Better Farming through Embedded AI

Chris Padwick

Director of Computer Vision Machine Learning

Blue River Technology

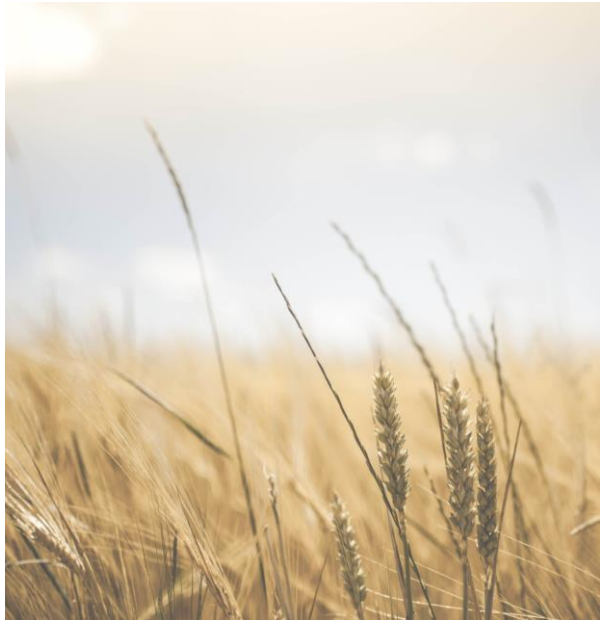
BLUE RIVER TECHNOLOGY

The Challenges of Agriculture

- Growing population
- Extreme variability
- Labor shortage & aging workforce

Traditional Agriculture vs. the Next Frontier

Traditional: Bigger. Faster. Stronger.



Next: Automated. Easy to Use. More Precise.

Impact at Scale

More than 600,000 John Deere connected machines traverse **a third of the Earth's land surface**

High Level Overview of Spraying

See & Spray™

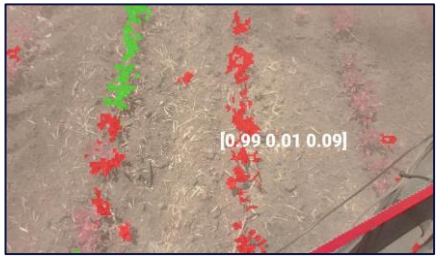
TECHNOLOGY

Computer Vision | Machine Learning | Edge Computing | Rugged cameras | Robotics

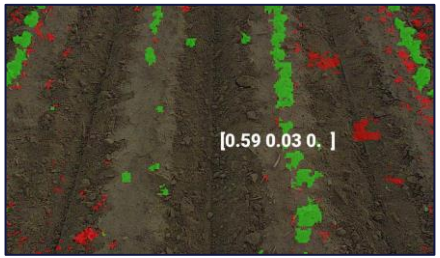
A Challenge See & Spray™ Solves

Real-Time Image Quality Predictions

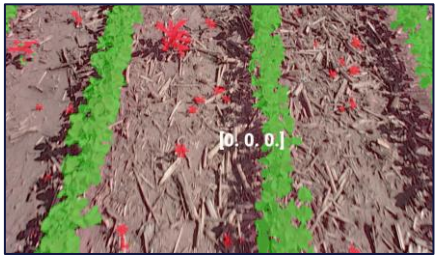
Dust, Fog, Condensation



Low Light

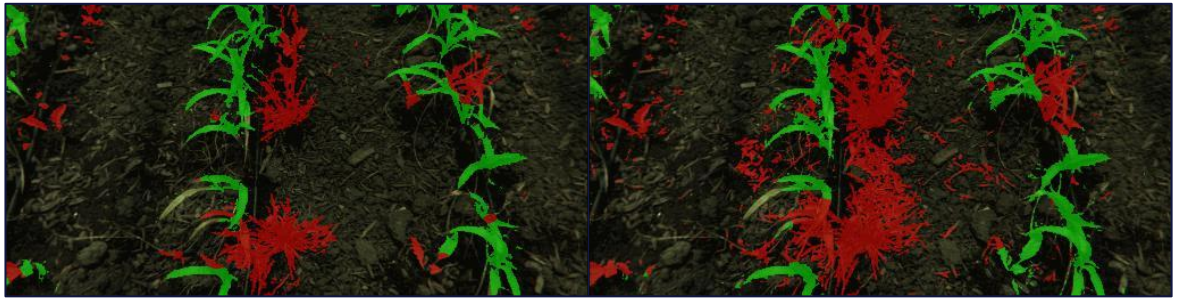


Glass, Defocus, Motion Blur



No Augmentation

Fog Augmentation



Key

- Weed
- Crop

BLUE RIVER TECHNOLOGY

Harvest Compute Cluster

Advantages of on-prem processing

Tools for Training and Deployment

Training Pipeline

PyTorch

argo

Kubeflow

slurm workload manager

Release and Deployment

TensorRT

JFrog Artifactory

Buildkite

dl-core

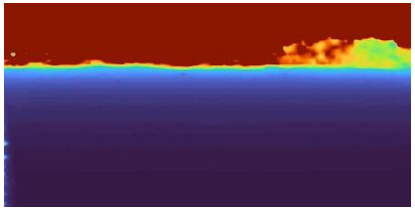
ONNX

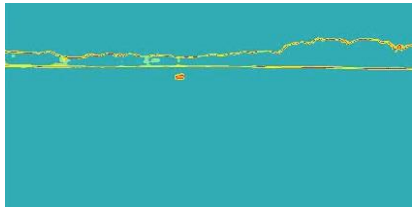
Looking Ahead

Deere’s Fully Autonomous Tractor

What Tech Does and Unlocks for Customers

What Happens When We Encounter an Obstacle?





Looking Ahead

Deere's goal is to have a **fully autonomous farming system** for corn and soybeans in the U.S. **by 2030**

The Intersection of Technology *AND* Purpose

Thank You