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Learning, Blue River Technology

How Deep Learning and Robotics are Transforming Agriculture



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 agricultural field at sunset. In the foreground, several large green leaves of a crop, likely soybeans, are visible, their edges catching the warm sunlight. Beyond them, rows of similar plants stretch into the distance. A single, tall, dark green tree stands prominently on the left side of the frame. The sky is a vibrant orange and yellow, with the sun low on the horizon, casting a golden glow over the entire scene.

**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

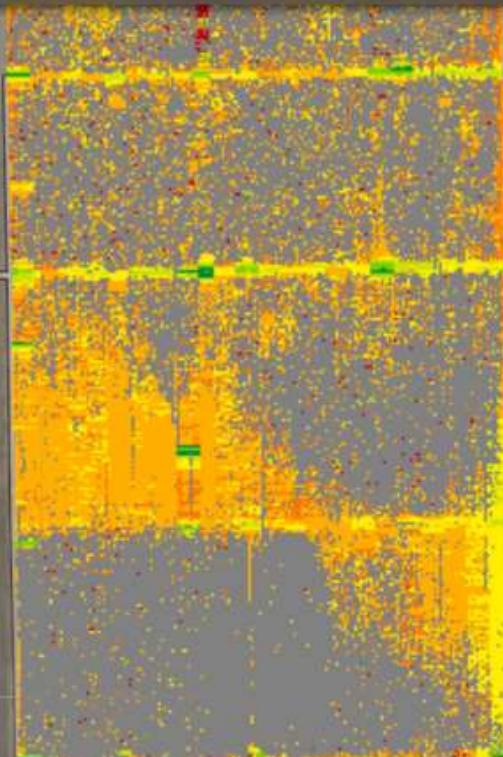
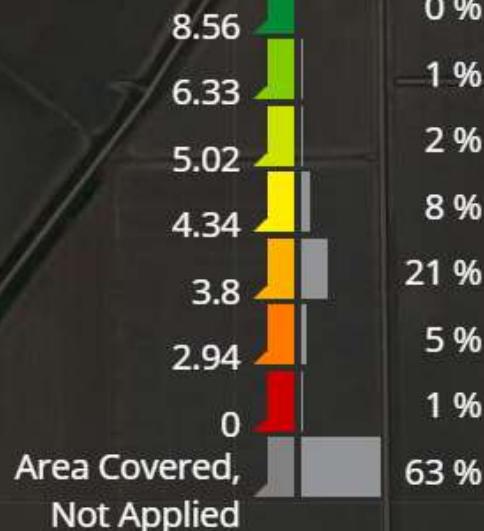
1 2021 RoundUp: Application
Applied Rate

Compare

Overlay

Share/Export

1



Google Summary Data Analysis

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Productivity 129.2 ac/hr

Working Time 2 hr 9 mins

Total Fuel 16.2 gal

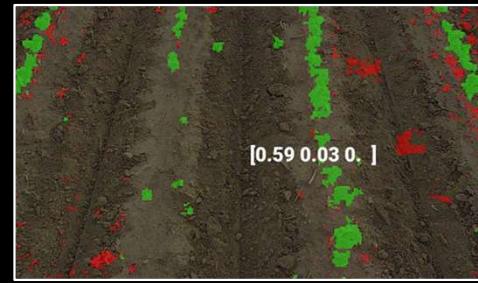
See & Spray™ Savings
62.8% | 2,632 gal

Real-Time Image Quality Predictions

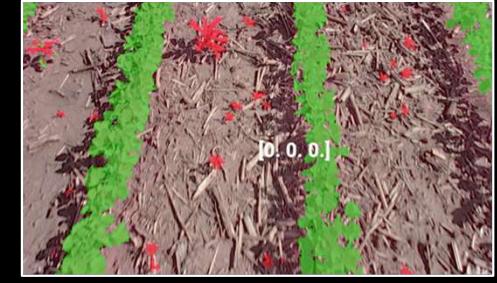
Dust, Fog, Condensation



Low Light



Glass, Defocus, Motion Blur



No Augmentation



Fog Augmentation



Key

■ Weed

■ Crop

Harvest Compute Cluster

Advantages of on-prem processing

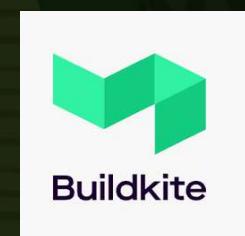
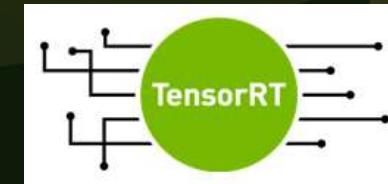
HARVEST



Training Pipeline



Release and Deployment



dl-core



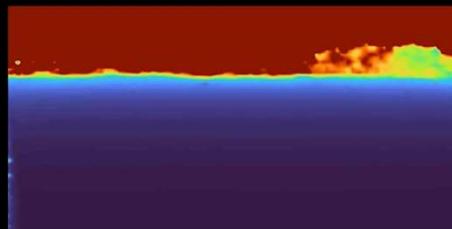








What happens
when we
encounter an
OBSTACLE

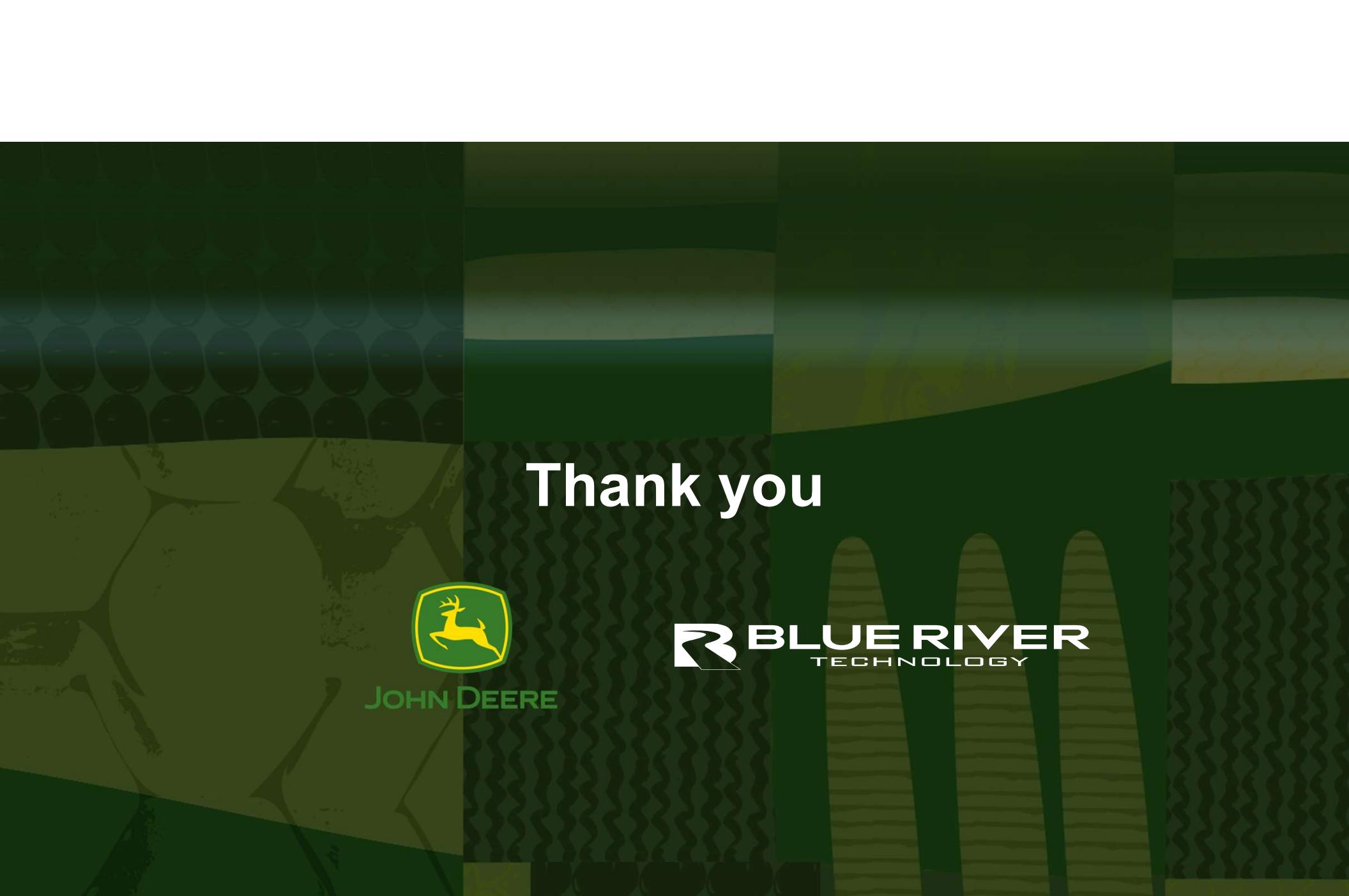


Deere's goal is to
have a **fully
autonomous
farming system**
for corn and
soybeans in the
U.S. by 2030





The Intersection of Technology **AND** Purpose



Thank you



JOHN DEERE



BLUE RIVER
TECHNOLOGY