

Wonderware & AVEVA Training Webinar Series Enabling the connected worker to visualise the future

At Wonderware, we believe in the unlimited potential of technology to empower people and transform businesses. In this series of webinars, Wonderware shares its experience in driving industrial digital transformation.



How we connect the worker



How the connected worker operates at the



How the connected worker manages your



How the connected worker manages data



How the connected worker improves on

Connected Worker

Engineer

Lower total cost, time and risk in capital projects

Operate

Plan and operate to maximize profitability within operating constraints and regulatory norms

Perform

Increase longevity and performance of assets while ensuring safe, reliable environment for the workforce





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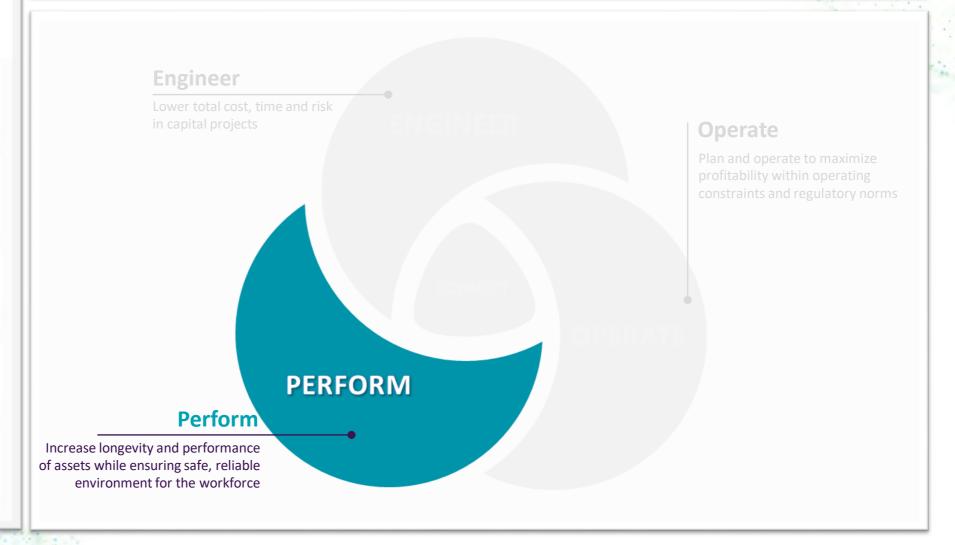


How the connected worker manages data



How the connected worker improves on plant performance

Connected Worker





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How we connect the worker

Art Unit software policitions make assets and operations safer, more effective, and more sustainable. Eric can hispen self guide you through the entire Avexe portfolio in only 30 mint to applian erly ARTUA bit already for the future enterprise is as much more than Mondermare.

Available now

English

Watch Now



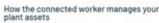
How the connected worker operates at the edge

To be agree to look as a production piece and its KPNs, there we many factors receive those amenoraries proposed to the proof and no context. Because of context of proposed to context and analyse state from many offlowers sources and systems. Because of context and analyse state from many offlowers sources and systems. Because of context and analyse state from many offlowers sources and systems. This context is what allower the received analyse state of the state of th

28 October 2020

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4 PM English



Now is the connected worker able to prioritize, gran, schedule and execute safe and compliant work? The connected worker has the ability to close the divide between centers and generation, and is also to just maintenance count. Spraume we can rightly the work processes, we can enable the connected worker to work aments and have may accreted without making critical admissions. We divide and the above integrated differ may accrete when making critical admissions. We divide and the above integrated differ the connected of the connected workers and the connected workers are connected as the connected and the connected as the

4 November 2020

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How the connected worker manages data

There is one thing all connected earliers have in common. Balat Sata is the fundamental foundation in order to gat any saive out of frequenement consists. So how does the connected earlier images to indeed information out of all her earl time balat from different systems and gut it till contact that can be analysed, a firing inarytic and hery to improve per formation of its level of the data gat any so contact that the connected existence of the service of the servic

25 November 202

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How the connected worker improves on

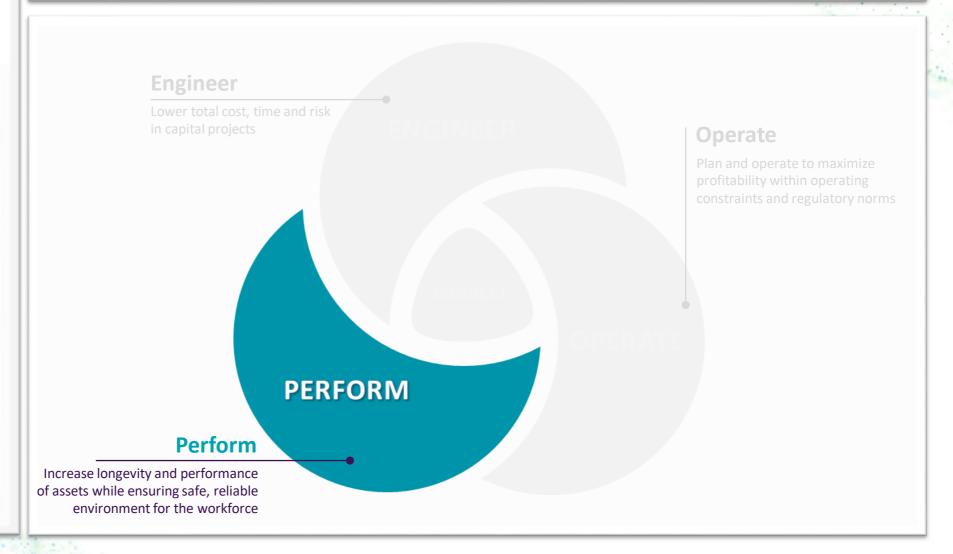
The connected worker is give to tesse performance so set facture they have transparency of their processor. The engoling distinstrumstrumstant in fraundacturing operations helps to improve productivity and effectiveness through easitive access to information. Forget levels of advantation and states the temping the set you've own to done in it manufacturing paint. Be set to set all special what systems the connected workers levelage to accessor and advantage.

9 December 202

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AVEVA Asset Performance Management





Machine Learning

- Expectations vary from "All solving solution" to "buzzword"
- No Artificial Intelligence (AI) solution can solve all your problems
- Many different applications that require unique types of Al and expertise





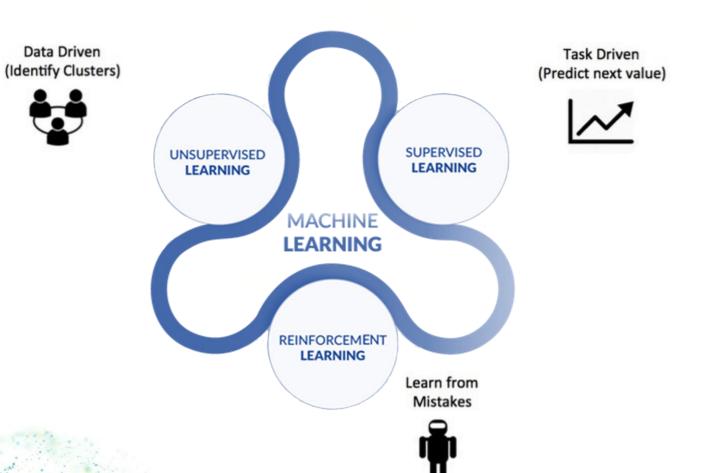
Trends in Manufacturing Al

A Journey through Predictive Maintenance and beyond

	In use today	Change over the next 5 years	In use in 5 years
Predictive Maintenance	28%	+38%	66%
Big Data driven process & quality optimization	30%	+35%	65 %
Process visualization & automation	28%	+34%	62 %
Connected factory	29%	+31%	60%
Integrated planning	32%	+29%	61%
Data-enabled resource optimization	52 %	+25%	77 %
Digital Twin of the factory	19%	+25%	44%
Digital Twin of the production asset	18%	+21%	39%
Digital Twin of the product	23%	+20%	43%
Autonomous intra-plant logistics	17 %	+18%	35%
Flexible production methods	18%	+16%	34%
Transfer of production parameters	16%	+16%	32%
Modular production assets	29 %	+7%	36%
Fully autonomous digital factory	5%	+6%	11%

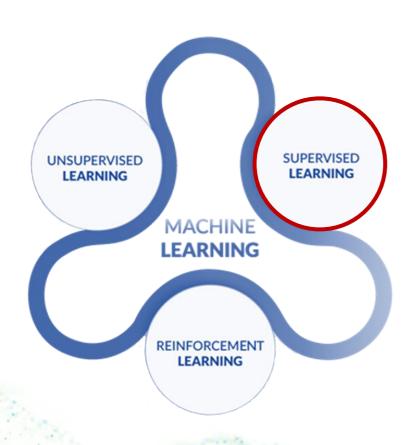


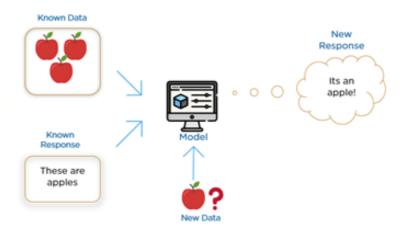
Source: mobidev.biz





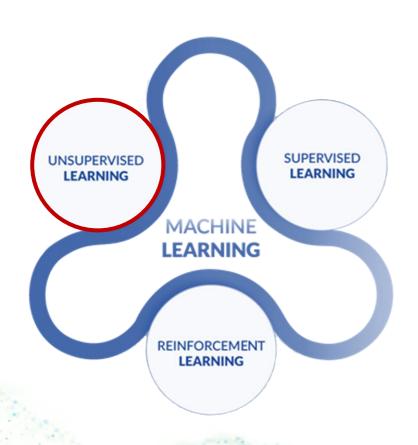


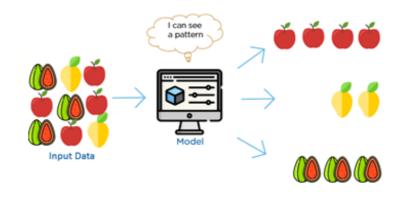




- Easiest to understand & implement
- Trained to generate a target output using labeled data
- Applied to predict output for new data



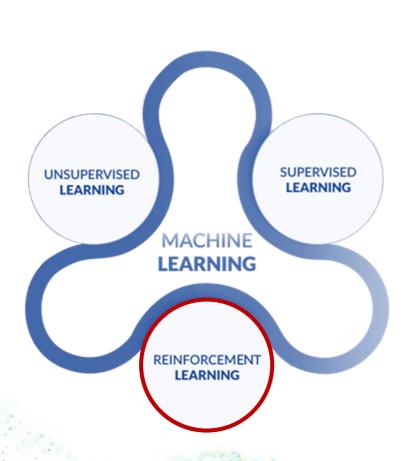




- Training on unlabeled data
- No output categories or labels
- Mainly used for pattern detection and summarization







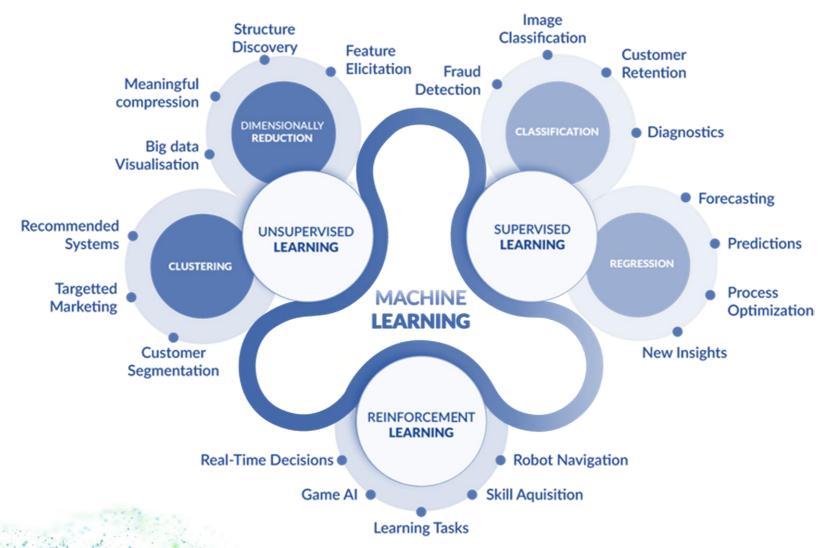


- Less common in Manufacturing
- Learning from mistakes
- Cycle of evaluating current state and reward to decide next move





Machine Learning Applications







Industrial AI Quadrant

A Journey through Predictive Maintenance and beyond

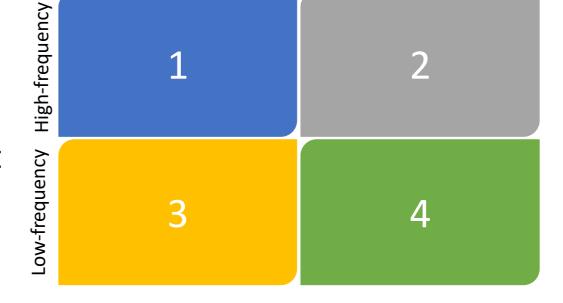
Process-driven Asset-driven High-frequency Process-driven Process affects asset \rightarrow 1 supervised ML Faulty asset → 4 (ex. Predictive Quality) 4 Low-frequency Asset-driven Process-driven Unsupervised ML unsupervised ML (ex. Predictive Maintenance)



Industrial AI Quadrant

A Journey through Predictive Maintenance and beyond

- 1. What are the main problems causing production losses?
- 2. Are these problems related to asset performance, or the production process?



Asset-driven

Process-driven

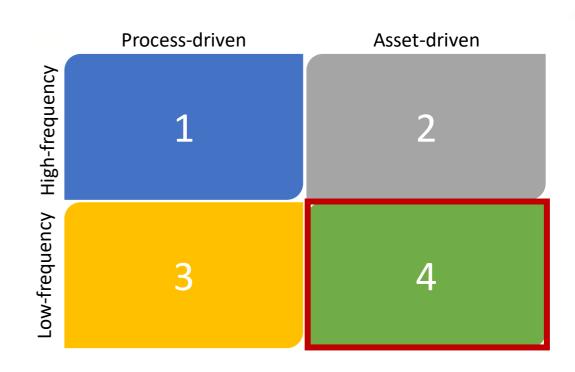
3. Do these problems occur frequently?





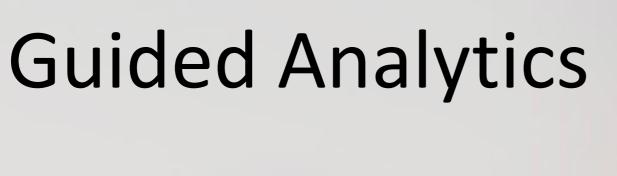
Finding the right technology

- Low-frequency, asset-driven losses
 - Repairing/replacing assets
 - Downtime
- Unsupervised ML
 - Detect Anomalies
 - Prevent breakdowns









Anomaly Detection Practical Example



AVEVA™ Insight



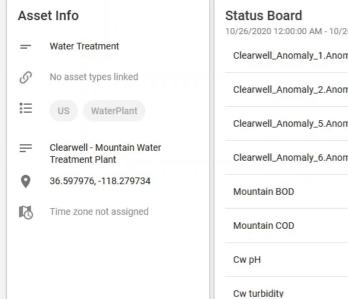


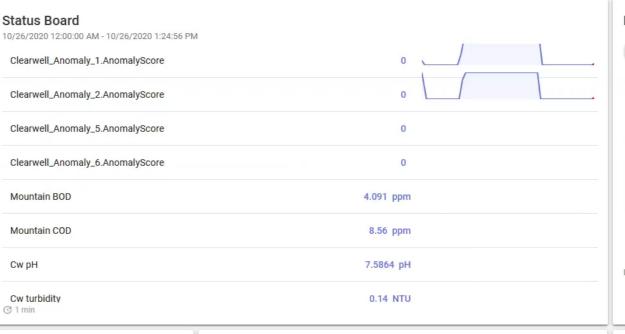
Mountain Water > Clearwell

Clearwell

Water Treatment

ASSET ACTIONS ▼





Guided Analytics Models

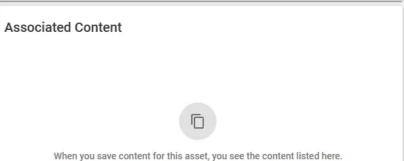




Location







■ AVEVA[™] Insight

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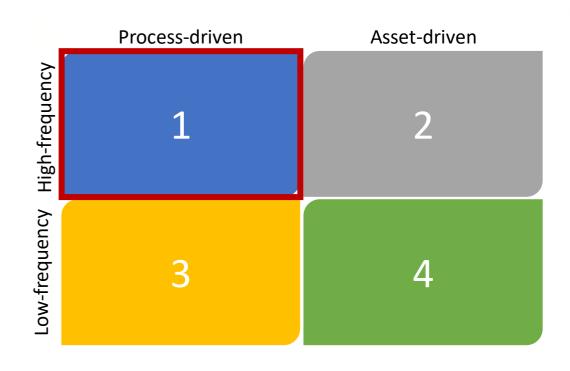






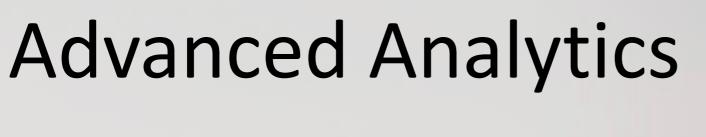
Finding the right technology

- High-frequency, process-driven losses
 - Quality, yield, energy, waste
 - Inefficiencies in process
- Supervised ML
 - Continuous analysis
 - Interrelations between tag









Advanced Warning & Automated Diagnosis

Practical Example



Advanced Analytics

AVEVA Performance Management







Advanced Analytics

AVEVA Performance Management

Predictive Uptime Predictive Quality • Uptime % Run CpK Remaining Time to Downtime First Pass Quality % Probability of Downtime **Predictive Throughput Predictive Asset Reliability** Advanced Production Rate Mean Time Between Failure Run Length Remaining Time To Failure **Analytics** Cycle Time Probability of Failure Material Cost/Unit Production **Predictive Energy Efficiency Predictive Asset Life Energy Cost** Remaining useful life Total life **Unit Production**





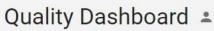
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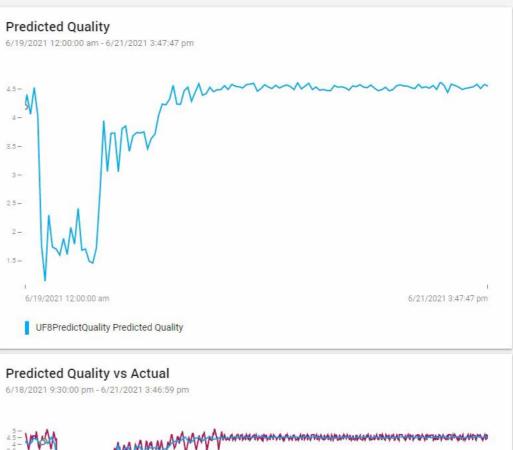


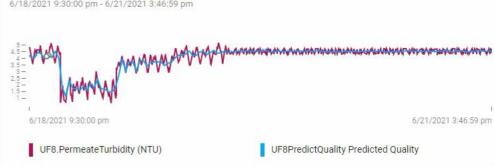


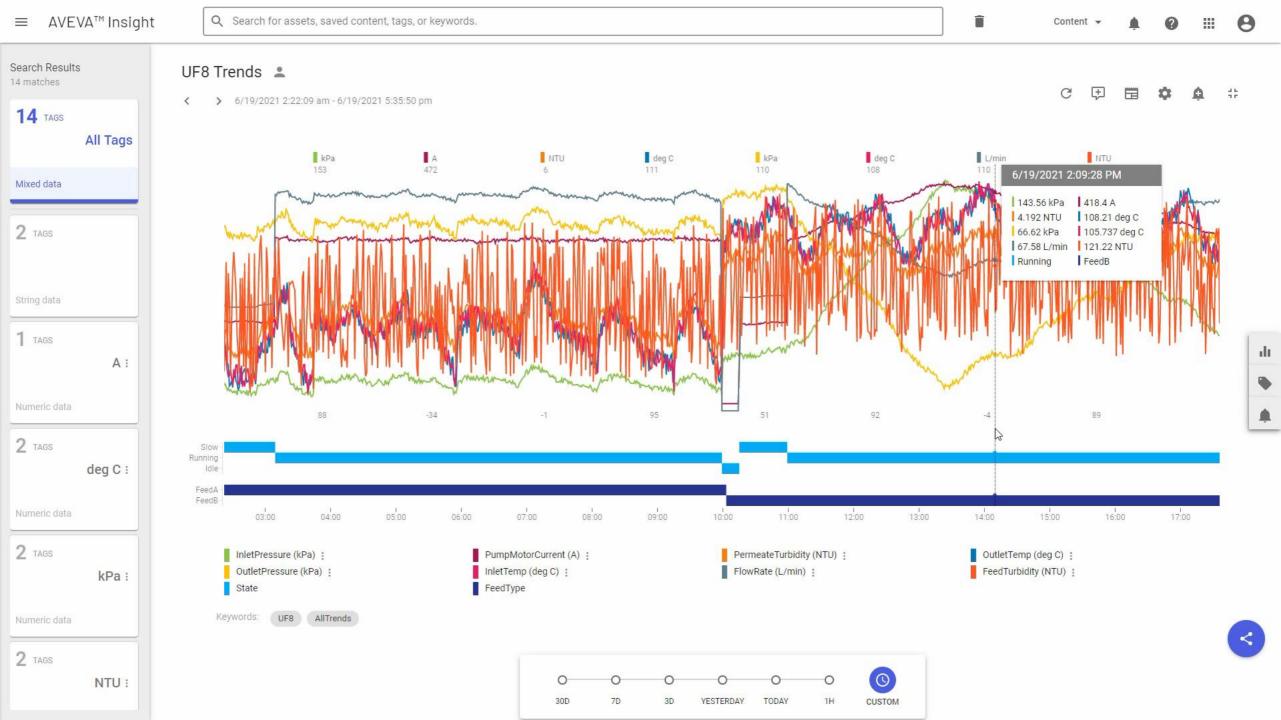


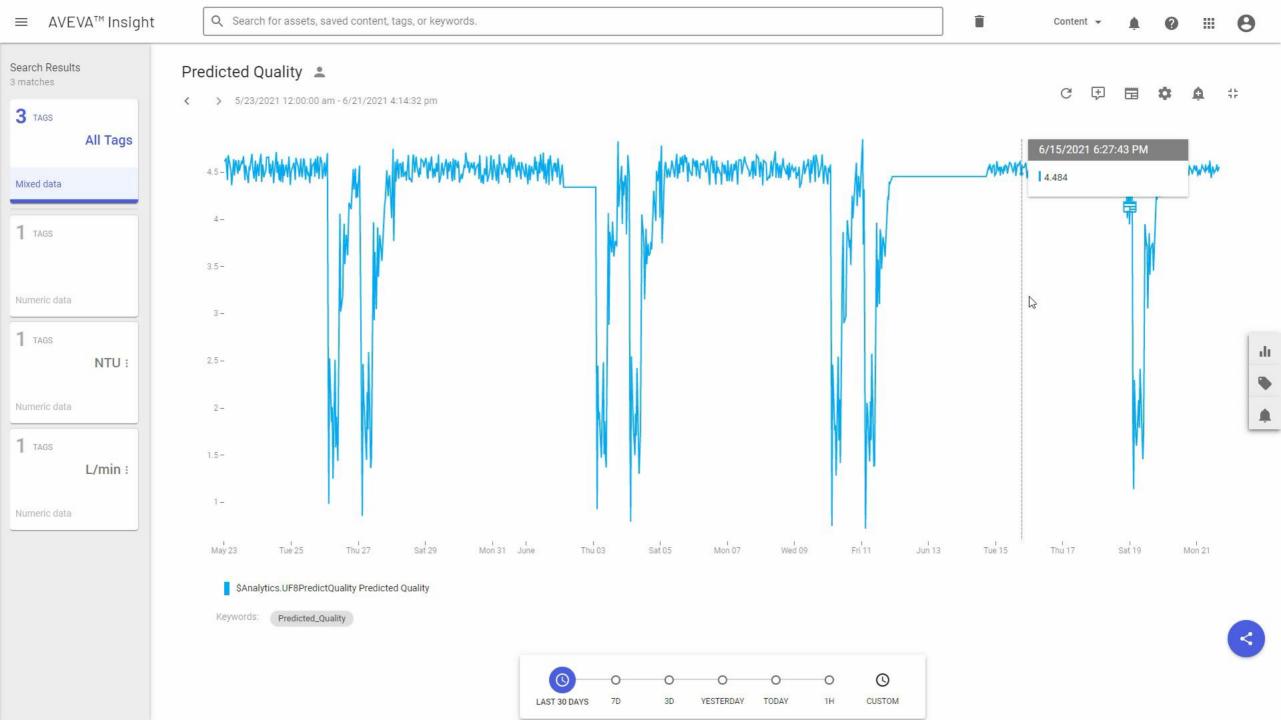


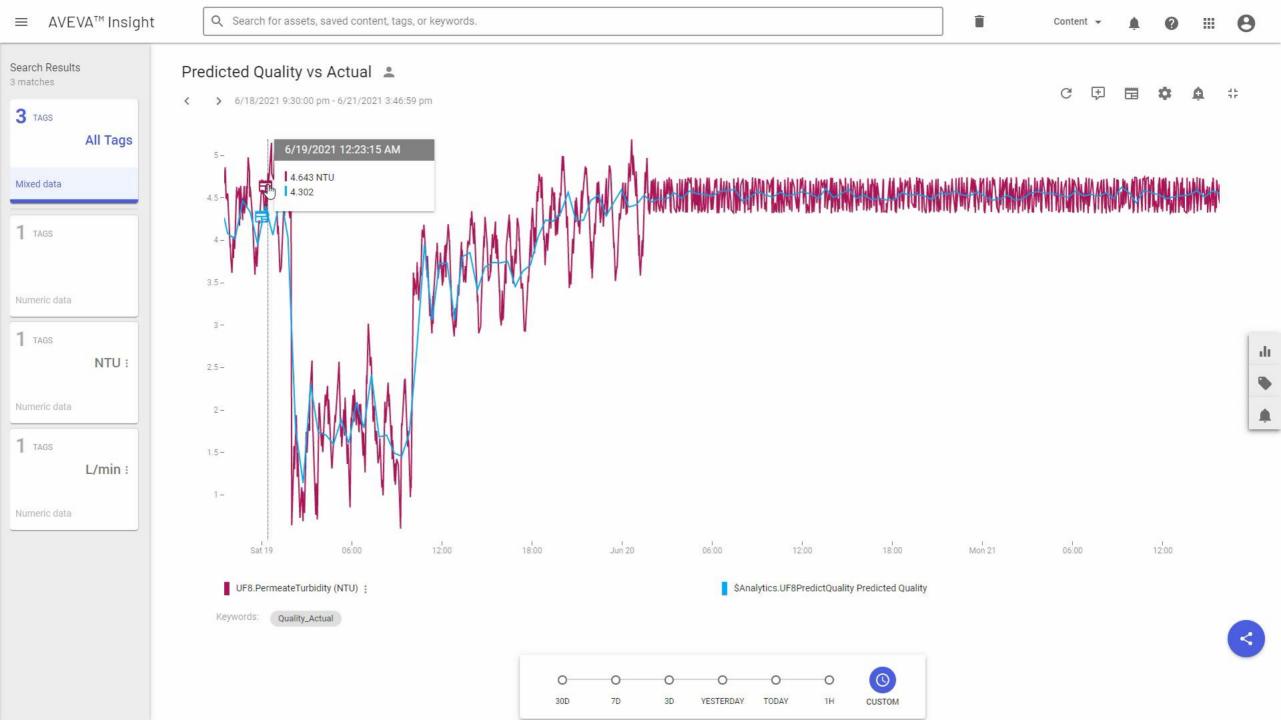


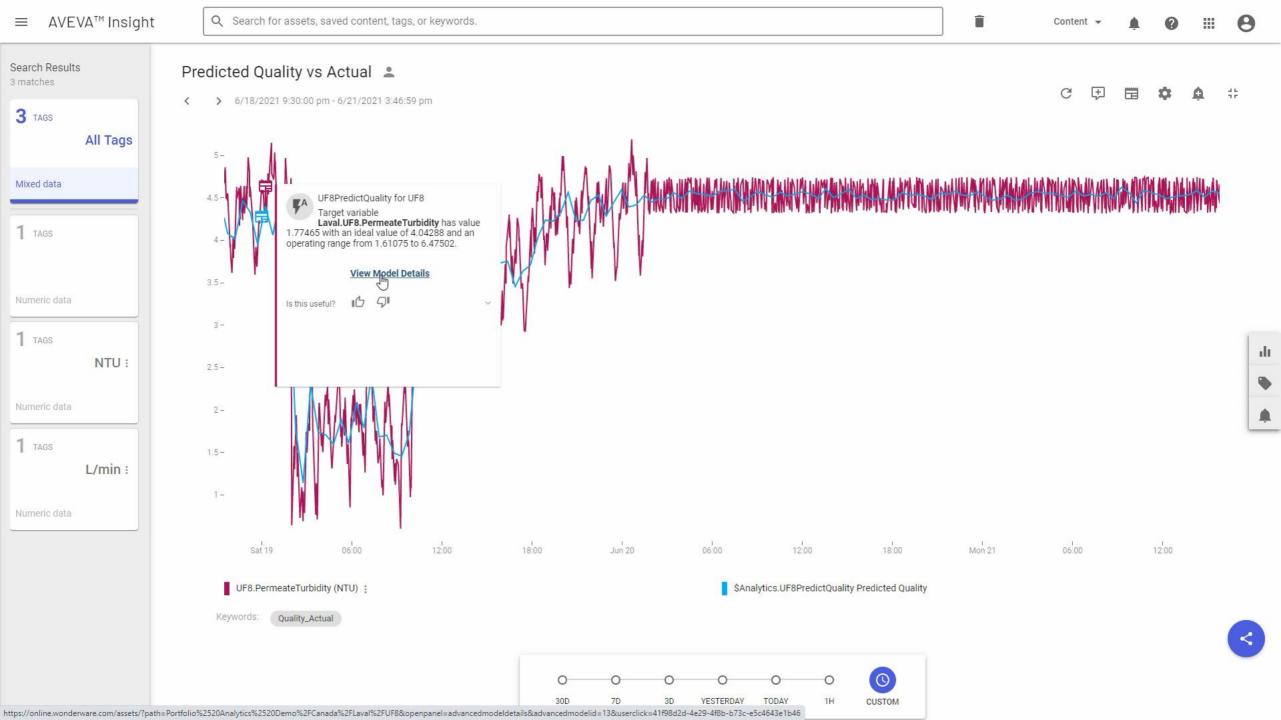






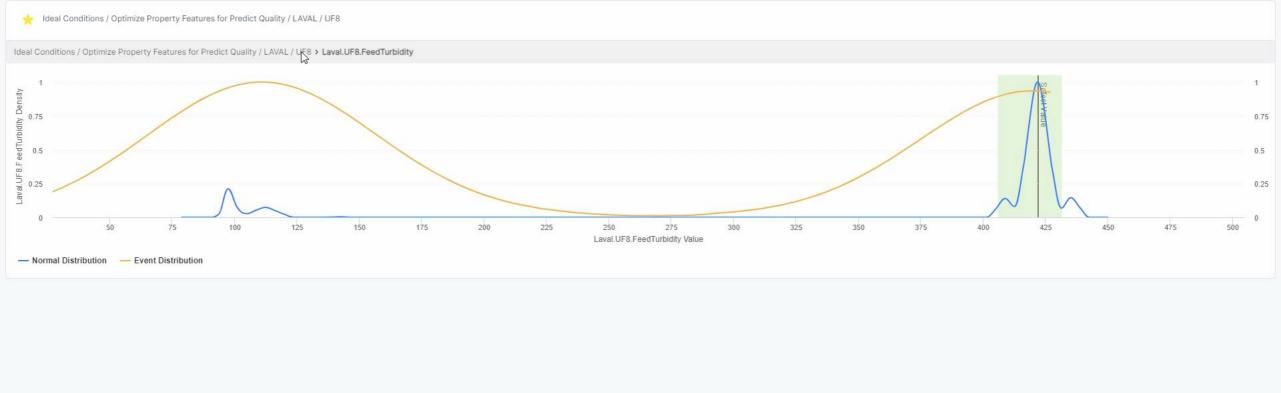








Topic	Transform	Distribution	Runs	Units	Ideal	Ideal Low	Ideal High	Observed Average	Observed Low	Observed High	Number Observed	Difference	Outside Ideal	Separation Score	Ideal Modes	Non Ideal Modes
Laval.UF8.FeedTurbidity	Average		dil	NTU	421.9	405.9	431.6	323.1	95.2	436.4	1405	23.4%	100.0%	29884.3	6	2
Laval.UF8.FlowRate	Average	<u> </u>	ılıl	L/min	105.0	87.3	106.2	94.3	25.7	106.2	1405	10.2%	100.0%	811.7	4	5
Laval.UF8.OutletTemp	Average	<u> </u>	ılıl	deg C	109.2	108.7	109.6	106.9	97.6	111.2	1405	2.0%	100.0%	86.4	6	2
Laval.UF8.InletTemp	Average	<u> </u>	dil	deg C	106.3	105.8	106.7	104.1	94.8	107.6	1405	2.1%	100.0%	60.1	6	2
Laval.UF8.PermeateTurbidity	Last		dil	NTU	4.4	4.2	4.8	3.9	0.6	5.2	1405	10.7%	100.0%	45.1	4	2
Laval.UF8.InletPressure	Average		dil	kPa	106.8	105.8	108.5	106.5	95.2	153.4	1405	0.3%	100.0%	0.0	8	6
Laval.UF8.OutletPressure	Average	<u> </u>	dil	kPa	105.3	104.8	106.2	102.1	57.2	107.6	1405	3.1%	100.0%	0.0	7	4
Laval.UF8.PumpMotorCurrent	Average	<u> </u>	dd	Α	321.2	318.2	325.1	304.5	49.6	446.4	1405	5.2%	100.0%	0.0	5	20
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Improve Profitability by Balancing Risk, Cost and Performance



Connecting the workforce

Safety, reliability, efficiency

Prescriptive actions for closed loop remediation

Accelerate time to value

Self Service Enablement



Automated

Unsupervised, automatically draws inferences from the data



Utilization

Rules based equipment utilization and OEE to understand effectiveness



Conditions

Rules based approach to alert on condition, automated workflow



Guided

Self-service creation of anomaly detection models



Advanced

Uses cases requiring SME & services

Fit for purpose, industrialized, actionable

Visualization, collaboration, business intelligence

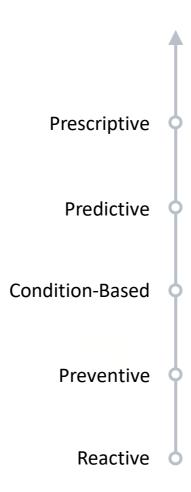
Collect, Contextualize in to One Model

Data democratization

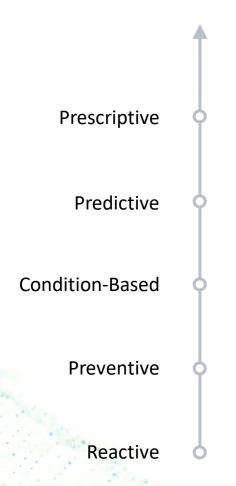








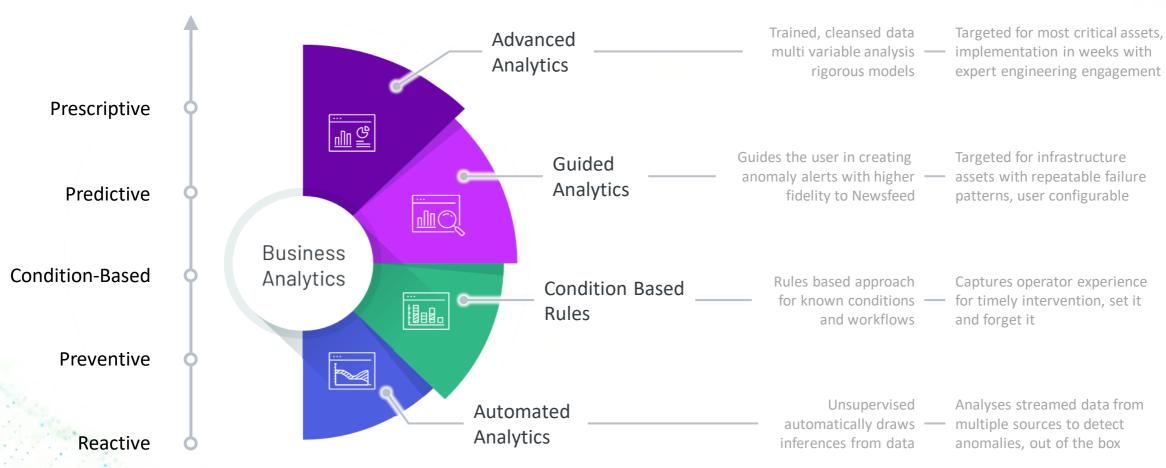










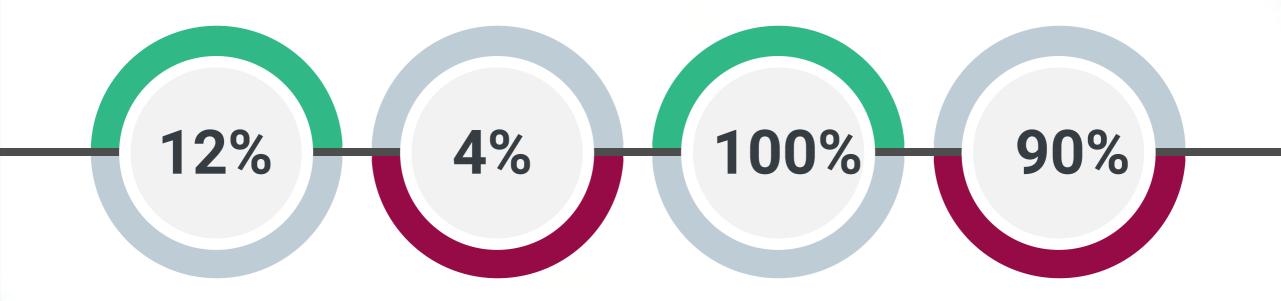






Customer Achievements

Fast value with 10x ROI



Improvement in line Uptime

Reduction in energy costs

First pass quality

Reduction in hardware, development, and consulting costs



