Using AI for OT Security

InnoTech summit

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Taiwan, August 2018

Securing the Operational Networks

Definitions

OT (operational technology) is hardware and software that detects or causes a change, through the direct monitoring and/or control of physical devices, processes and events.

OT security is the process, technology and services used to secure industrial (and commercial) automation and control systems as a life cycle to create a safe and resilient environment for physical devices, processes and events.

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About Radiflow

Empower users to maintain visibility and control of their operational network in the Industrial IoT era

- Focus on OT Security since 2014
- Tier-1 customers and partners
- Validation by 3rd-party labs

Recent success-stories


Case Study

Case Study:
Midwestern Electric Utility Deployment

The Challenge

Several requirements needed to be met to support the network project:

- Mechanism to control and monitor access to sub-station assets, according to NERC CIP v6 requirements
- Mechanism for creating specific firewall rules at BES Asset Boundaries for a variety of substation topologies, as per new CIP requirements
- Compliance with upcoming NERC CIP requirements for transient assets
- Serial connectivity, which is still required at several substations for legacy applications


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Cryptocurrency Mining Malware Hits Monitoring Systems at European Water Utility

By Mike Lennon on February 08, 2018

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Malware Chewed Up CPU of HMI at Wastewater Facility

Cryptocurrency mining malware worked its way onto four servers connected to an operational technology (OT) network at a wastewater facility in Europe, industrial cybersecurity firm Radiflow told *SecurityWeek* Wednesday.

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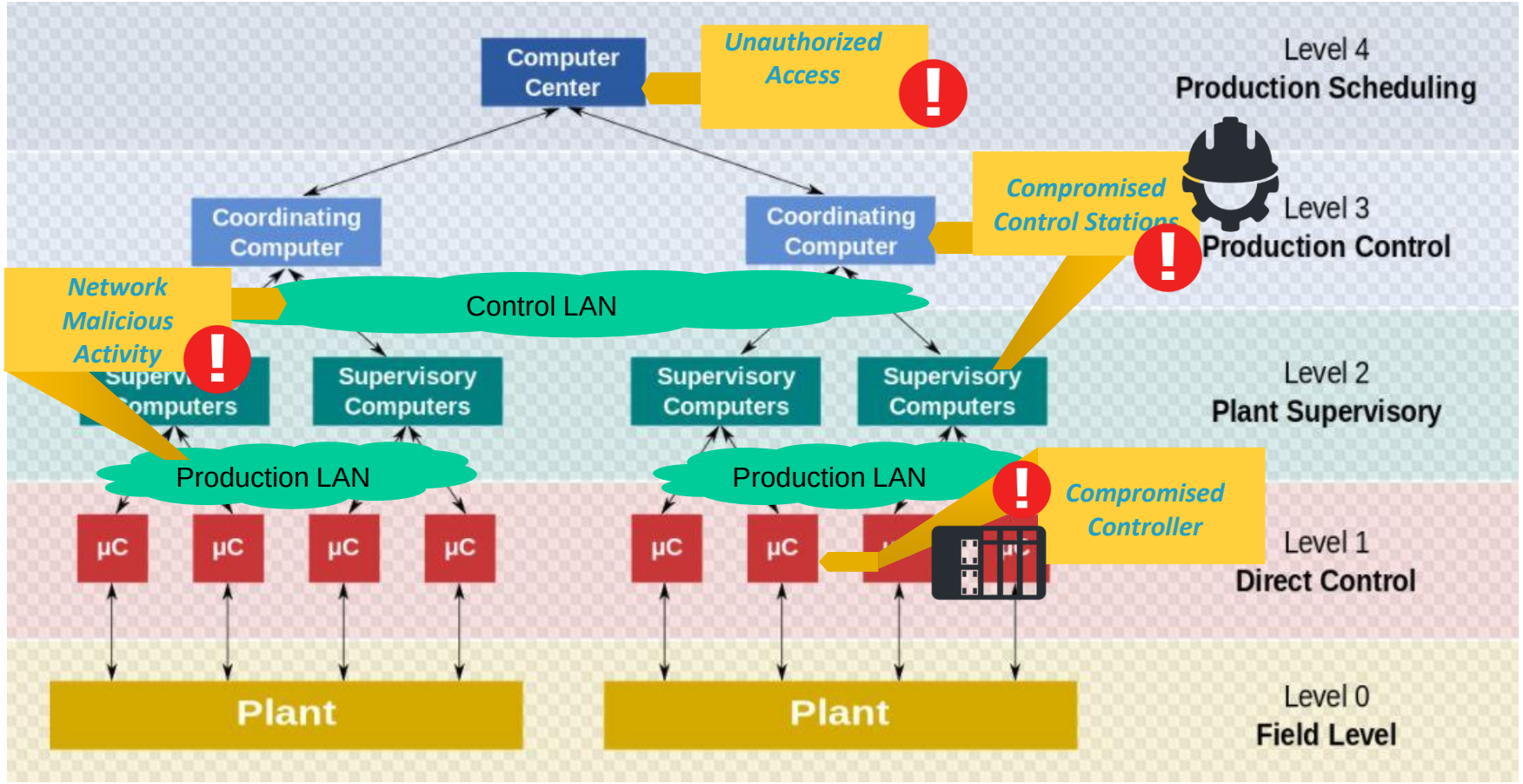
Security Vulnerabilities in an Industrial Network



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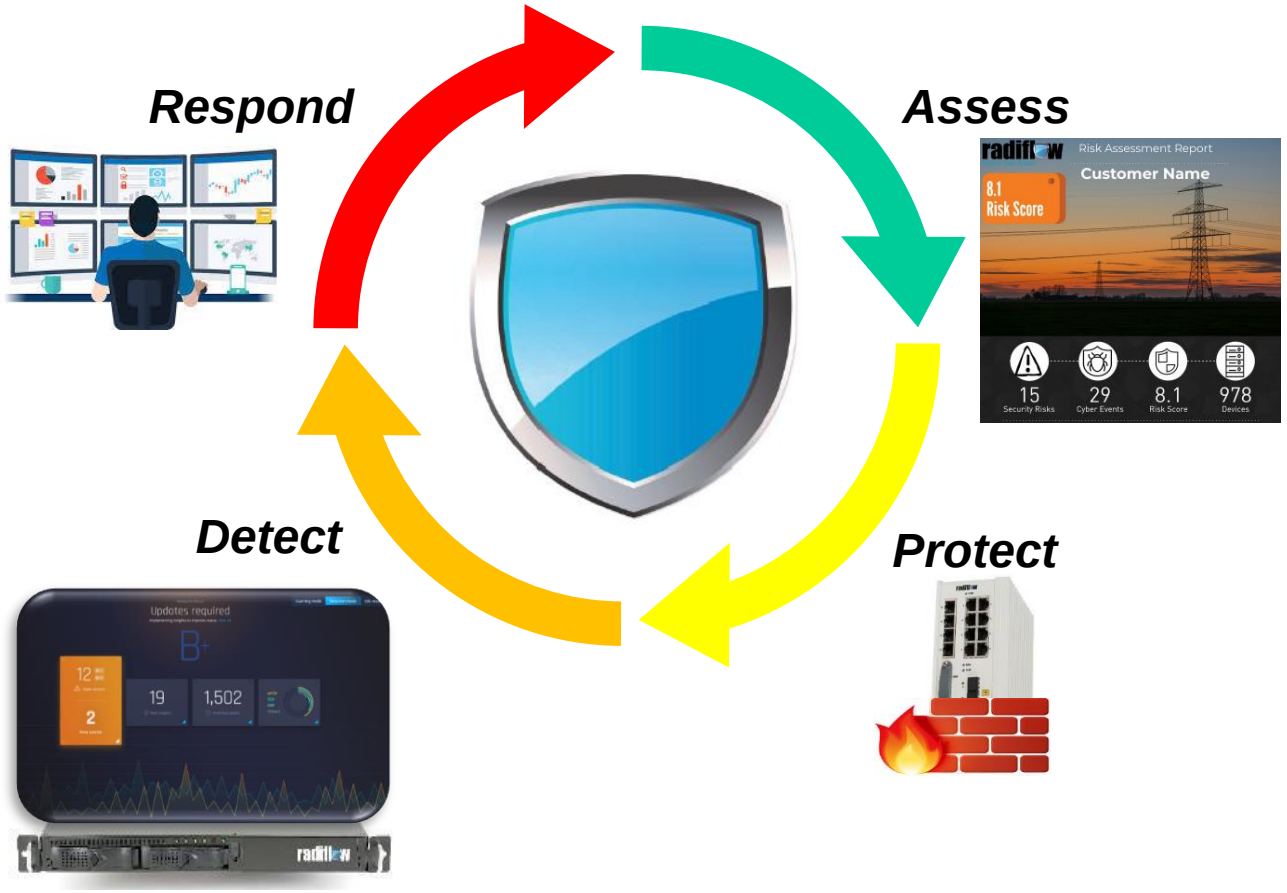
Differences between IT and OT

Attribute	IT Systems	OT Systems
C- Confidentiality	High	Most cases - Low
I - Integrity	Low-Medium	Very High
A - Availability	Medium	Very High
Authentication	Medium to High	High
System Lifetime	3-5 years	10-15 Years
Typically Utilized OS	Windows/Linux	Windows/Linux/Embedded
Security patching	Standard/Frequent	Strongly Tested/Rare

Target – Ease the deployment of OT Security (1)



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Target – Ease the deployment of OT Security (2)

Op Center HMI

Security Center

- **Asset Inventory**
- **Risk mapping**
- **Anomaly detection**

Network Firewalls

Smart Probes

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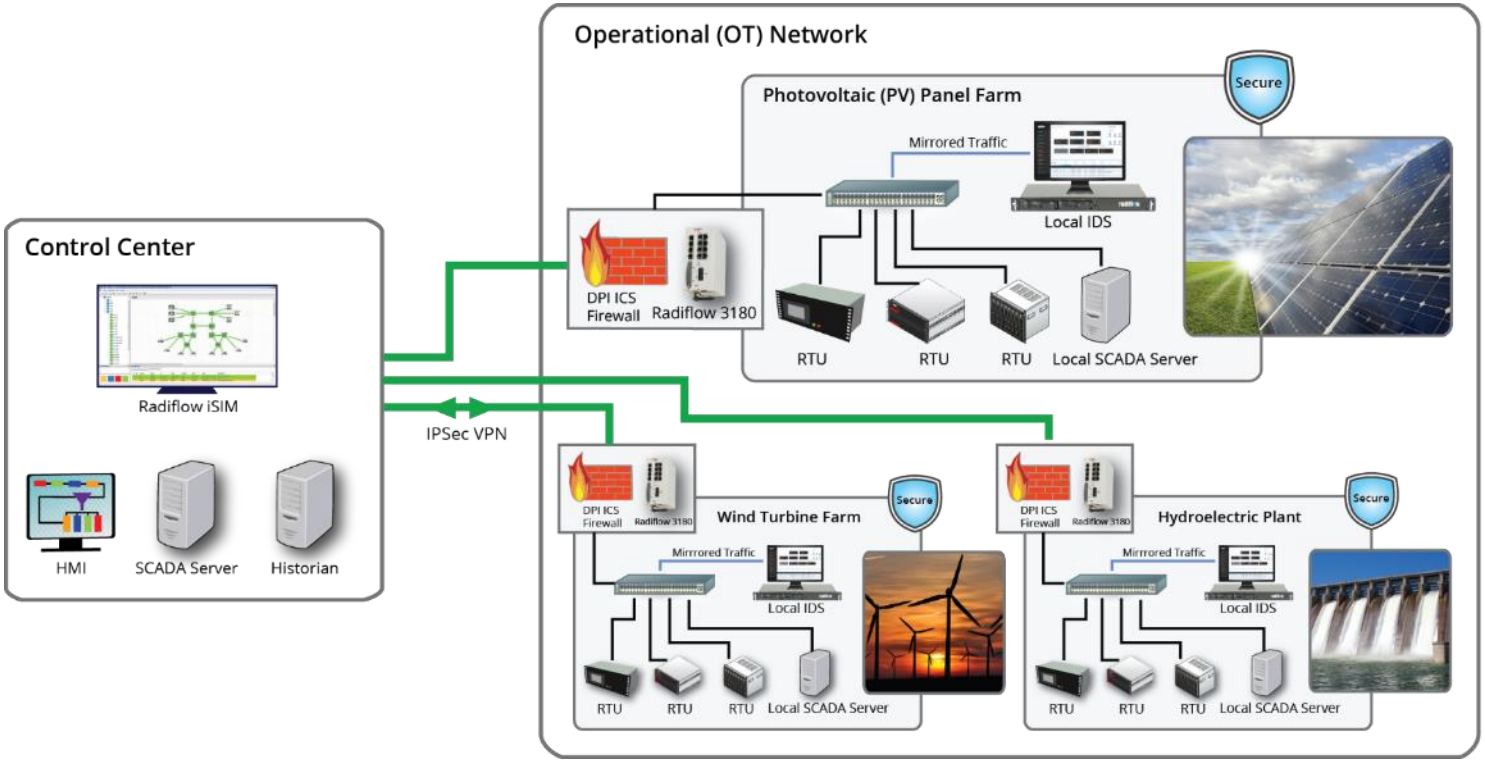
Case study – Securing Renewable power plants

- Site Threat Detection
- Secure remote access
- Integration with SCADA/SIEM



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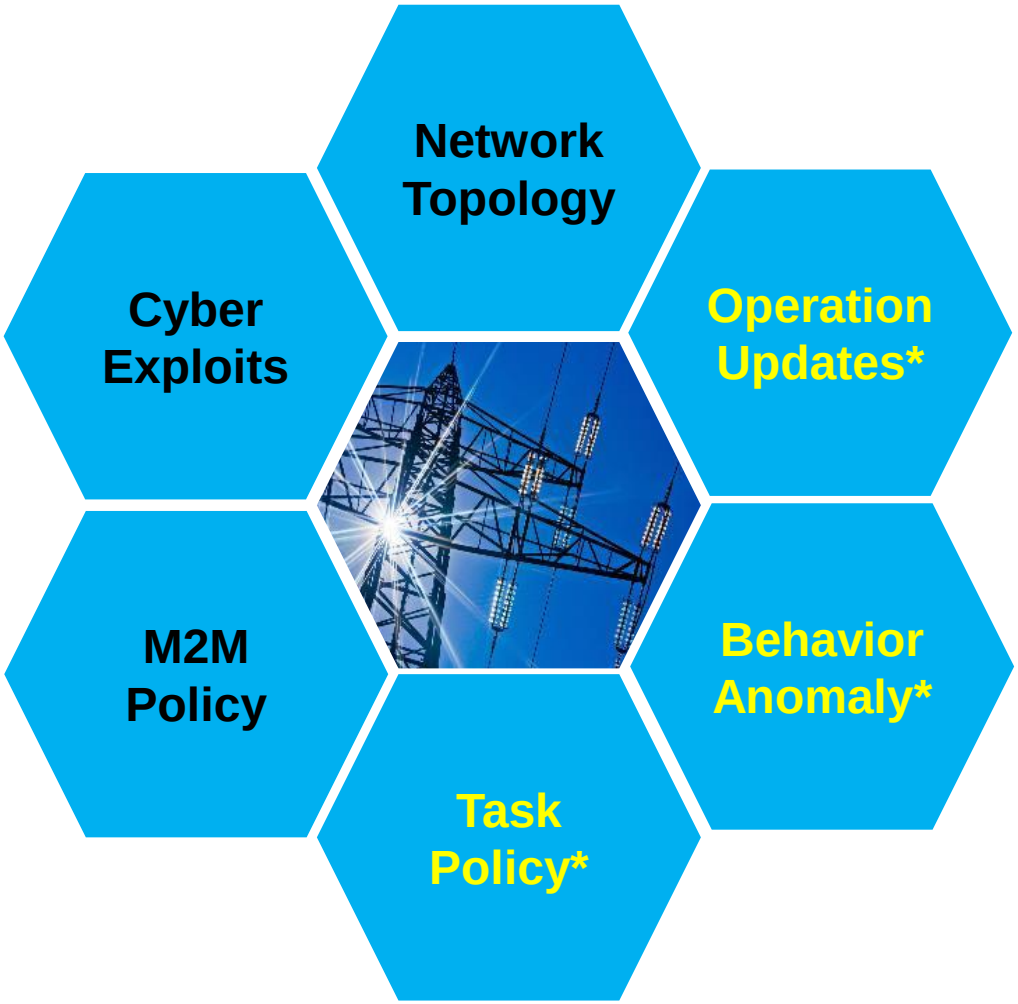
OT Security Engines



*** AI Potential**

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What is AI

AI is technology that appears to emulate human analytics performance by learning, processing complex data and reaching its own conclusions

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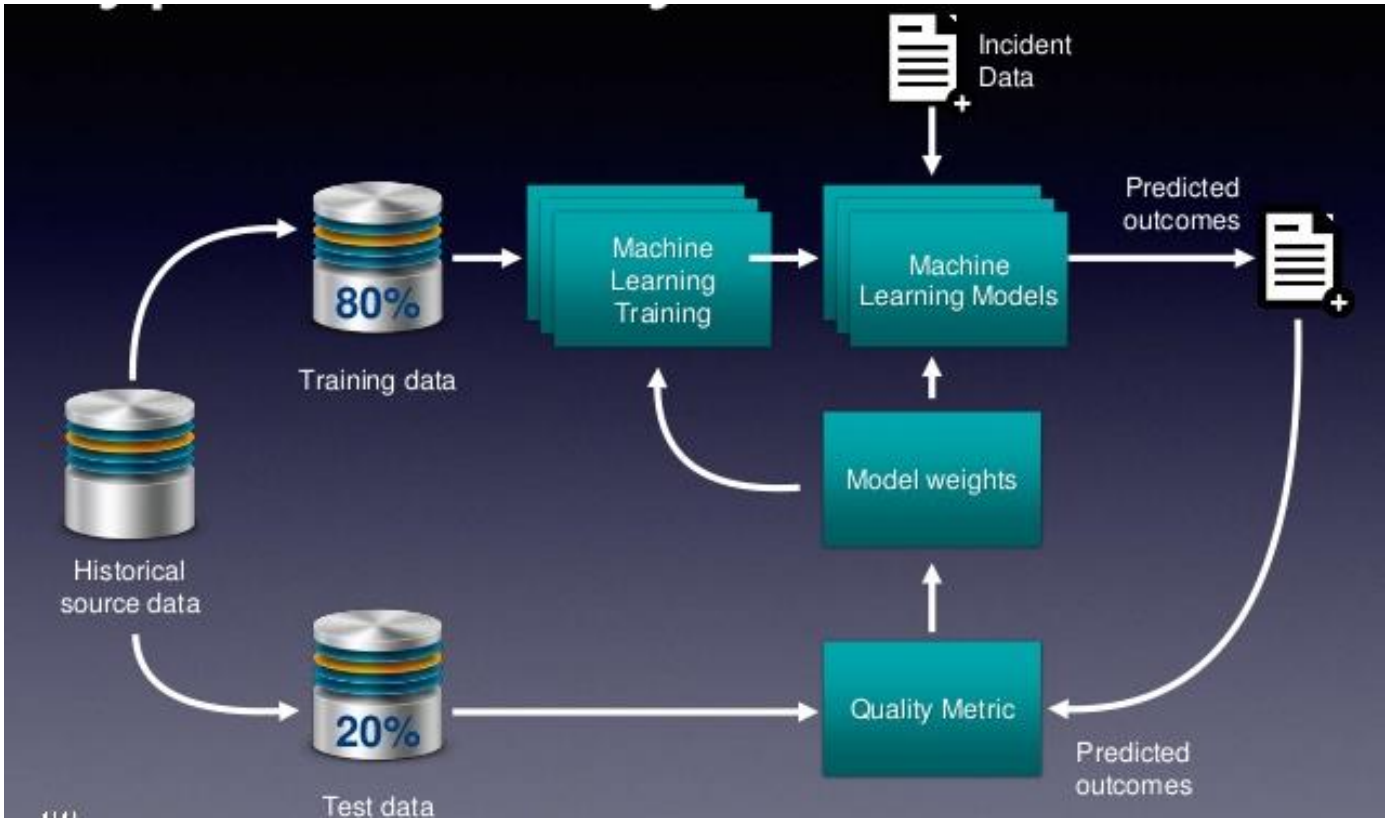
AI Machine Learning Overview



Source: CFML

Status of AI today

Source: XKCD

The challenge for using AI in Security systems is not around the algorithms implementation but rather about applying them with a high degree of confidence

AI in OT Security – Issues to consider

- Value of AI for Industrial Networks
- Explaining the AI results
- Industrial Data for training AI Engines

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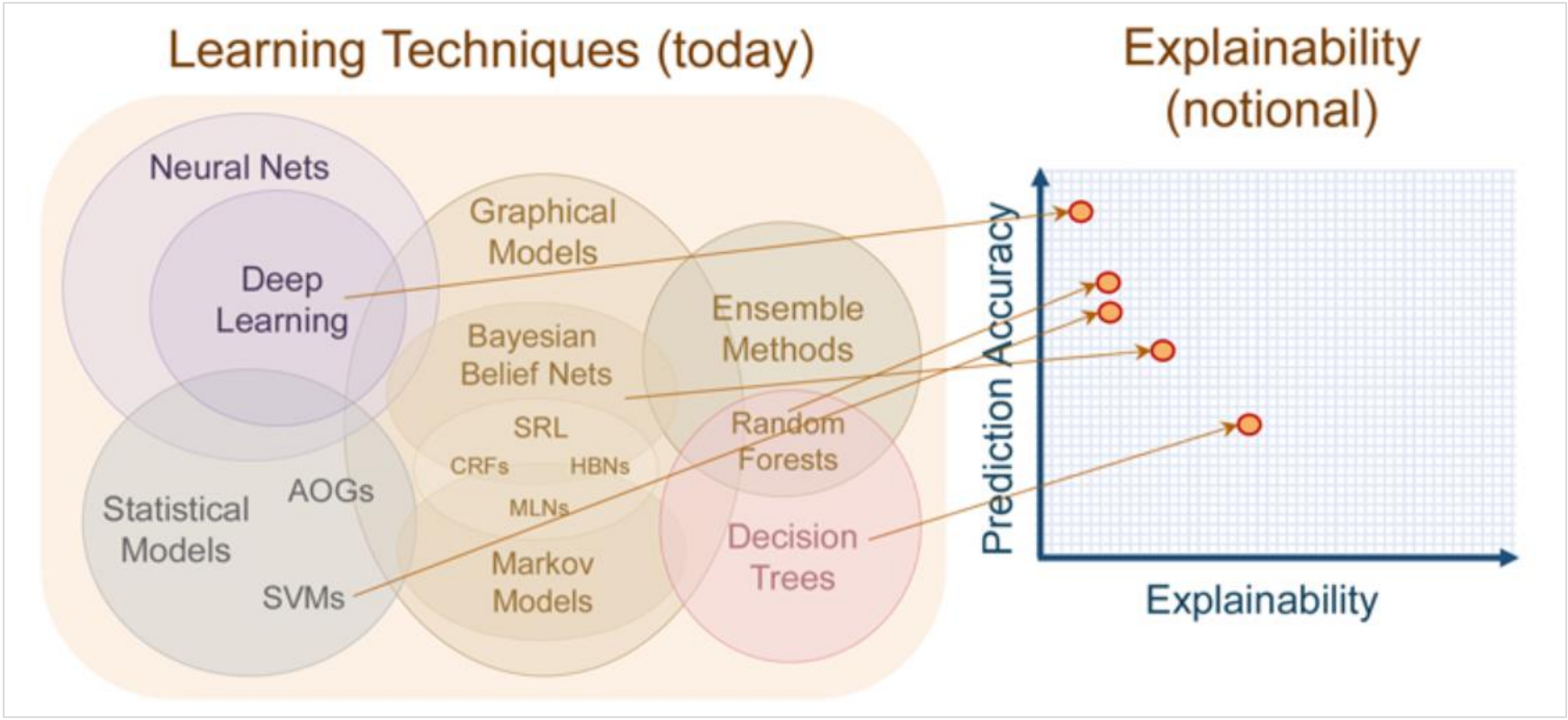
Use-cases for AI in OT Security

- M2M sessions
  - OT Assets
    - Well-defined behavior → Rule-based Policy monitoring
    - Many vendors, Types & Protocols → AI for modeling
  - OT Processes – Many variations → AI for modeling?
    - Multiple sources of information – Sensors, Network, Servers
    - Process Anomaly alarms should be explainable

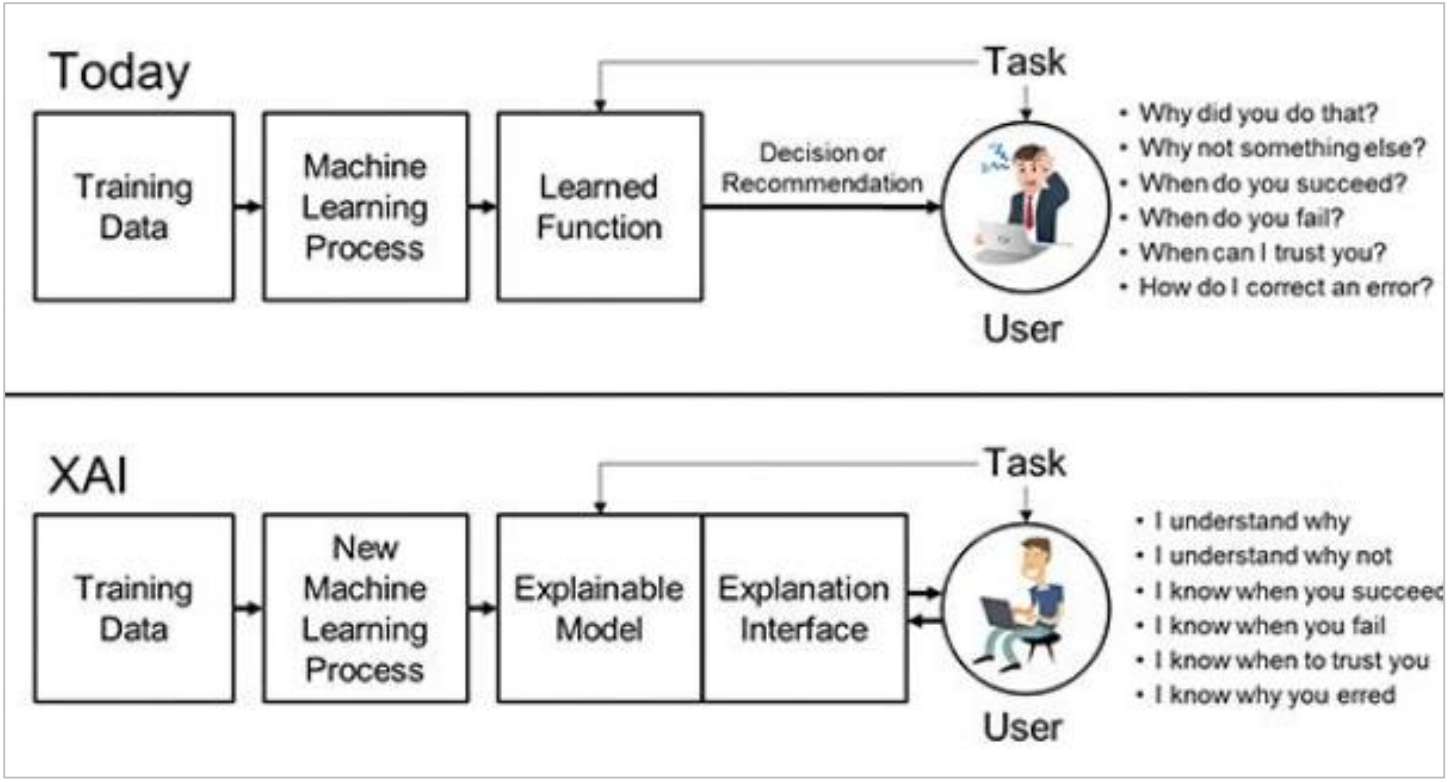
- H2M sessions
  - Restricted access → Rule-based task monitoring
  - Malicious actors → AI for Behavioral analysis?
  - Firmware & Logic updates → AI for impact analysis?

Status of AI Explainability



Source: DARPA

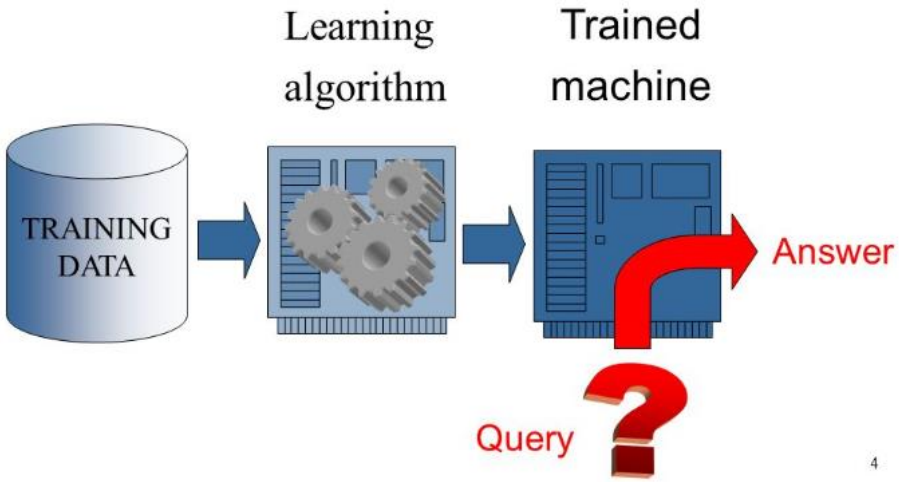
XAI model



Source: DARPA

Training Data for ML

- Effective ML algorithms require high amount of training data
- Such data is not easily-available for OT networks
  - Collecting such data requires the customer approval
  - Structuring the data requires the operator support



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AI in OT Security – Recommended Roadmap

- Current Use of AI
  - Automation – Parse new protocols and new types of devices
- Future Use of AI
  - Gather Data for Training AI algorithms
  - Decouple explainability from ML models

THANK YOU

For more details:
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