

# How Deep Learning and Robotics are Transforming Agriculture



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Learning, Blue River Technology



# The Challenges of Agriculture

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



# Traditional Agriculture

Bigger. Faster. Stronger



# Next Frontier of Agriculture

Automated. Easy to Use. More Precise.



A photograph of a vast agricultural field at sunrise. The sun is low on the horizon, casting a warm, golden glow over the scene. In the foreground, rows of green crops, likely soybeans, are visible, with some leaves in sharp focus. A large, dark tree stands prominently in the middle ground on the left side. The sky is a mix of soft orange and pale blue.

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



# SEE & SPRAY™



## TECHNOLOGY

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

2021 RoundUp: Application

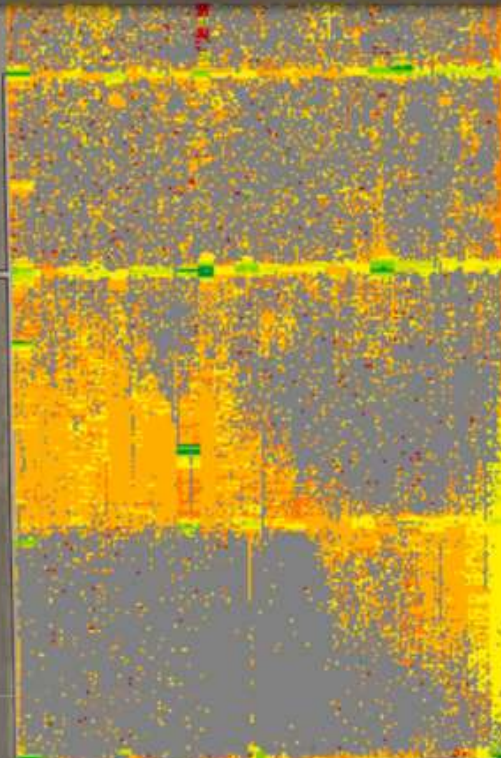
Applied Rate

Compare

Overlay

Share/Exp

1



Google Summary Data Analysis ©2022, CNES / Airbus, Maxar Technologies, Texas General Land Office, U.S. Geological Survey, USDA/FPA

Productivity 129.2 ac/hr

Working Time 2 hr 9 mins

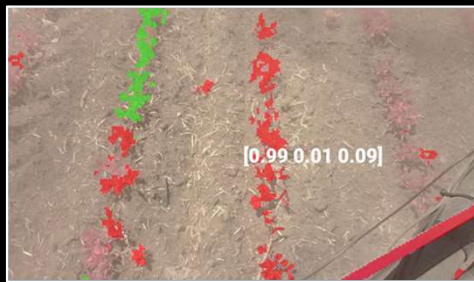
Total Fuel 16.2 gal

See & Spray™ Savings

62.8% | 2,632 gal

# Real-Time Image Quality Predictions

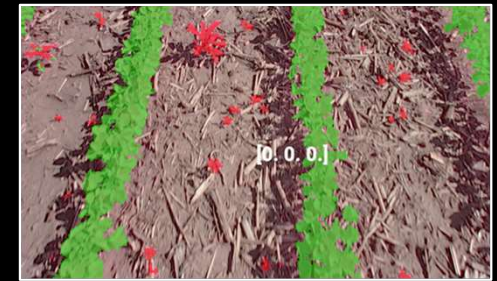
Dust, Fog, Condensation



Low Light



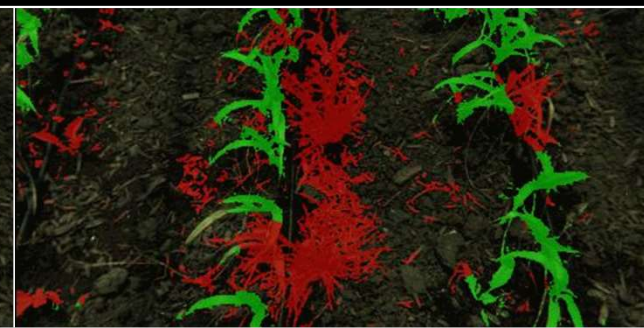
Glass, Defocus, Motion Blur



No Augmentation



Fog Augmentation



## Key

 Weed

 Crop



# Harvest Compute Cluster

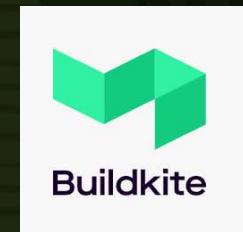
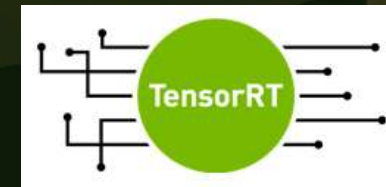
Advantages of on-  
prem processing



## Training Pipeline



## Release and Deployment



dl-core



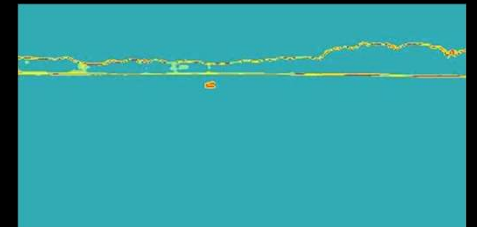
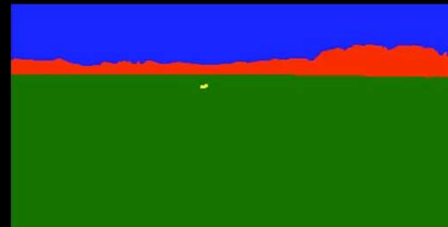
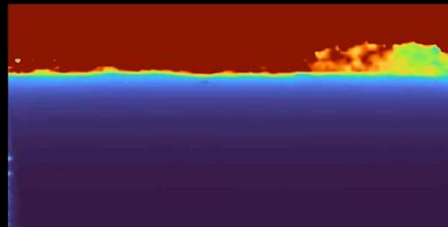








What happens  
when we  
encounter an  
***OBSTACLE***



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



A wide-angle photograph of a vast agricultural field, likely corn, with rows of green plants stretching towards the horizon. The sky is a mix of blue and orange, indicating a sunset or sunrise. The sun is visible on the left side of the horizon, casting a warm glow over the scene. The overall mood is serene and hopeful.

# The Intersection of Technology *AND* Purpose



Thank you



JOHN DEERE

