TrendMiner Live Training Session

From data points to decisions:
Advanced scatter plot analysis

TrendMiner

Housekeeping

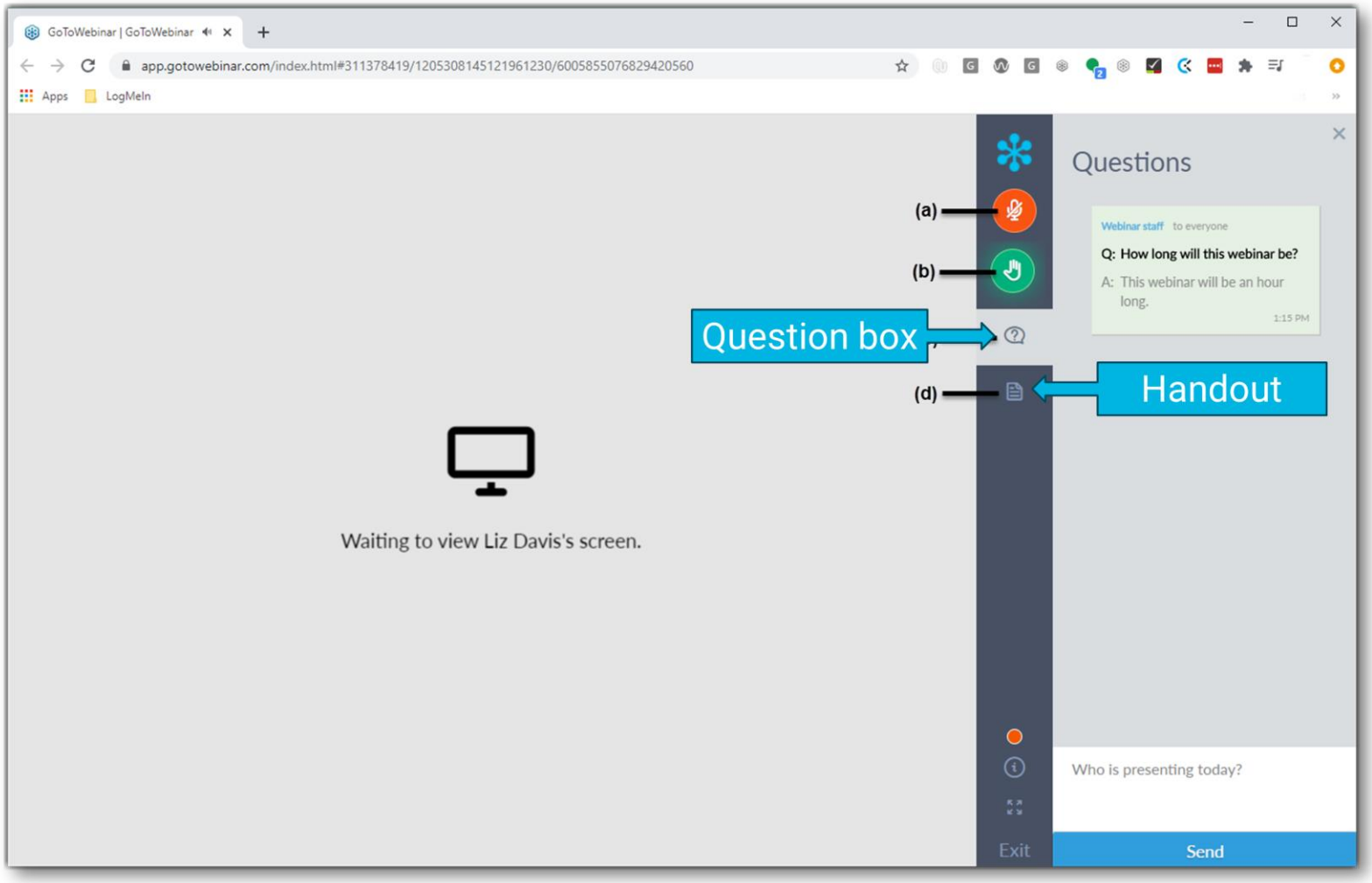
Listen Only Mode

Use Question Box!

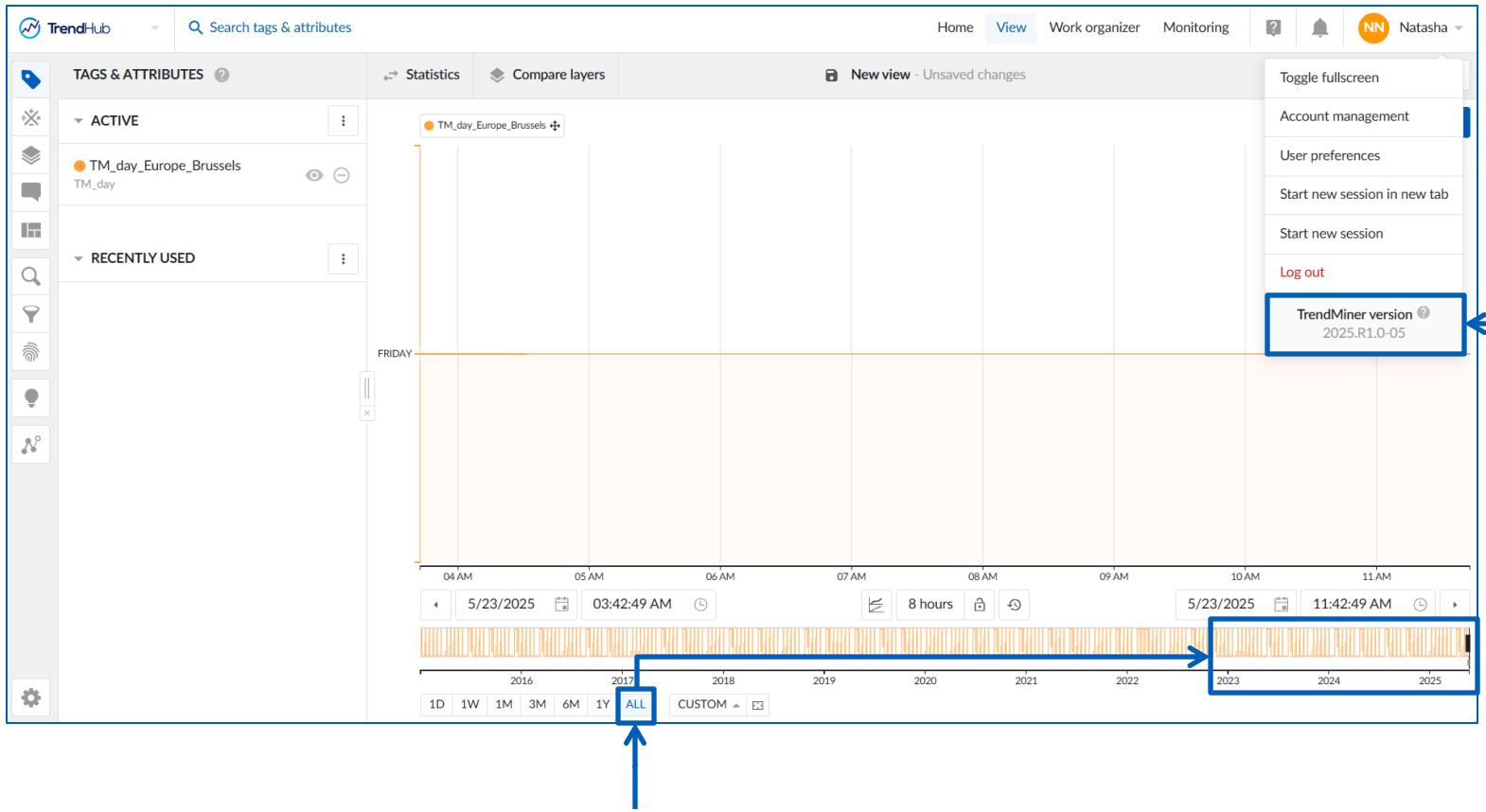
Recording and Handout will be provided!

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?



1 Version **2025.R3** or newer

2 After clicking on "ALL", your data will be available until at least 01.01.2024.

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

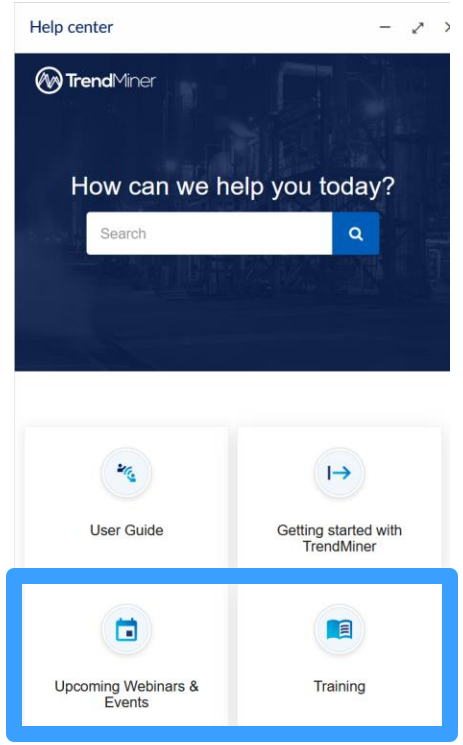
❌ If one of the requirements is not met, ask for an account in the question box.

Introduction & Today’s goals

Personal introduction

Kevin Li, Data Analytics Engineer

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



POLL about the users:

What is your current level of TrendMiner knowledge?

Today’s goals

1. **Scatter plots introduction**
   - Application Enhancements

2. **Exercise 1 – Operating area analysis: Detecting heat exchanger fouling**
   - Identify operational areas with and without fouling using flow pump and differential pressure tags
   - Search for time ranges outside the defined operating area and set up a monitor

3. **Exercise 2 – Regression lines and limit curves for heat exchanger analysis**
   - Use two heat exchanger tags to create a scatter plot view
   - Configure regression type and draw lower and upper limit curves

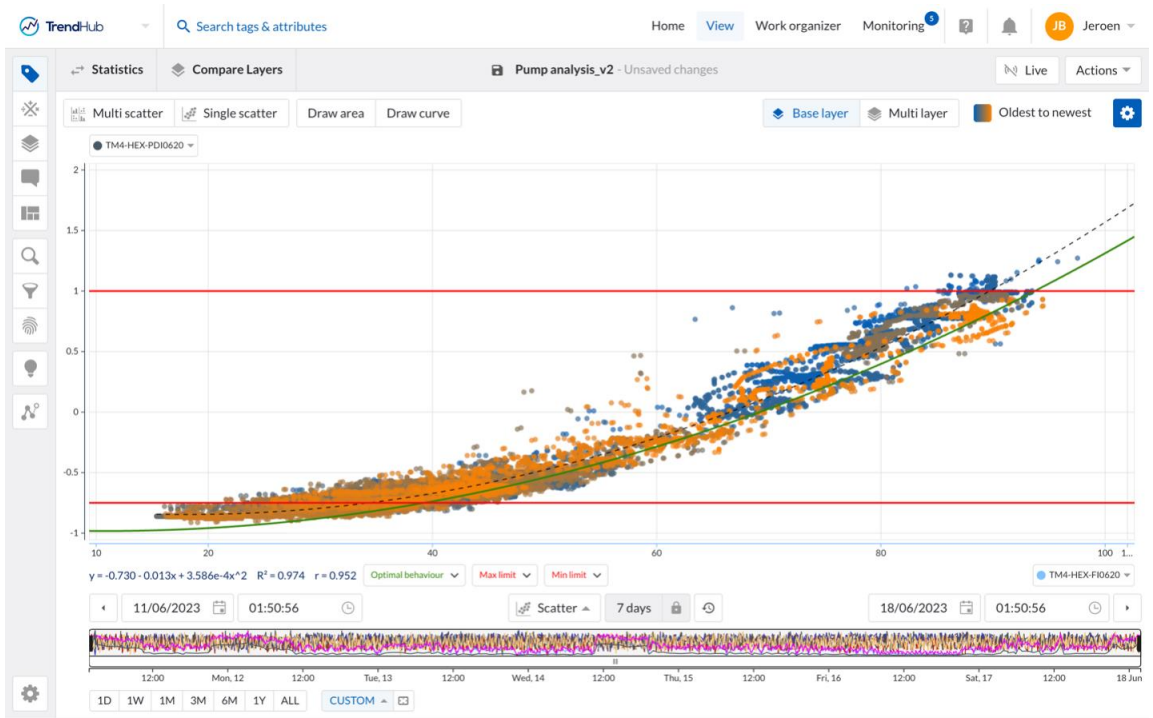
4. **TrendMiner solution**
   - Take your analysis one step further – Automated operating area monitoring

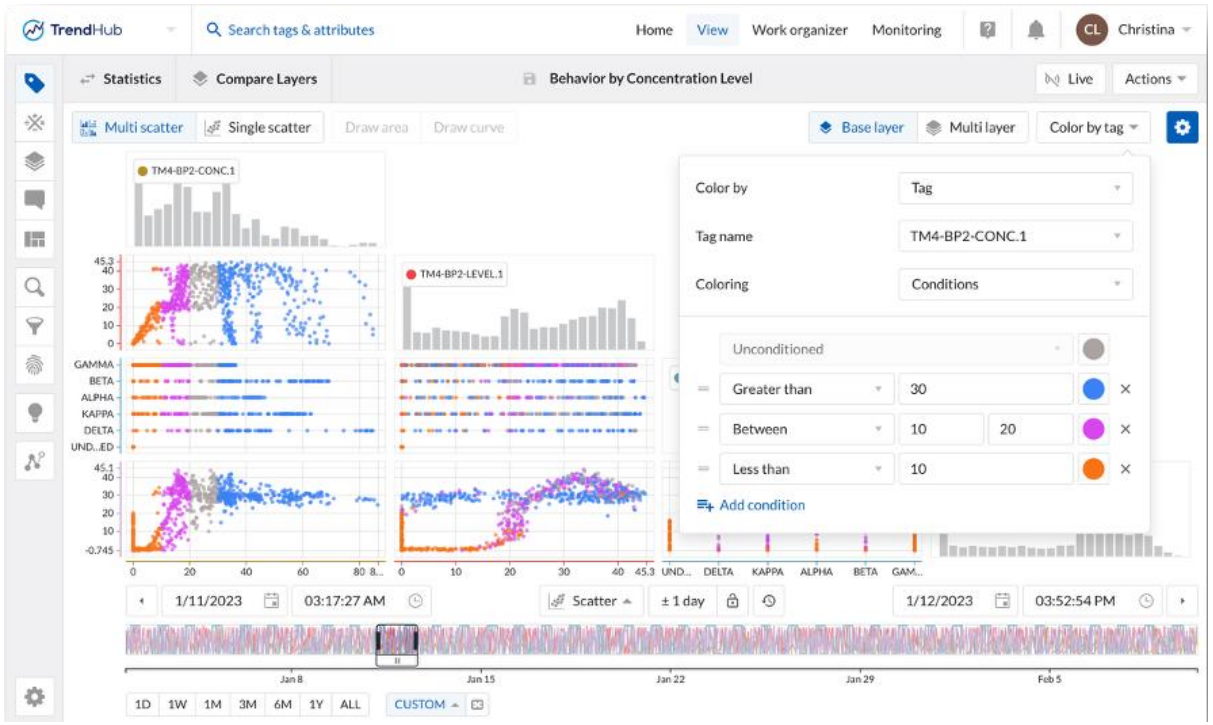
Scatter plots introduction

Scatter plots

Application Enhancements

- 2025.R2: Upgrades in terms of data resolution, regression options and reference lines
- 2025.R3: Extended coloring options





Exercise 1 – Operating area analysis: Detecting heat exchanger fouling

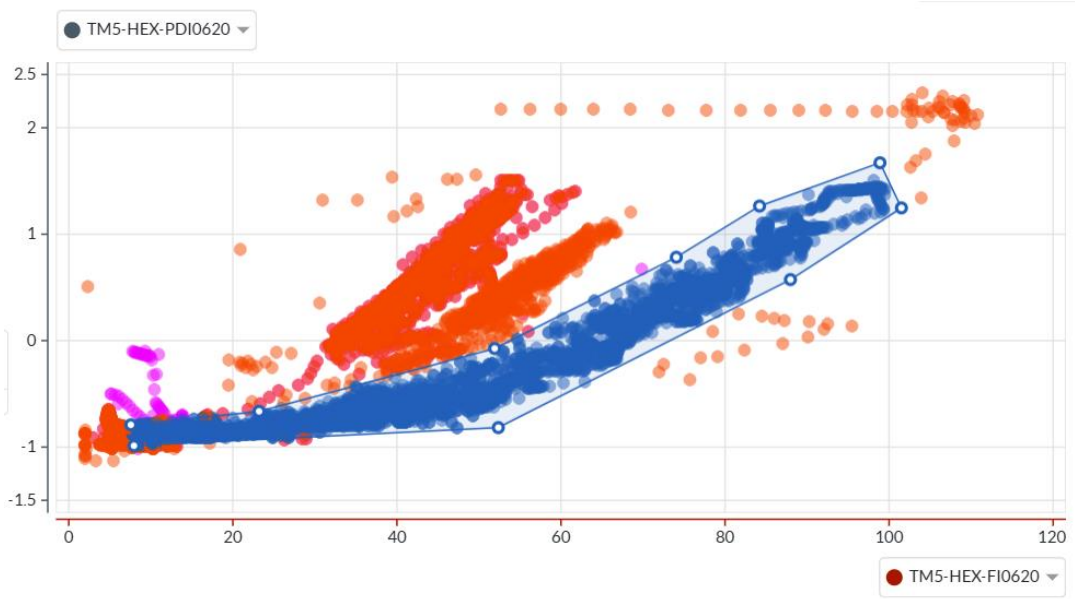
Operating area analysis: Detecting heat exchanger fouling

Background:

- Heat exchanger performance can degrade over time due to fouling, which causes measurable shifts in key process variables such as flow rate and differential pressure.
- By analyzing the relationship between these variables, distinct operational areas – before and after cleaning – become visible, enabling a data-driven approach to condition monitoring.

Goals:

- Define a normal operating area based on a clean reference period and search for time ranges that fall outside this boundary.
- Set up a saved search and monitor to automatically detect future deviations from the expected operating behavior.



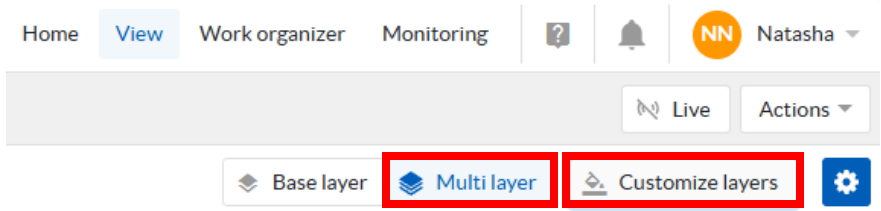
Operating area analysis: Detecting heat exchanger fouling

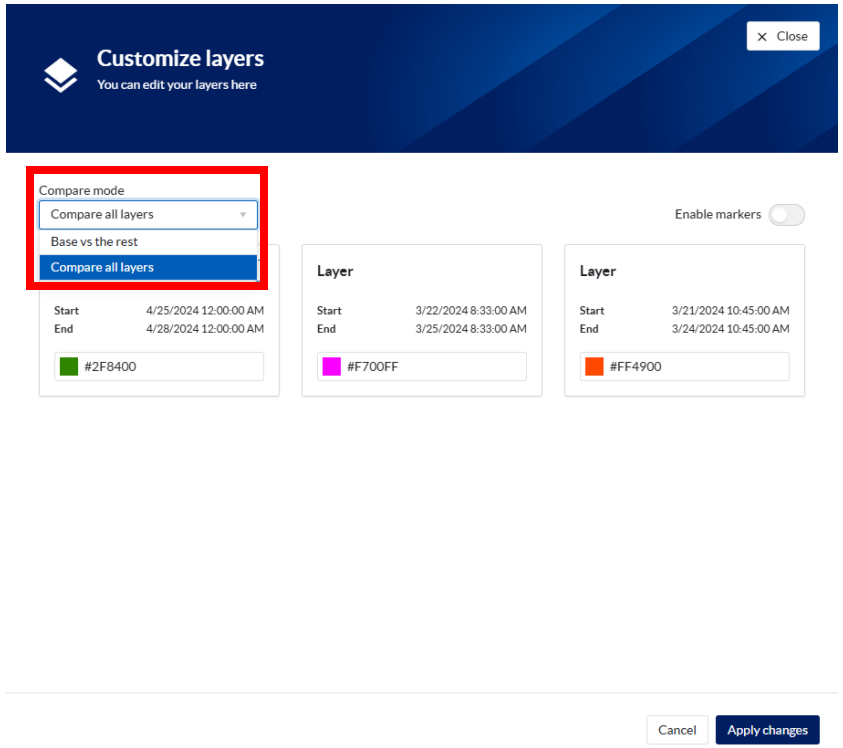
1.	Load tags	TM5-HEX-XI0620 TM5-HEX-FI0620 TM5-HEX-PDI0620	
2.	Set custom context chart	3/20/2024 | 12:00:00 AM – 6/19/2024 | 12:00:00 AM	
3.	Set focus chart	4/21/2024 | 12:00:00 AM – 4/28/2024 | 12:00:00 AM	
4.	Switch focus chart type	Select chart type: Scatter Select the scatter plot of **flow** and **differential pressure** → Notice the **two operating zones** that exist for the process.	
5.	Set focus chart	4/25/2024 | 12:00:00 AM – 4/28/2024 | 12:00:00 AM	
6.	Draw area	Draw area around operating area (single click to start, double click to stop drawing)	
7.	Perform an operating area search	Region	Outside the drawn area
		Minimum duration	12 hours (12h)
8.	Analyze search results	Add layers	
9.	Save the search	As “Heat exchanger fouling”	
10.	Enable a monitor	Monitor future non ideal operating conditions based on saved search	

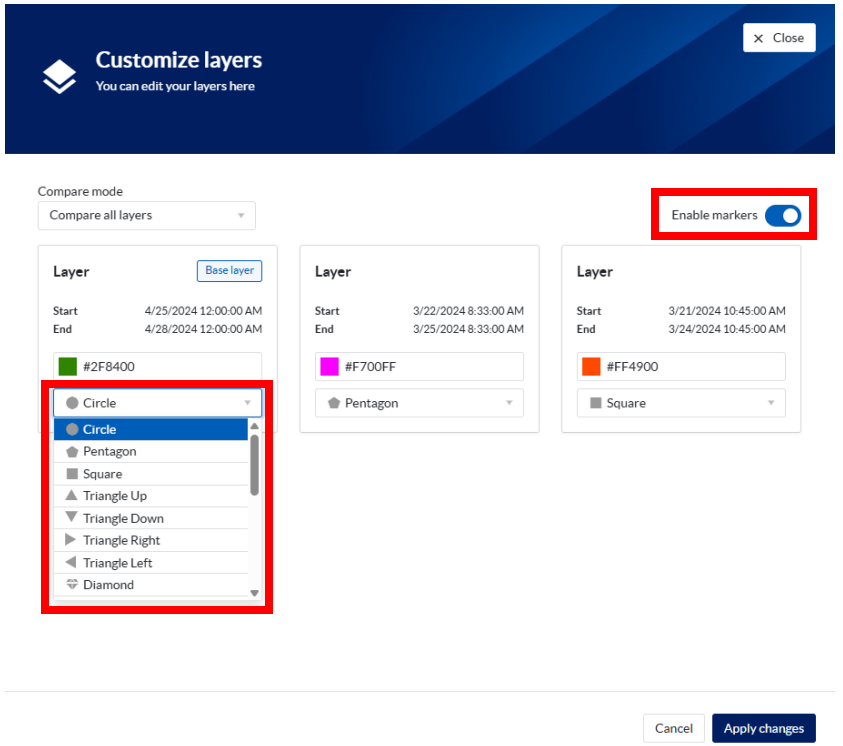
Operating area analysis: Detecting heat exchanger fouling

You have the option to customize your layers

Pro tip







Exercise 2: Regression lines and limit curves for heat exchanger analysis

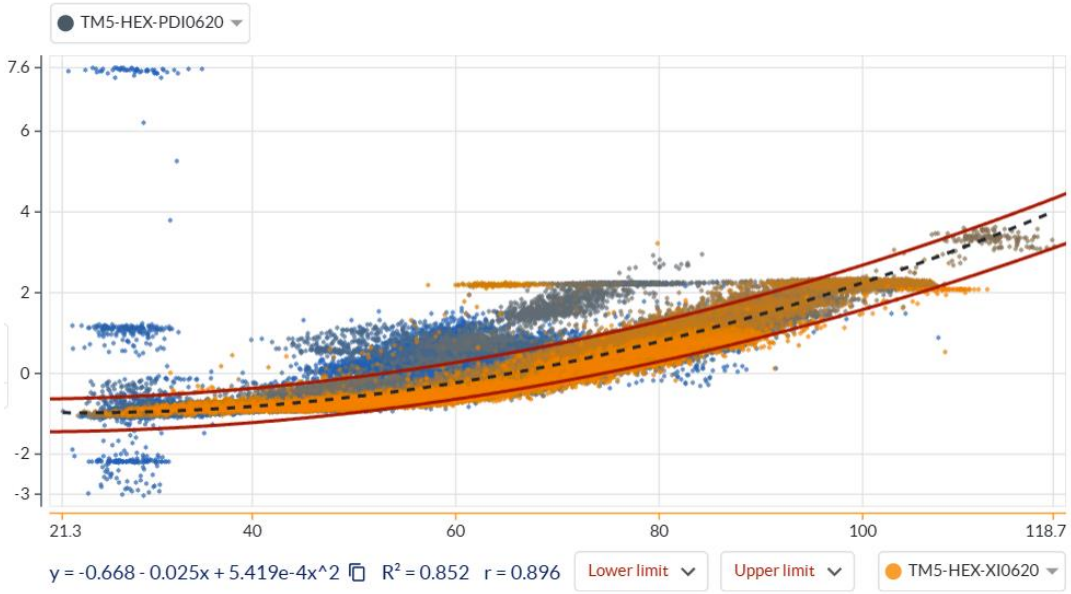
Regression lines and limit curves for heat exchanger analysis

Background:

- Heat exchangers involve multiple interdependent process variables (e.g., temperatures, flow rates, pressures) that are best understood in relation to each other rather than over time alone.
- TrendMiner's scatter plot view allows engineers to visualize correlations between two tags, making it easier to detect deviations from expected operating behavior.

Goals:

- Create a scatter plot view using heat exchanger tags and configure the regression type.
- Define normal operating boundaries by drawing lower and upper limit curves in the Scatter view.



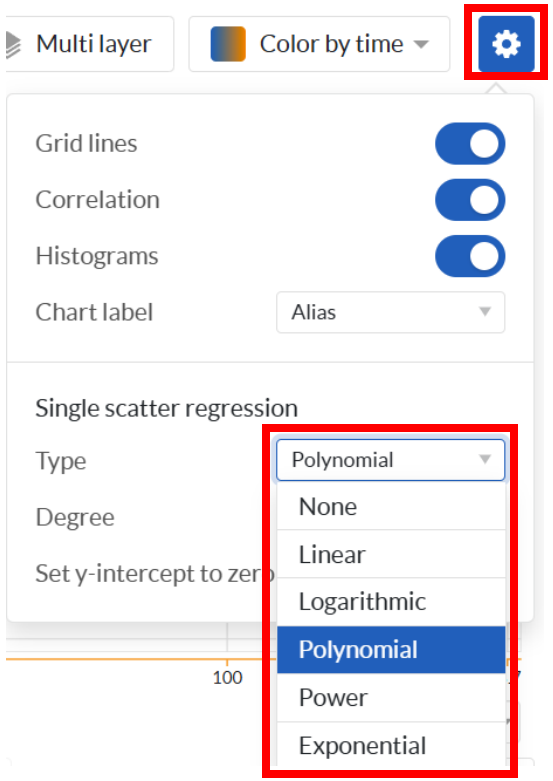
Regression lines and limit curves for heat exchanger analysis

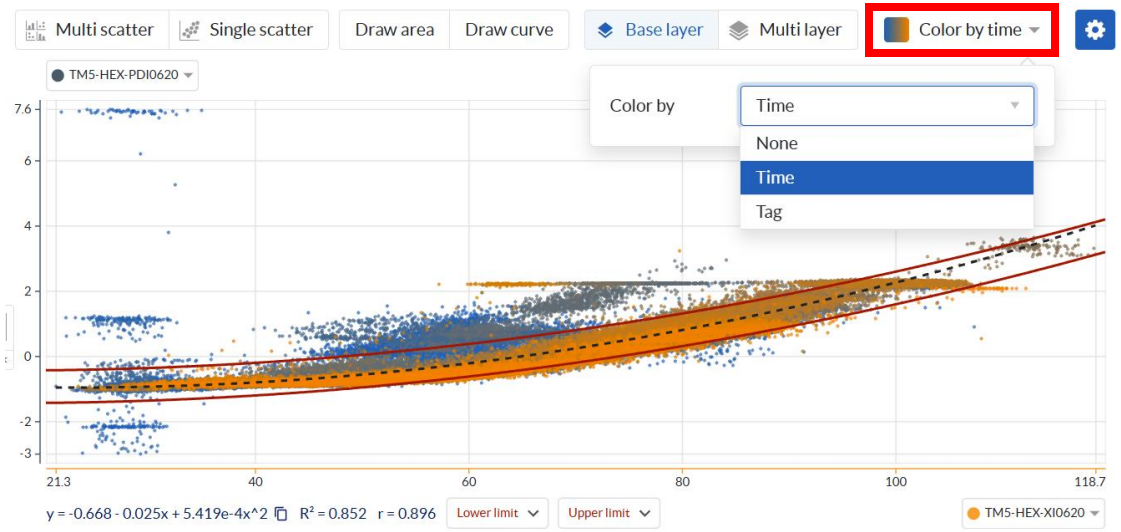
1.	Continue from exercise 1	Remove TM5-HEX-FI0620		
2.	Set focus chart	3/20/2024 | 12:00:00 AM – 6/19/2024 | 12:00:00 AM		
3.	Switch focus chart type	Select chart type: Scatter Make sure TM5-HEX-XI0620 is set as the x-axis		
4.	Change scatter regression type	Type	Polynomial	
		Degree	2	
5.	Draw curves	Formula: -1.3 - 0.015x + 4.4e-4x^2	Description: “Lower limit”	Color: Red
6.	Add regression lines	You can copy the formula and adjust the intercept (e.g., -0.5 instead of -1.3) or add a value (e.g., +1).		
7.	Save the view	As “Relational view heat exchanger variables”		

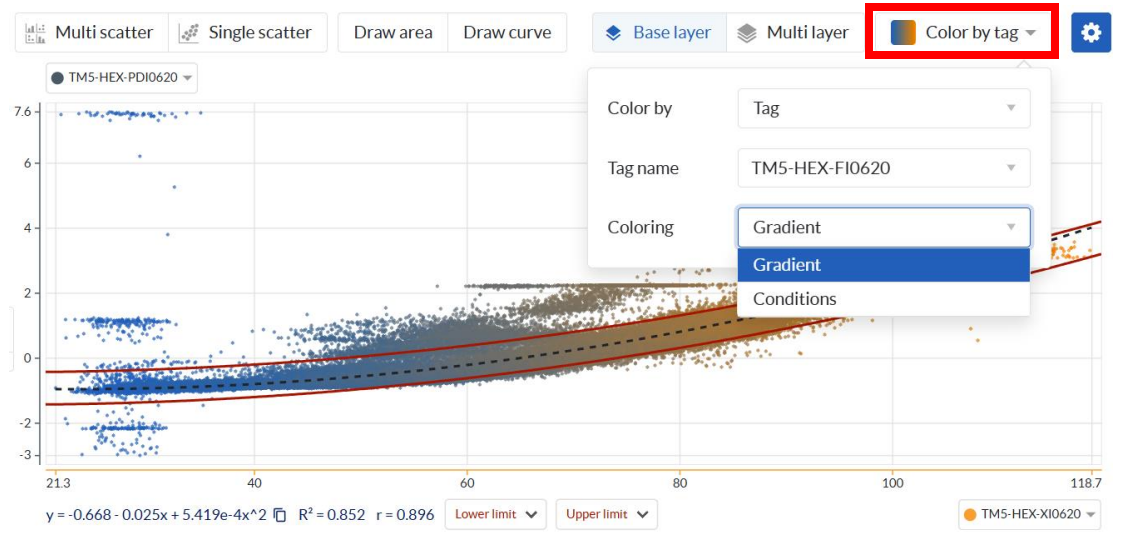
Regression lines and limit curves for heat exchanger analysis

Regression line types and coloring options

Pro tip





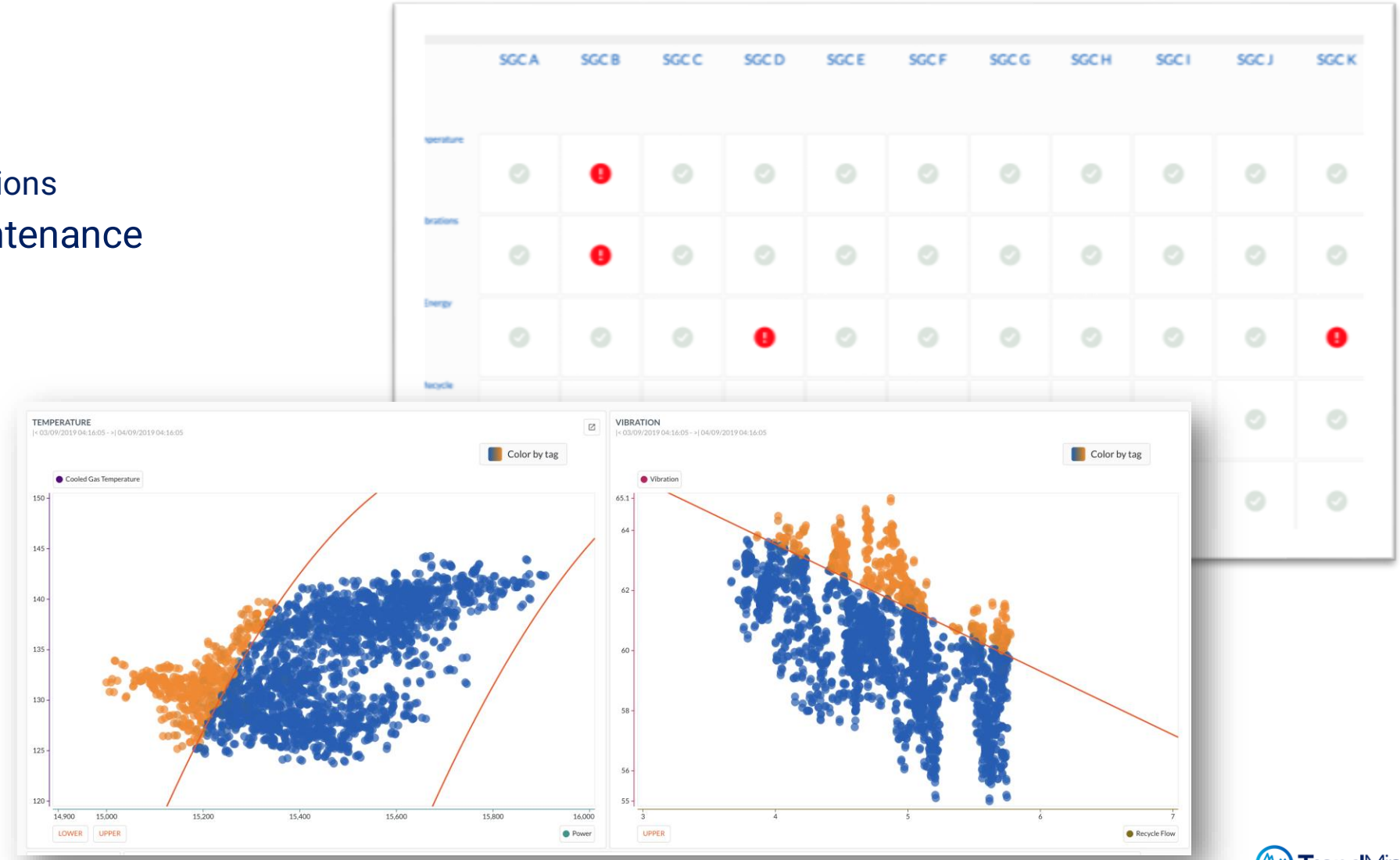


TrendMiner solution

Automated operating area monitoring

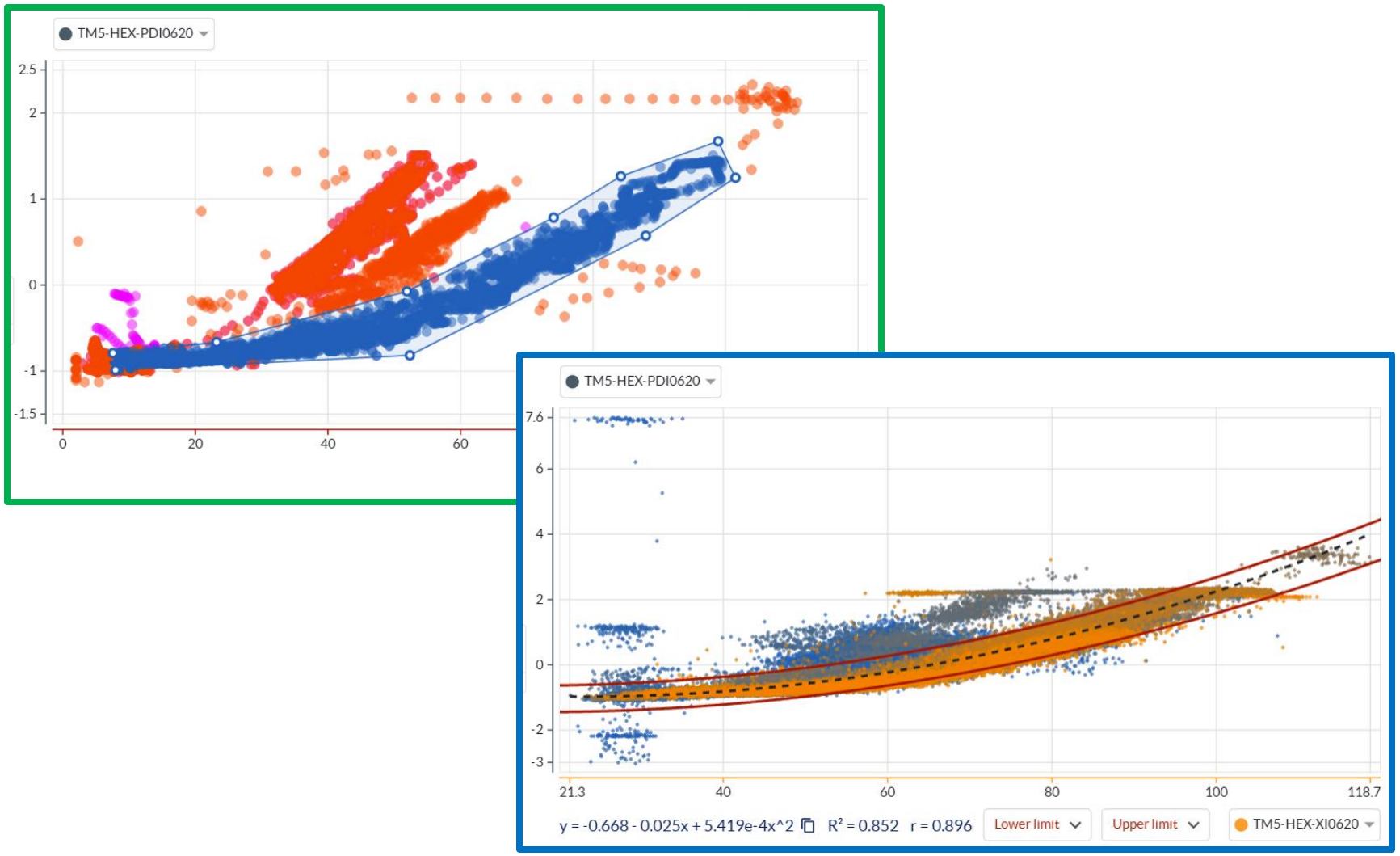
Automate cross-asset rollout of operating zone detection

- Ideal operating zones
  - Energy efficiency
  - Pump curve specifications
- Condition-based maintenance
  - Energy efficiency
  - Failure prevention
- Drift detection
  - Sensor drift
  - Setpoint deviations



Wrap-up

Wrap-up



- Define normal operating areas and search for deviations
- Automate detection with a saved search and monitor

- Visualize tag correlations in a scatter plot
- Define expected behavior using regression lines and limit curves

TRENDLAB 2026

Europe
Eindhoven, NL

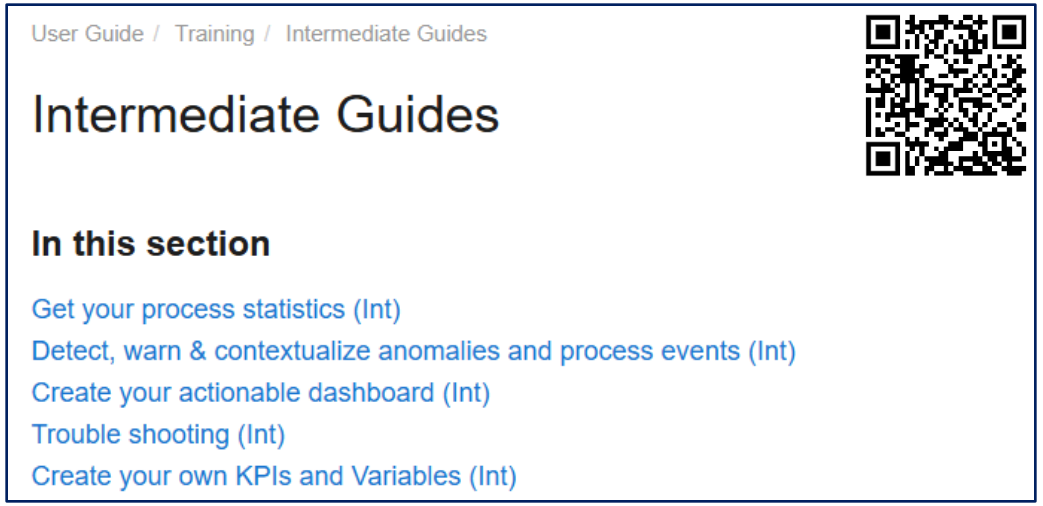
Americas
Houston,USA

Registration Link:
https://community.trendminer.com/p/trendlab

Do you want to learn more?

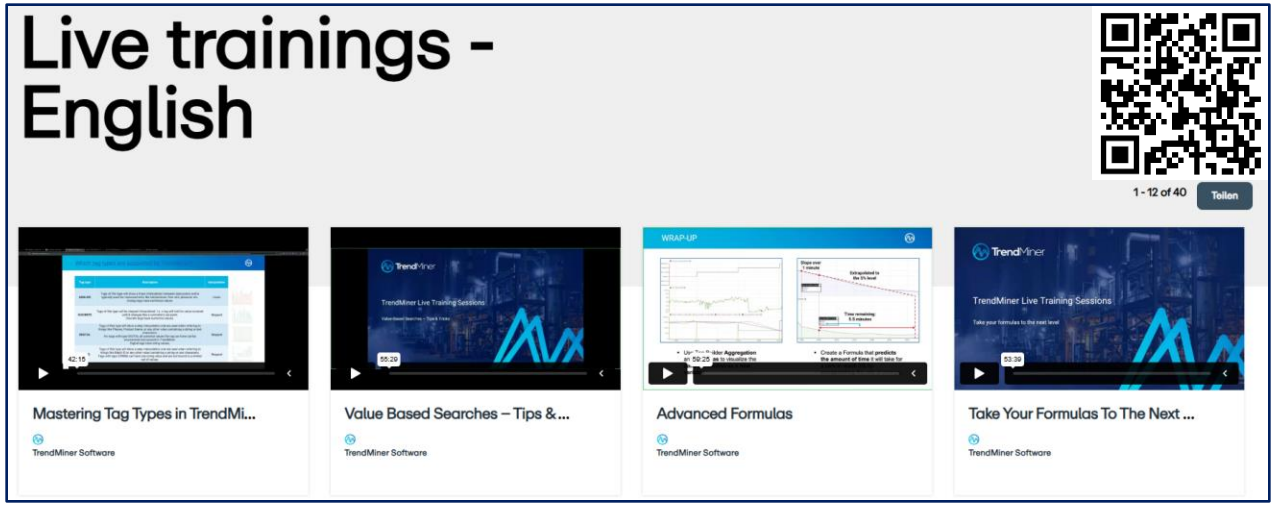
Intermediate Guides & Live Training Webinars

Here you can find the Intermediate Guides:



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

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



https://vimeo.com/showcase/8476721

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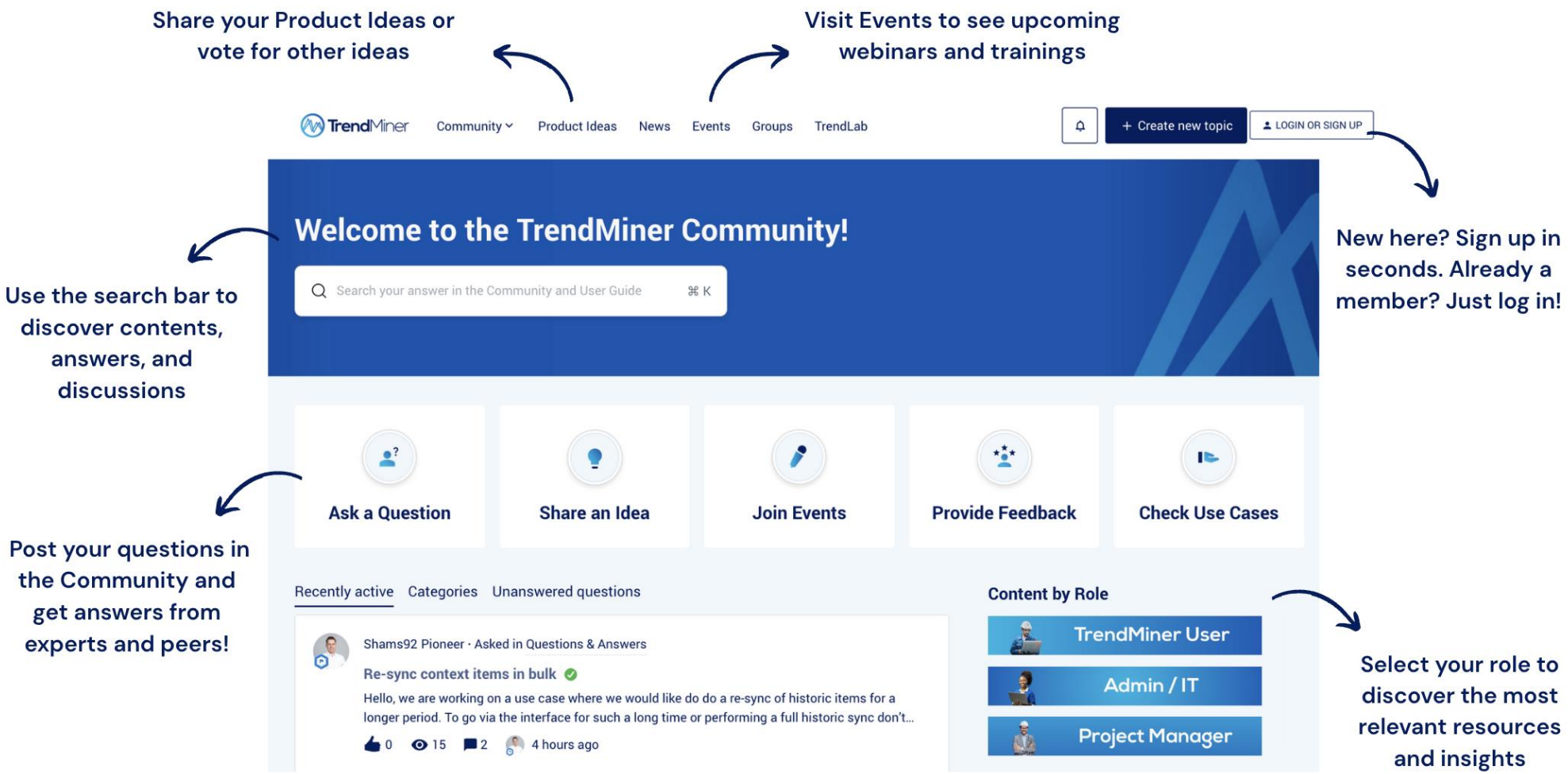

Thank you for your attention

TrendMiner