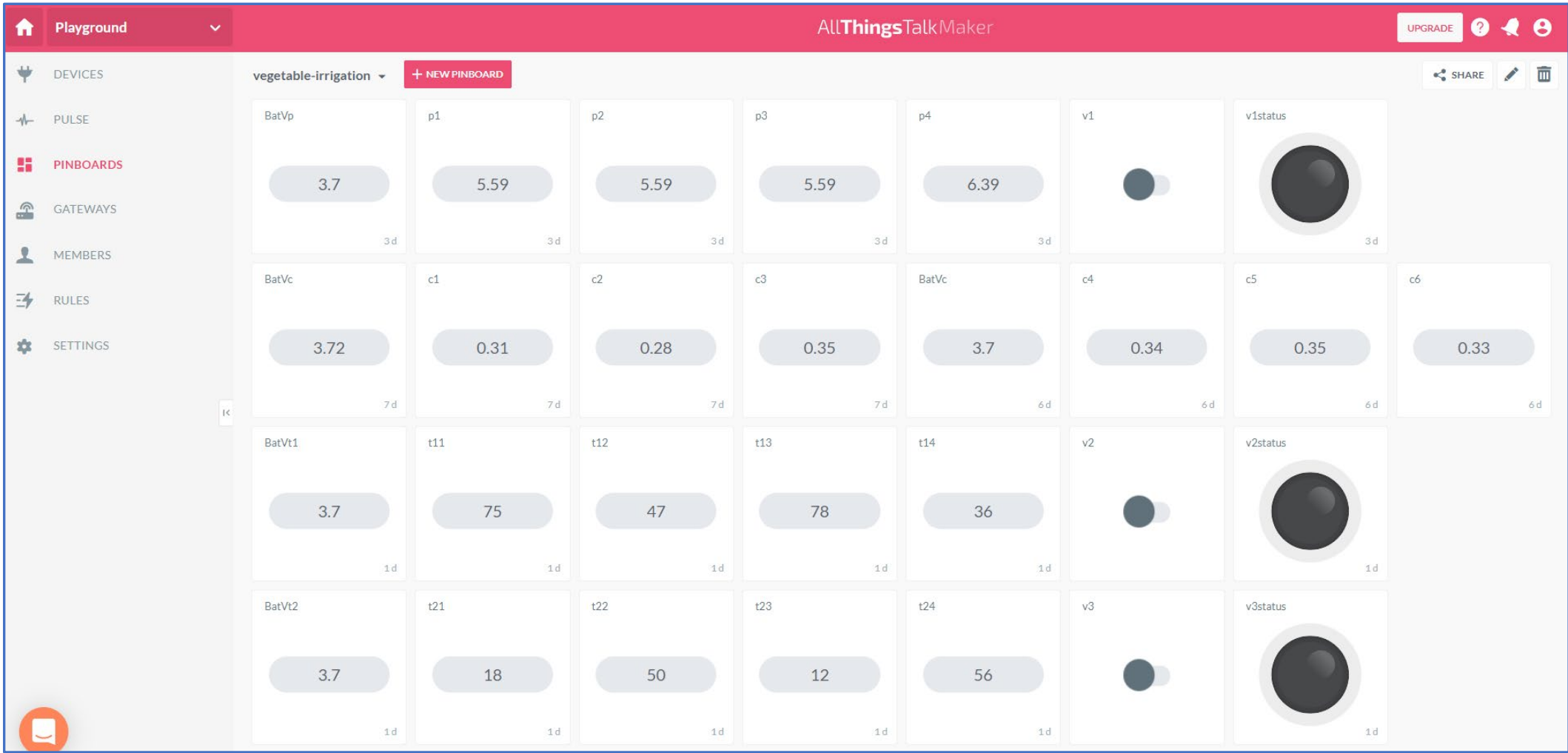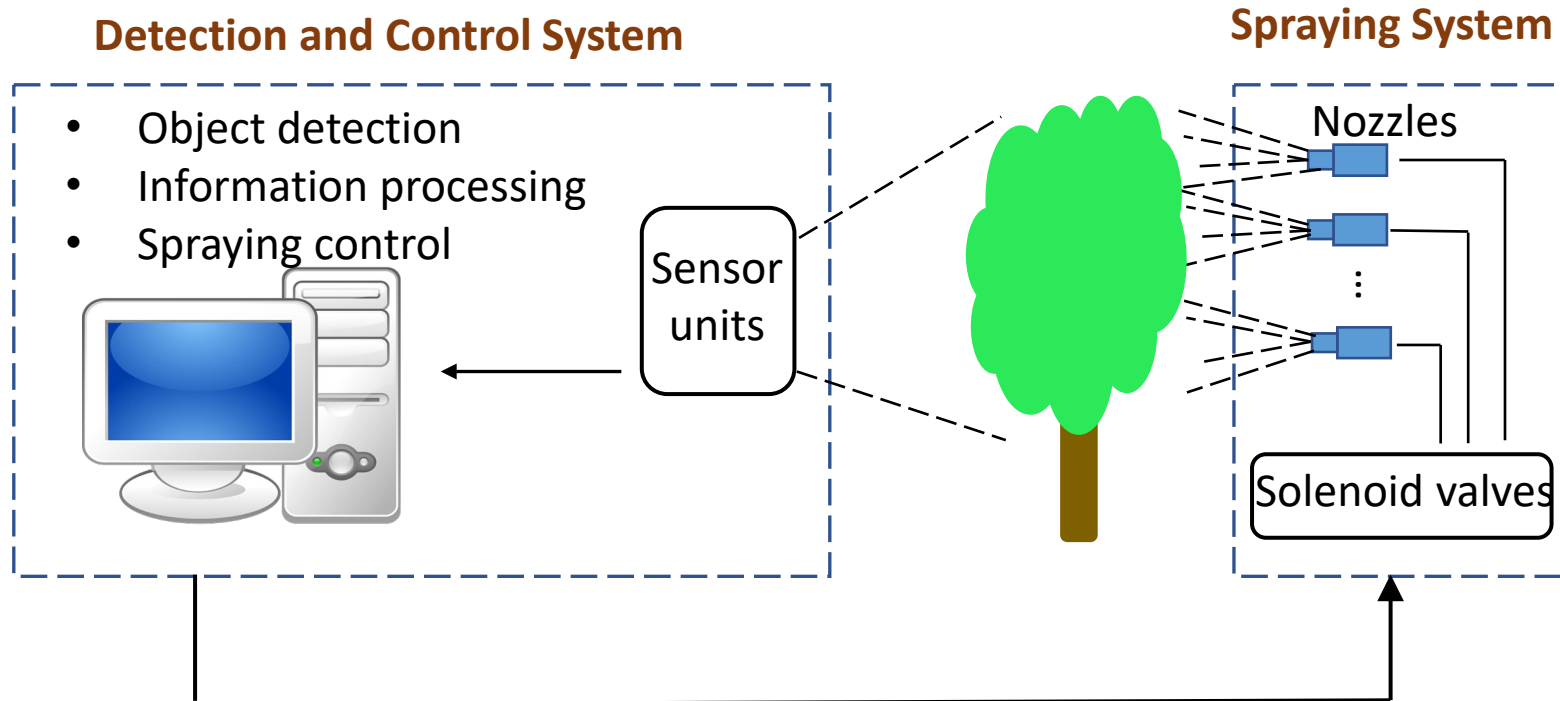
Data Visualization/Automatic Control

Intelligent Pesticide Spraying

Variable Rate Spraying

Detection and Control System

- Object detection
- Information processing
- Spraying control

Sensor units

Spraying System

Nozzles

Solenoid valves

Intelligent Pesticide Spraying

Tree Canopy Density Measurement

Segmented Apple Tree Canopies

Leaf area density map

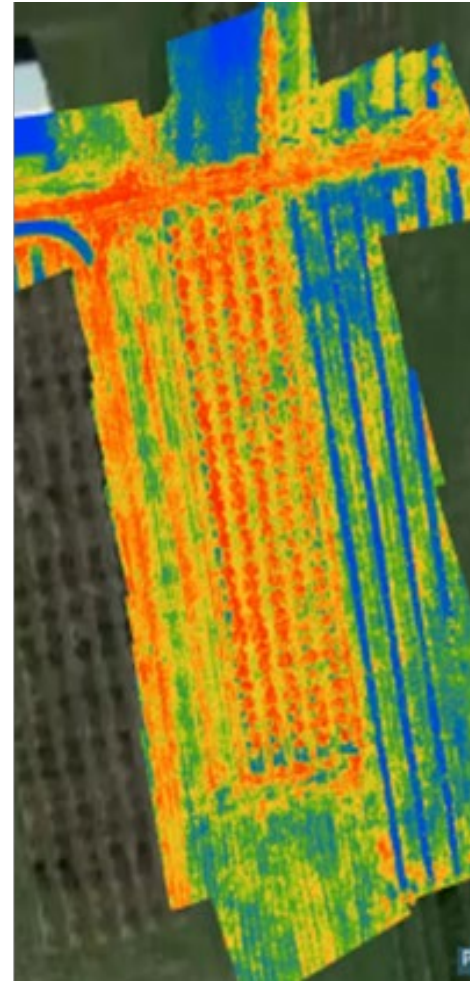# *Intelligent Pesticide Spraying*
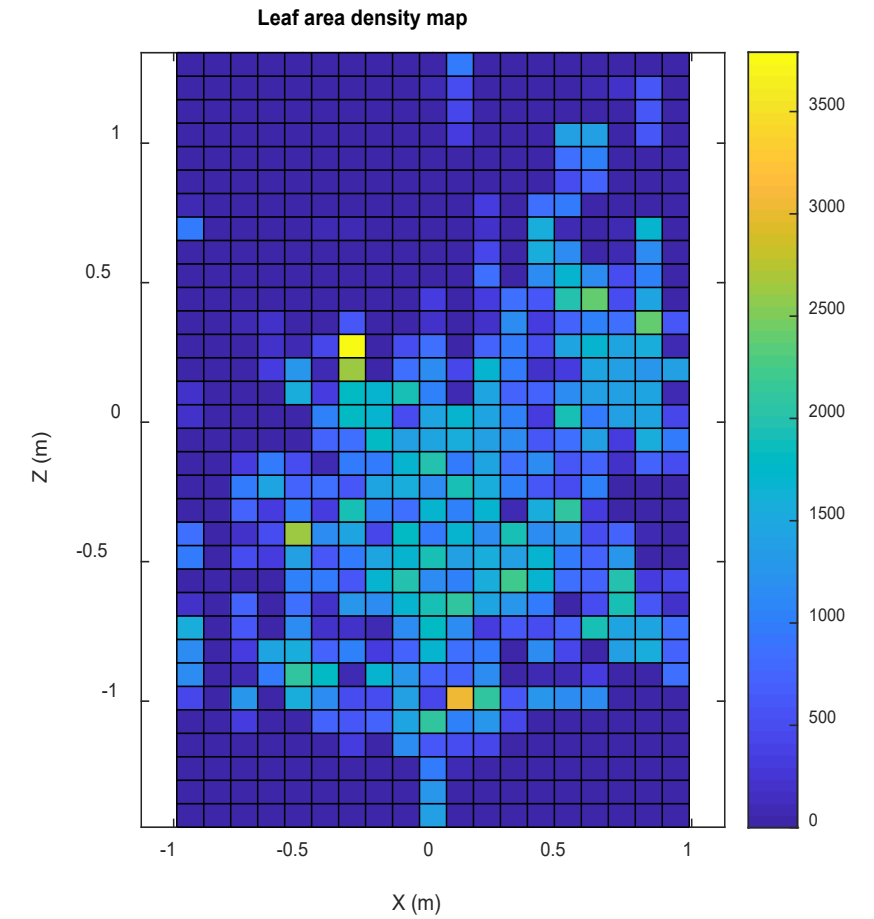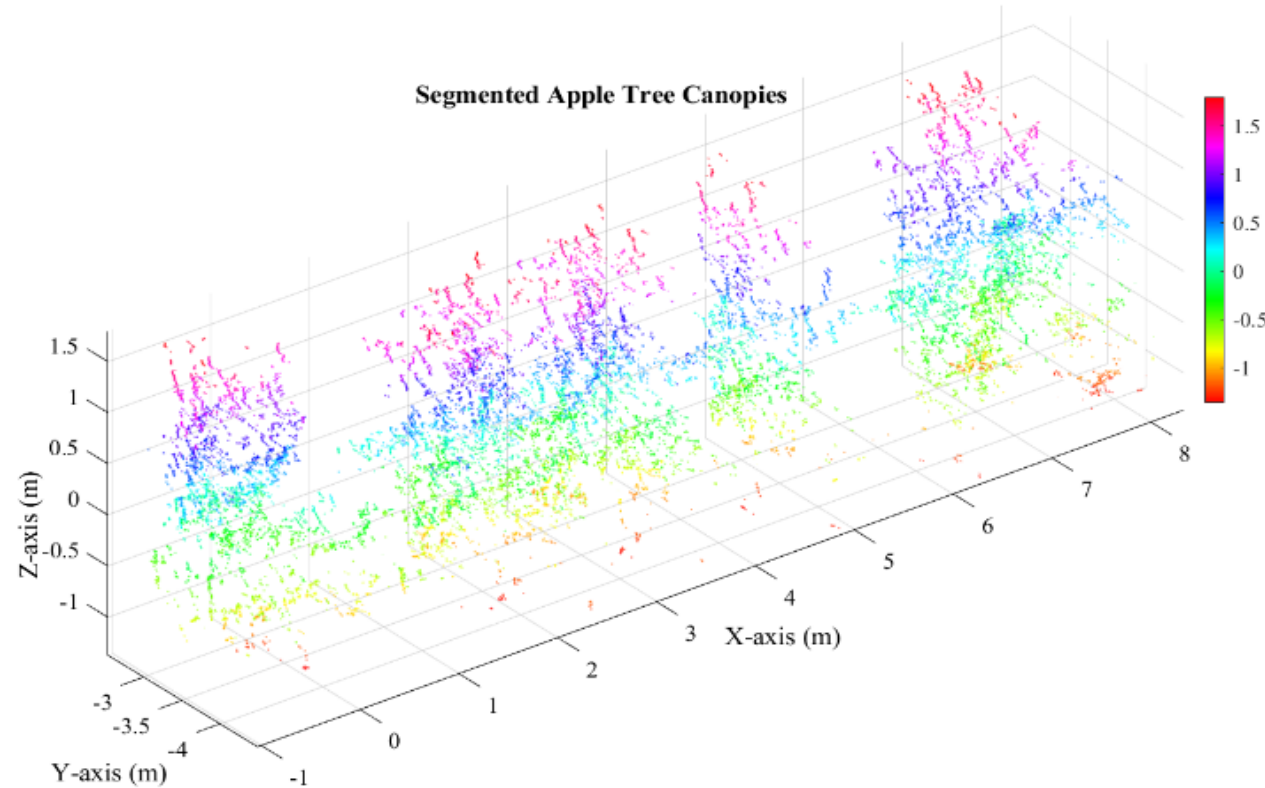
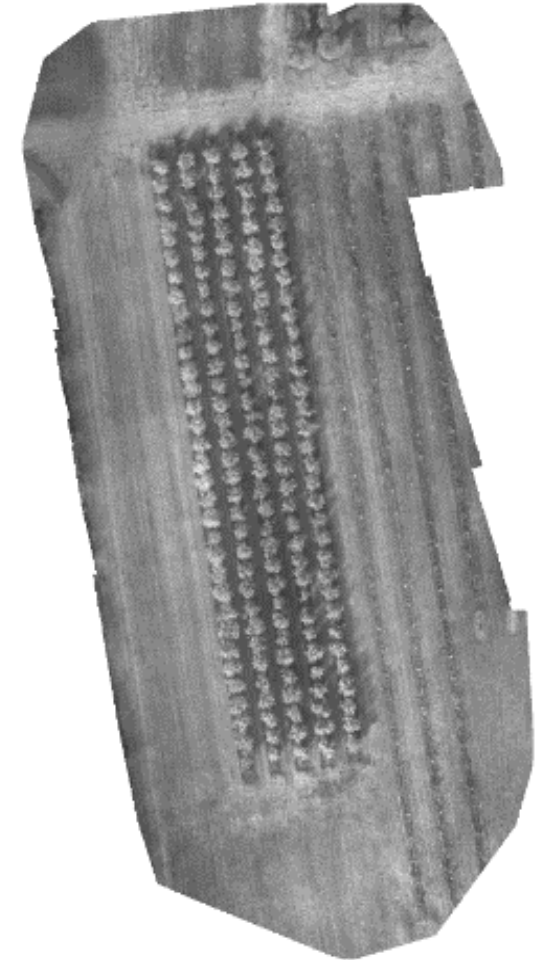## UAV-Based Crop Health Scouting- Early Symptom Detection

Drone flight

RGB image

NDVI map

NIR spectral image

Robotic Tree Fruit Production

- Robotic branch pruning for apple trees
- Robotic pollination/blossom thinning for fruit trees
- Robotic green fruit thinning for apple trees
- Robotic tree fruit harvesting

Thank you!

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