

GTC Webinar:

Analytics" Augmented Modeler

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Machine Learning Primer



FTAnalytics Data Explorer & Augmented Modeler



Anomaly Detection Demo



Additional Information







3

How is Machine Learning Done?

Cross Industry Standard Process for Data Mining

CRISP-DM:

- Define your business target
- Gather relevant data with context
- Prepare data for new discovery
- Identify relationships with statistics & models
- Evaluate success and enhance as needed
- Deploy useful insights or models for actions
 TIME PREPARING DATA
 50-60%







Different Strategies for Normal Models

Temporal Clustering

Spatial Clustering





Rockwell

Predictive Analytics Machine Learning Types









■ Analytics[™] Data Explorer

Analytics Augmented Modeler





Interactive Data Preparation for ML

- Visualize past data for discovery
- Clean and filter data graphically
- Wizard for smart, flexible time-merge
- Rich statistical summaries & information
- Correlation and ranking including time
- Programlessly transform data for enrichment

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Interactive ML Solutions

- Graphical data visualization & preparation
- Visual model development & validation
- Validate & deploy without programming
- Version & execution management
- Drives ML results toward action
- Open scalable application environment

Simplified DIY Machine Learning Applications for OT Engineers



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Augmented Modeler what's different?

Application Development, Management & Utilization framework

Ease-of-Use targeting plant engineers.

o Leverage your know-how!

□ Interactive ML supports application evolution.

Integrated visual data preparation & model evaluation

o Show my model on my data.

Graphical run-time visualization targeted to value delivery.





Node 1	Web Server Security	Centos 7.4, 64 bit, 4 Core, 16 GB (RAM), 0.5 TB (SSD)
Node 2	Data store	Centos 7.4, 64 bit, 8 Core, 32 GB (RAM), 0.5 TB (SSD)

F Analytics[®] DataFlowML inside



Analytics" Data Explorer

Prepares Data for Machine Learning & MPC



Actionable Results



Analytics Augmented Modeler

MPC Drive coordinated peak performance

UTILITY OPTIMIZATION Reduce energy spend

PREDICTIVE KPIs

Predict performance, identify influences

PREDICTIVE MAINTENANCE ~

Identify equipment issues early



ANOMALY DETECTION

Early detection of abnormal operations

Graphical, Interactive, Informed, DIY Machine Learning Solutions for plant engineers





Anomaly Detection



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Why Anomaly Detection?

- What just happened?
- Did my start-up go well?
- Were there problems with my last change-over?
- Why doesn't the plant seem normal?
- Are my chemicals the same as usual?
- Is equipment performance affecting production?
- Can we have predictive maintenance without failure data?

Stuff Happens! Detect & resolve earlier.





Anomaly Detection

- System unusual behavior alert
 - Incorrect set-up
 - Wrong/bad feedstock
 - Equipment failing
- Know as soon as something is wrong!
- · Report on key indicators (why).



Improve OEE Availability, Productivity & Quality



