Agricultural Cyberbiosecurity

Precision Agriculture

Introduction

Have you ever considered a job as a drone pilot? Do you enjoy turning your house into a smart home? Have you supposed to protect the data and programs involved with both? Now, have you ever considered paring that with farming? It might sound funny at first, but agriculture is quickly becoming very high-tech. Farmers aren't just planting crops or tending to their cows. Now they use drone-mounted thermal cameras to see how healthy crops are, GPS trackers to keep tabs on cows, and phone apps to drive tractors. All this is being done to make farming cost-effective and more environmentally friendly.

Figure 1.
Drone flying over open a field.

"Drone 2" by Michael Khor is licensed under CC BY 2. 0.

Key terms

- **Big Data**: Data sets that are increasingly large and complex, in which we can find helpful trends that would not be otherwise apparent.
- **Data Literacy**: The ability to read, work with, analyze, and communicate measures or records in context.
- **Internet of Things**: The connectivity between different computers/sensors/products/processes via the internet.
- **Phishing Scam**: A type of online scam that targets consumers by sending them an e-mail that appears to be from a well-known source – an internet service provider, a bank, or a mortgage company.
- **Ransomware**: a type of malicious software designed to block access to a computer system until a sum of money is paid.

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History of Precision Agriculture

Precision agriculture gets its name from farmers trying to be “precise” with what they do on the farm. This includes using resources like water or driving tractors. Precision agriculture can involve making changes by hand in its most basic form. But people started to look for ways to make this easier. This is why drones and robots do much of this work now. While using robots and drones for this work might seem like a new idea, it began in the 1980s. The first drone was used in agriculture in the 1980s to spray rice paddies.

Modern Precision Agriculture

Since the 1980s, **precision agriculture** has become more high-tech. Since the first agricultural drone, researchers have created many more ways to automate farming. Farmers do not even need to be in the tractor anymore! Instead, tractors, computers, and sensors all talk to each other, helping farmers to make decisions. So, some farmers can use their phones to check the sensors, decide, and tell the tractor where to go.

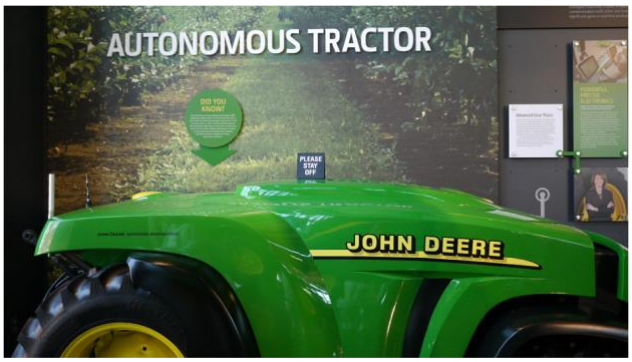

Figure 2. An autonomous tractor produced by John Deere. "Our Future" by adamthelibrarian is licensed under CC BY-NC-SA 2.0.

Connection to Cyberbiosecurity

With all this technology, there are a lot of good things as well as some risks. When you are online, you must be careful with what sites you visit and who you talk to. Farmers have the same issue now. Farmers today must be cautious with the data they create, their internet connection, and software updates. They must be careful to keep themselves safe and our food safe! This overlap between security, agriculture, and technology is called cyberbiosecurity. Cyberbiosecurity is quickly becoming a large part of agriculture. The more technology our farmers use, the more critical cyberbiosecurity will become.

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Career connections

Crop Consultant

Precision Agriculture Specialist

Equipment Technician

Data Analysist

Sales Support

Cooperative Extension

Operations Management

Did you know? The College of Agriculture and Life Sciences at Virginia Tech has nearly 70 program options! Find your career connections at cals.vt.edu or email applytoCALS@vt.edu

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Scientist Spotlight

Shannon Bradley is a drone pilot and has her masters in entomology. She uses precision technology, like drones, to monitor agricultural and urban landscapes. The use of precision technology needs cyber security for the data that is collected and how it is used. She is excited to use precision technology to highlight potential pollinator habitats in unexpected places. Shannon is a CAIA Graduate Student Affiliate.

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Acknowledgements

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- Student fact sheet
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