

TrendMiner Live Training Session

- Event Analytics in Action:
- Gain Deeper Process Insights



Housekeeping



Listen Only
Mode



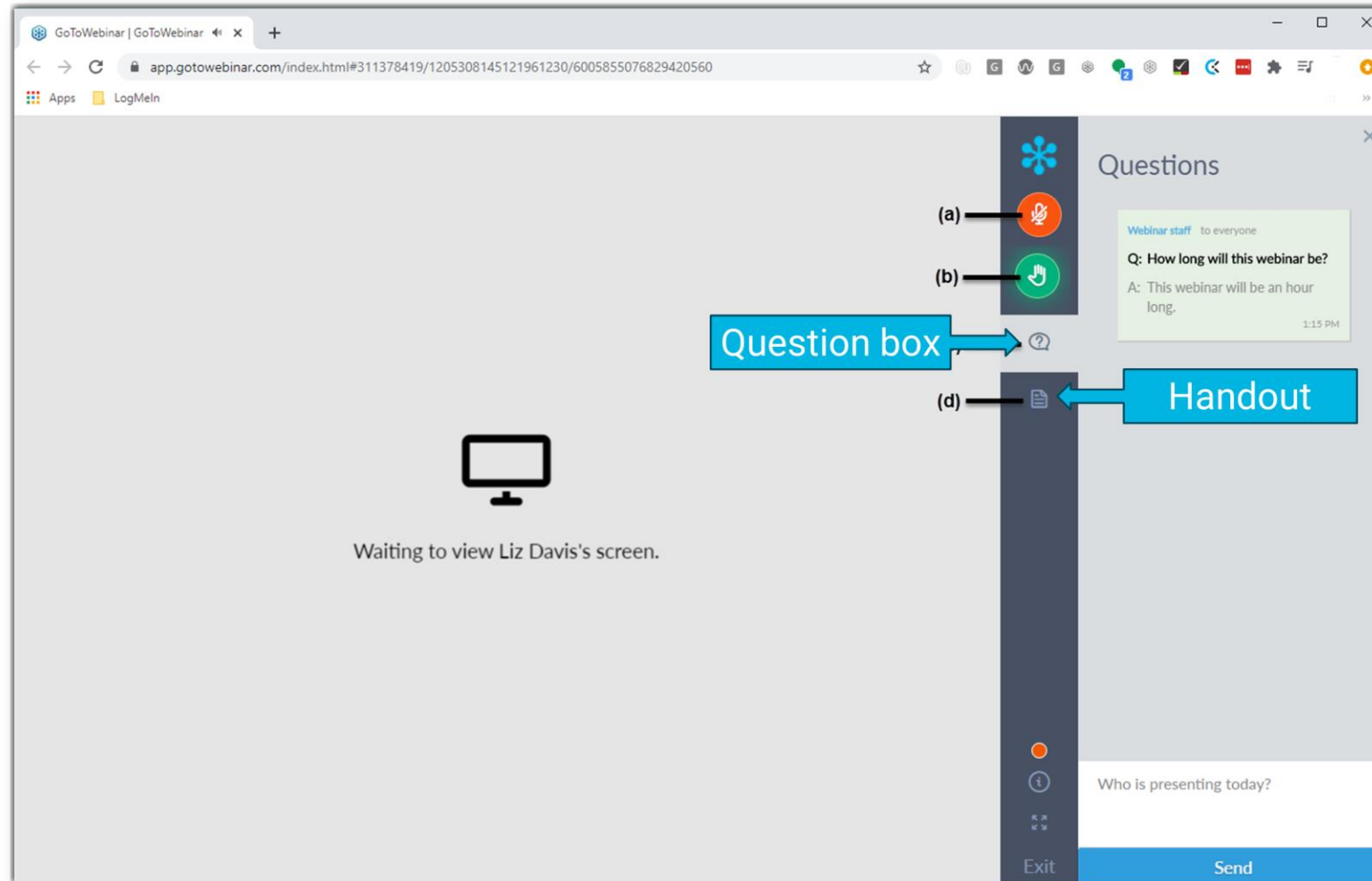
Use Question Box!



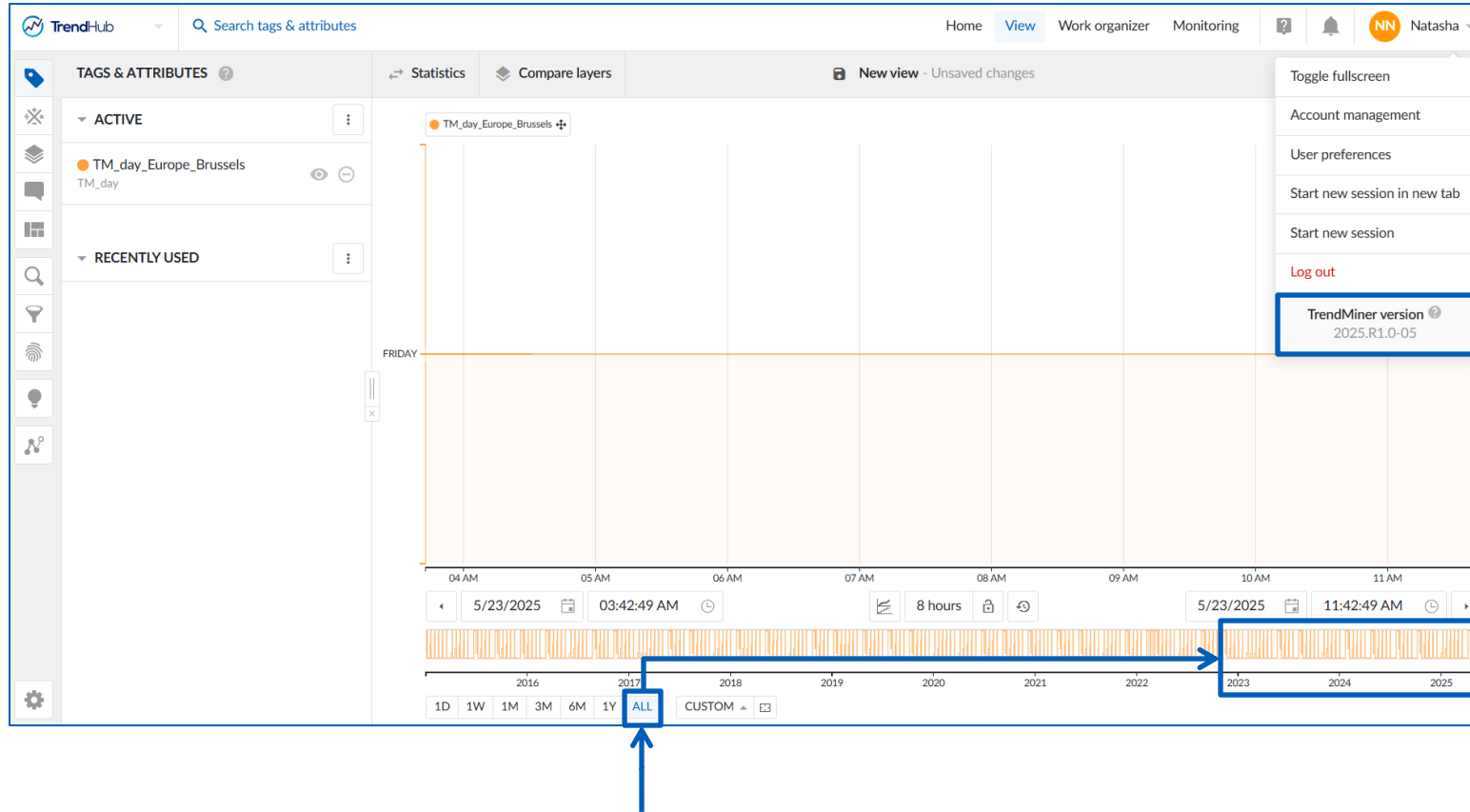
Recording and
Handout will be
provided!

Online training includes exercises.
You may log in to your own TrendMiner account using Firefox or Chrome if possible.

GoTo Webinar – Question box & handout



Do you need a training account?



2 After clicking on "ALL", your data will be available until at least 01.01.2023.

1 2 You can complete this training with your own account.

1 Version 2024.R1 or newer

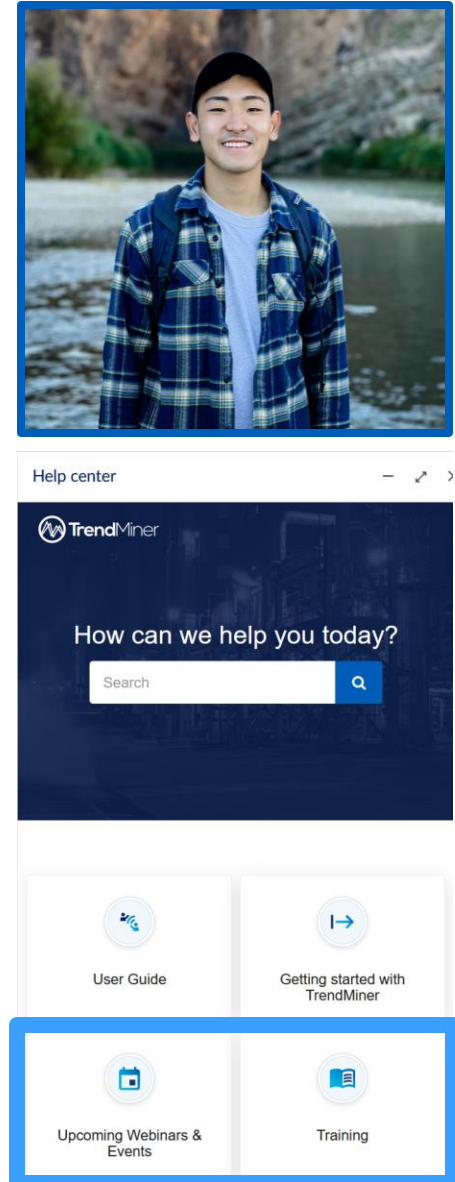
✗ If one of the requirements is not met, ask for an account in the question box.

INTRODUCTION & TODAY'S GOALS



Kevin Li, Data Analytics Engineer

- Support customers reaching value with self-service analytics
- Tackling more advanced use cases
- Support users in their analytics journey



Today's goals

1. Event Analytics Introduction

- Application Enhancements

2. Exercise 1 – Optimizing Batch Processes: RCA of low batch quality

- Use value-based search to identify all batches
- Define KPI to calculate & identify root cause
- Use Event Analytics to identify which KPI is abnormal during low quality batch

3. Exercise 2 – Optimizing Continuous Processes: Splitting data into manageable hourly intervals

- Analyze heat exchanger example and use `TM_hour_time_zone` tag in value-based search
- Define KPI to calculate & identify correlations
- Use Event Analytics for energy savings

Event Analytics Introduction

Event Analytics

Introduction

What is an Event?

- An event in TrendMiner refers to a search result or a context item

Examples of Events

- Anomalies
- Shutdowns
- Cleaning phases
- Other operational milestones

Analyzing Events with Event Analytics:

- Perform aggregations (calculations on search results) for deeper insights

Visualize results using:

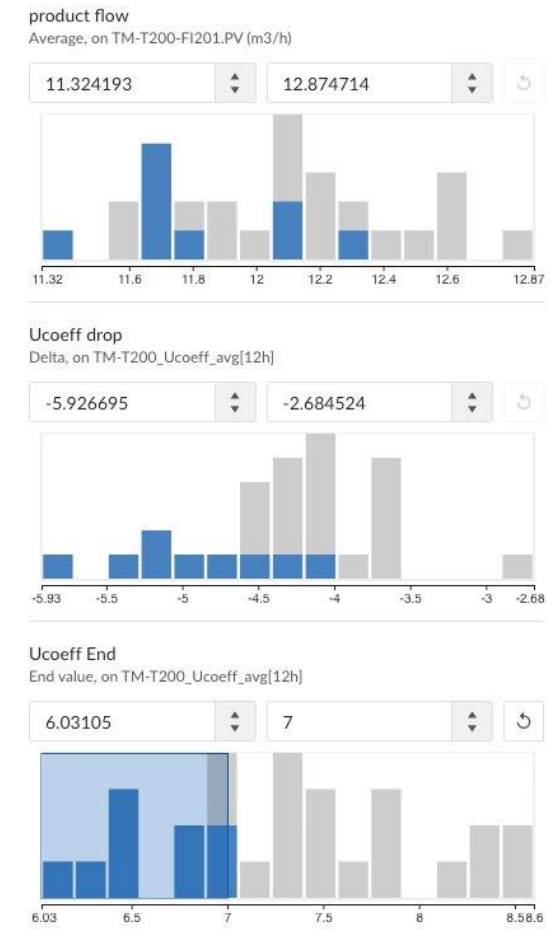
- Histograms
- Parallel coordinates plot
- Scatter plot

Event Analytics

Application Enhancements

- 2023.R1.0: Search refinements
- 2024.R1.0: Parallel coordinates plot in Event Analytics
- 2024.R3.0: Scatter in Event Analytics
- 2024.R3.1: Table in Event Analytics & other improvements

Refine results



Exercise 1 – Optimizing Batch Processes: RCA of low batch quality

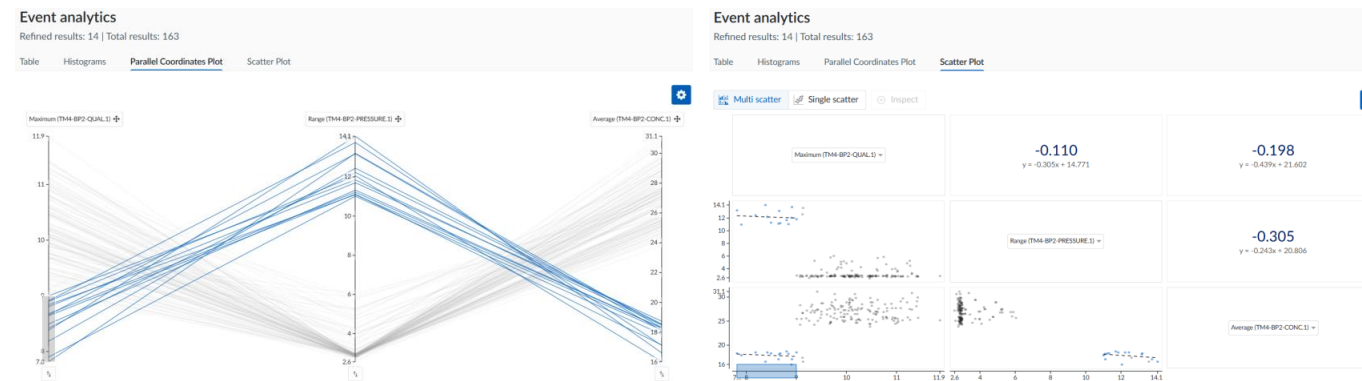
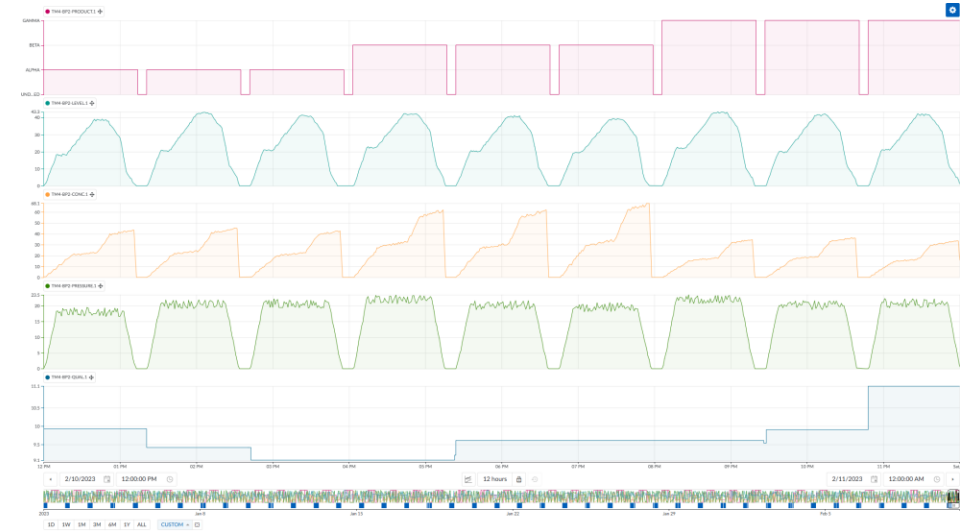
RCA of low batch quality

Background:

- We use a batch process to produce different product types. Occasionally, the final product has low quality (e.g., low concentration), resulting in "bad batches". Currently, we have little to no understanding of what causes this issue, making it difficult to prevent or resolve effectively.

Goals:

- Use the value-based search to identify all alpha batches
- Define KPI to calculate & identify root cause
- Use Event Analytics to identify which KPI is different when we have a low-quality batch



RCA of low batch quality

Steps for preparation

1.	Load tags	TM4-BP2-PRODUCT.1 TM4-BP2-LEVEL.1 TM4-BP2-CONC.1 TM4-BP2-PRESSURE.1 TM4-BP2-QUAL.1		
2.	Set custom context chart	01/01/2023 12:00:00 AM – 02/11/2023 12:00:00 AM → 40 days		
3.	Set focus chart	02/10/2023 12:00:00 PM – 02/11/2023 12:00:00 AM → 12 hours		
4.	Start a value-based search	TM4-BP2-PRODUCT.1	=	ALPHA
		AND		
		TM4-BP2-LEVEL.1	>	20
		Min. duration	30 m	

RCA of low batch quality

Additional steps

5.	Add calculation	Maximum	TM4-BP2-QUAL1
		Range	TM4-BP2-PRESSURE.1
		Average	TM4-BP2-CONC.1
6.	Open event analytics	A quality below 9 [g/L] is a bad quality. Analyze the histograms, parallel coordinates plot and scatter plots to find the root cause for the low quality.	
7.	Refine the results	Filter for low quality batches and visualize them in the focus chart	
8.	Save view & search	as "Exercise 1 – Analysis – Low ALPHA quality"	

RCA of low batch quality

You have the option to color results based on a string value



Pro tip

VALUE BASED SEARCH

Exercise 1 VBS pro tip

● TM4-BP2-LEVEL.1 > 20

ⓘ At minimum during 30m.

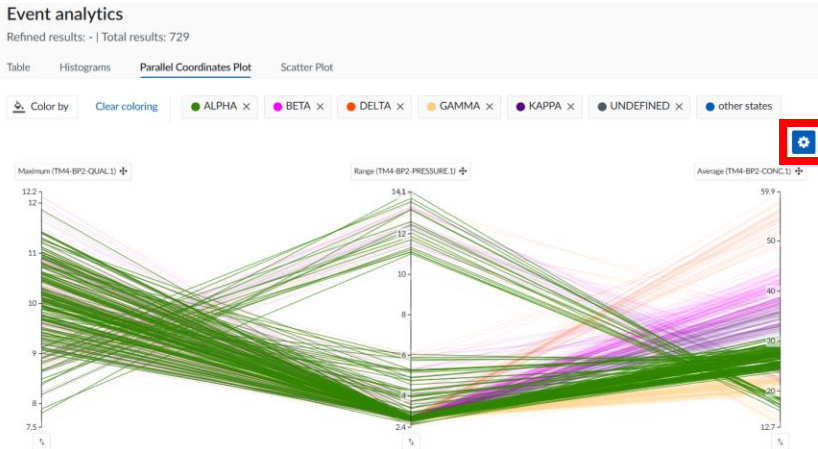
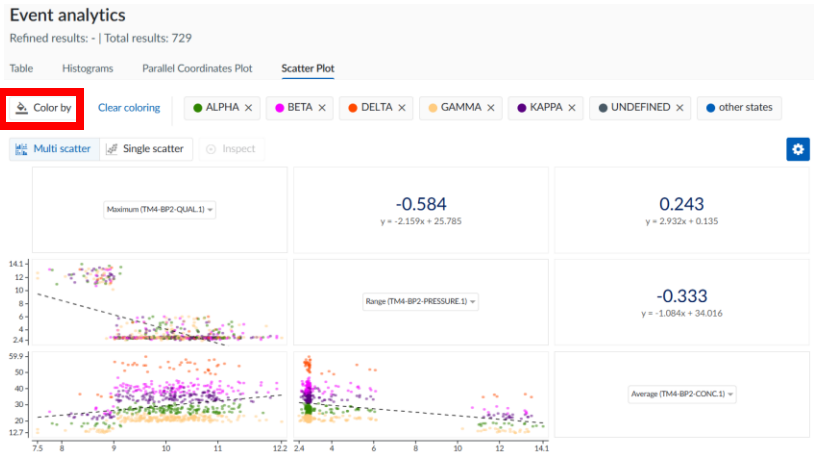
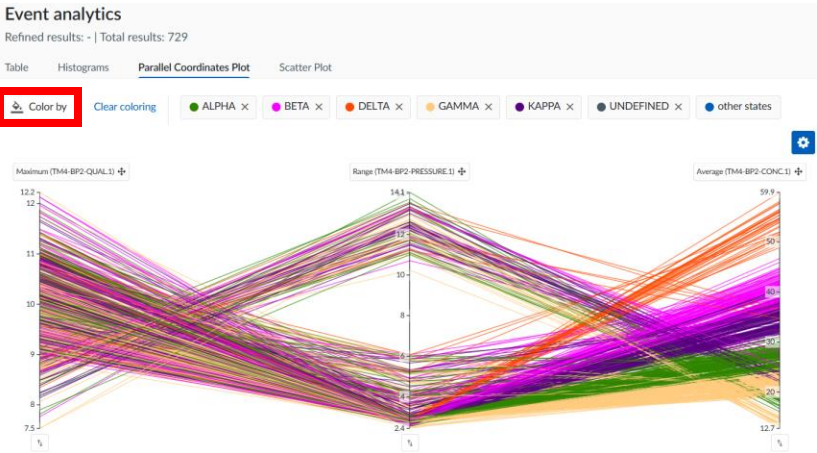
Edit search conditions

Manage calculations (4)

Save this search

1/1/2023 12:00:00 AM - 2/11/2023 12:00:00 AM

AVAILABLE CALCULATIONS (4/30)		
Maximum (TM4-BP2-QUAL.1)	×	
Tag to aggregate = TM4-BP2-QUAL.1 Operator = Maximum		
Range (TM4-BP2-PRESSURE.1)	×	
Tag to aggregate = TM4-BP2-PRESSURE.1 Operator = Range		
Average (TM4-BP2-CONC.1)	×	
Tag to aggregate = TM4-BP2-CONC.1 Operator = Average		
Start value (TM4-BP2-PRODUCT.1)	×	
Tag to aggregate = TM4-BP2-PRODUCT.1 Operator = Start value		



You can also highlight states by hovering over them

Event analytics configurations

SCATTER PLOT SETTINGS

VISUALIZED PROPERTIES

☐ Start date

☐ End date

☐ Duration

☒ Maximum (TM4-BP2-QUAL.1)

☒ Range (TM4-BP2-PRESSURE.1)

☒ Average (TM4-BP2-CONC.1)

☒ Start value (TM4-BP2-PRODUCT.1)

Exercise 2 – Optimizing Continuous Processes: Splitting data into manageable hourly intervals

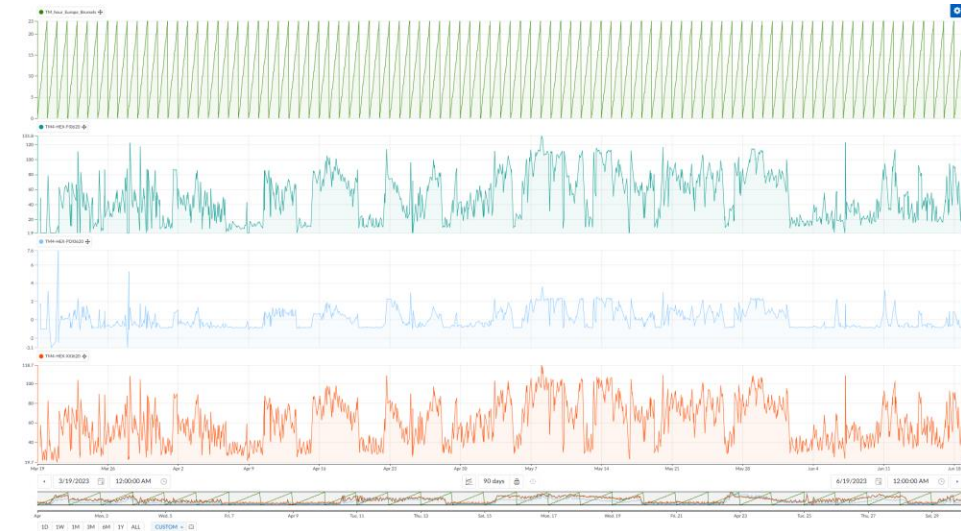
Splitting data into manageable hourly intervals

Background:

- We also want to optimize continuous processes. By breaking down the data into manageable hourly intervals, this approach provides detailed monitoring and identifies optimal conditions for enhanced efficiency and productivity.

Goals:

- Analyze a heat exchanger as an example and use the TM_hour_time_zone tag in a value-based search
- Define KPI to calculate & identify correlations
- Use Event Analytics, e.g. for energy savings



Splitting data into manageable hourly intervals

Steps for preparation

1.	Load tags	TM_hour_time_zone TM4-HEX-FI0620 TM4-HEX-PDI0620 TM4-HEX-XI0620	
2.	Set custom context chart	04/01/2023 12:00:00 AM – 04/30/2023 12:00:00 AM → 29 days	
3.	Set focus chart	04/01/2023 12:00:00 AM – 04/30/2023 12:00:00 AM → 29 days	
4.	Start a value-based search	TM_hour_time_zone	constant
		Min. duration	59 m

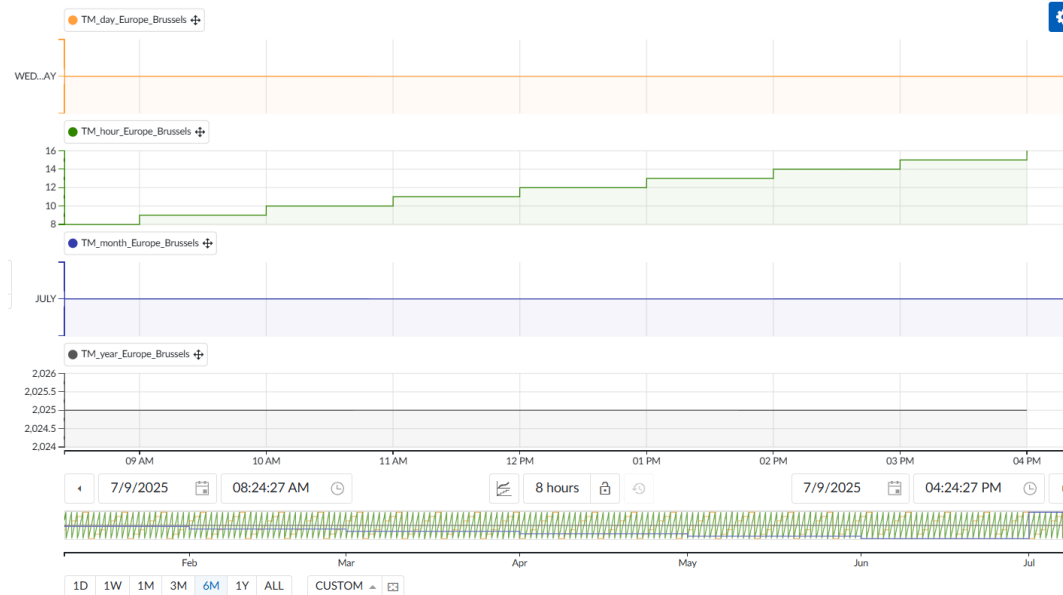
Splitting data into manageable hourly intervals

Additional steps

5.	Add calculation	Maximum	TM4-HEX-FI0620
		Integral	TM4-HEX-FI0620
		Maximum	TM4-HEX-PDI0620
		Range	TM4-HEX-XI0620
6.	Open event analytics	Analyze the histograms , parallel coordinates plot and scatter plots to look for correlations.	
7.	Save view & search	as "Exercise 2 – Analysis – Heat exchanger"	

Splitting data into manageable hourly intervals

Time/date tags

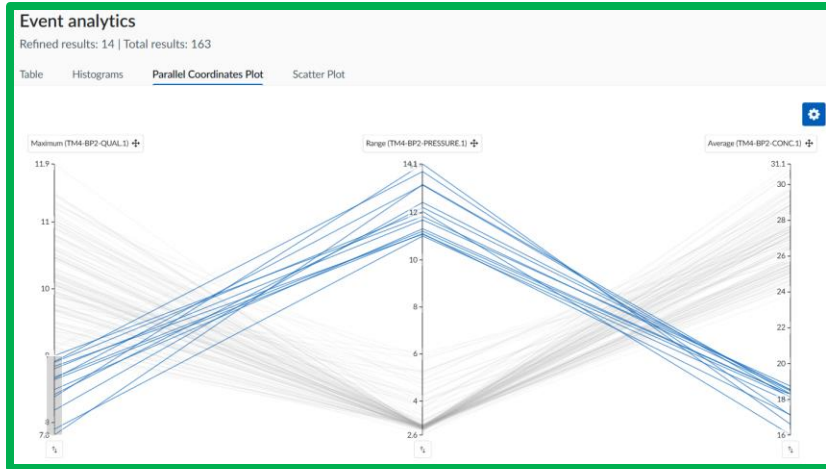


Pro tip

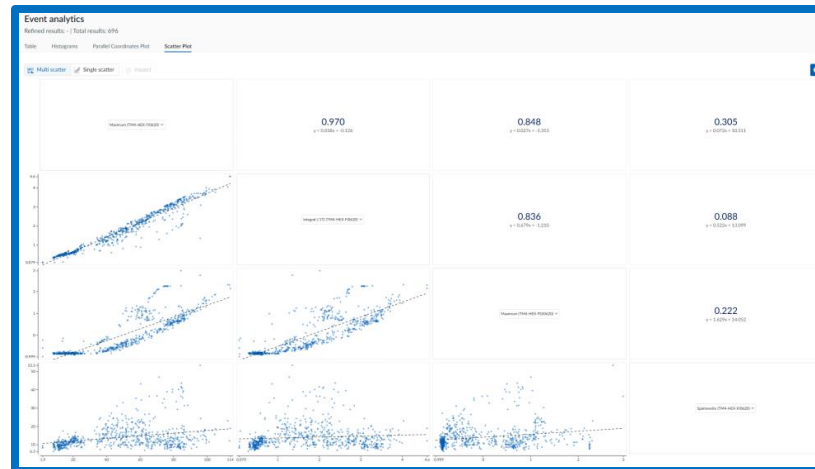
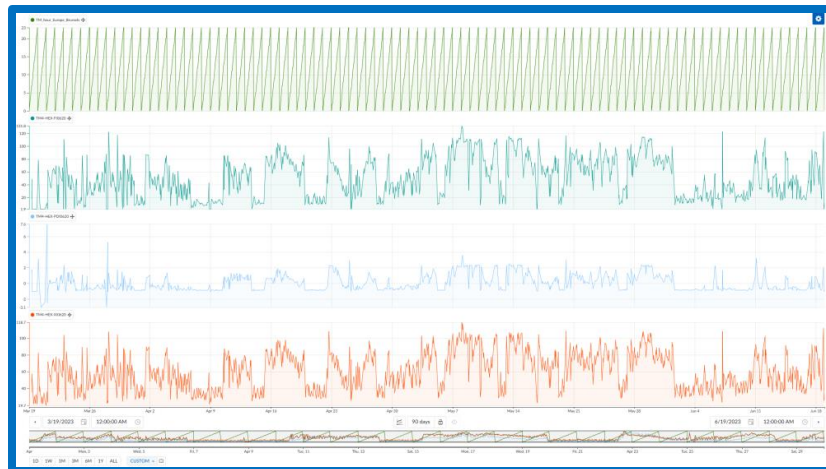
- Time/date tags are available for all time zones in TrendMiner (for *hour*, *day*, *month*, *year*)
- Time/date tags can be included in your analysis, not only in searches but also in formulas
- Further inspiration:
- [Daily raw material consumption report](#)
- [Calculations of hourly average consumption values](#)
- [How to calculate a daily average of a signal with a single result per day?](#)
- [Reporting daily specific resource consumption](#)

WRAP-UP

WRAP-UP



- Analyze low quality batches
- Root cause: pressure drops



- Analyze a heat exchanger and look for correlations

Do you want to learn more?

Intermediate Guides & Live Training Webinars

Here you can find the Intermediate Guides:

User Guide / Training / Intermediate Guides

Intermediate Guides



In this section

- Get your process statistics (Int)
- Detect, warn & contextualize anomalies and process events (Int)
- Create your actionable dashboard (Int)
- Trouble shooting (Int)
- Create your own KPIs and Variables (Int)

<https://userguide.trendminer.com/en/intermediate-guides.html>

Here you can find all Live Training Webinars from the past years:

Live trainings - English



1 - 12 of 40 [Toggle](#)



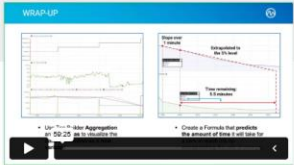
Mastering Tag Types in TrendMi...

TrendMiner Software



Value Based Searches – Tips &...

TrendMiner Software



Advanced Formulas

TrendMiner Software



Take Your Formulas To The Next ...

TrendMiner Software

<https://vimeo.com/showcase/8476721>



TRENDLAB 2025 TRAININGS

DAY 1 (COLOGNE 30TH SEP HOUSTON OCT 8TH)

SOLUTION TRAINING

- Learn how to turn your own OEE KPI use case into an automated reporting solution using TrendMiner, with expert guidance on event capturing, KPI calculation via Python, and dashboard creation.
- Who should attend? Experienced TrendMiner users with at least a basic knowledge of Python.

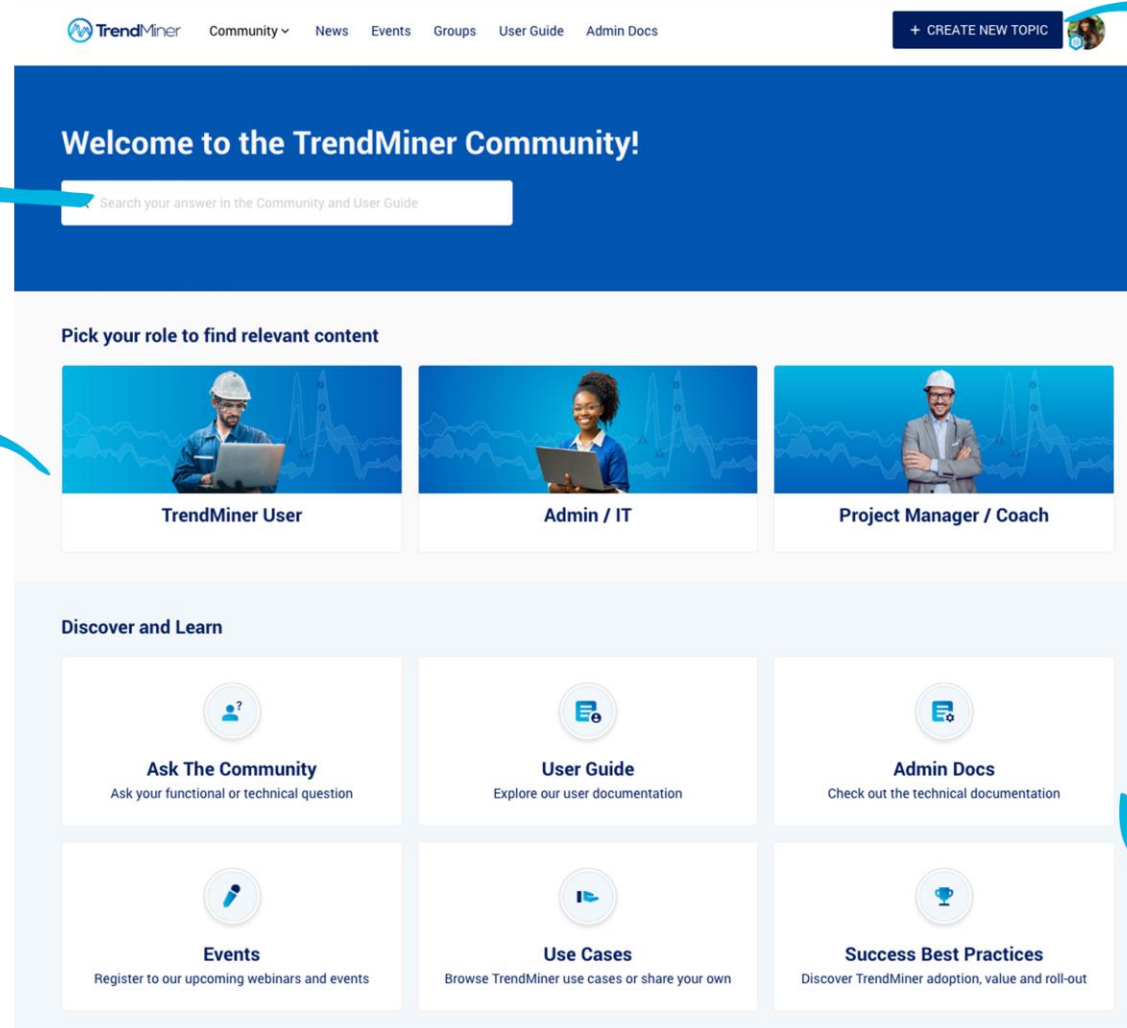
ADMIN TRAINING

- Understand how TrendMiner works under the hood and learn how to configure, troubleshoot, and support your users while exploring new functionalities and exchanging insights.
- Who should attend? TrendMiner application and system administrators with at least a basic knowledge of networking, API's, Linux, SQL, ...



Create your account now: <https://community.trendminer.com>

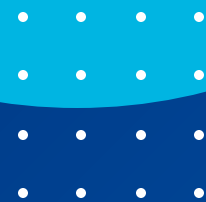
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**Thank you for your
attention**

