

PHILIPS Case Study

Predictive Maintenance:
Leveraging Data and Context Causality

Agenda



Introduction

An overview of our identity and Sibyl's role in unlocking it

01

Case Study

The PHILIPS Drachten Case Study concerning the Cold-forming Cutter

02

Questions

Some time for interaction!

03

Short Introduction

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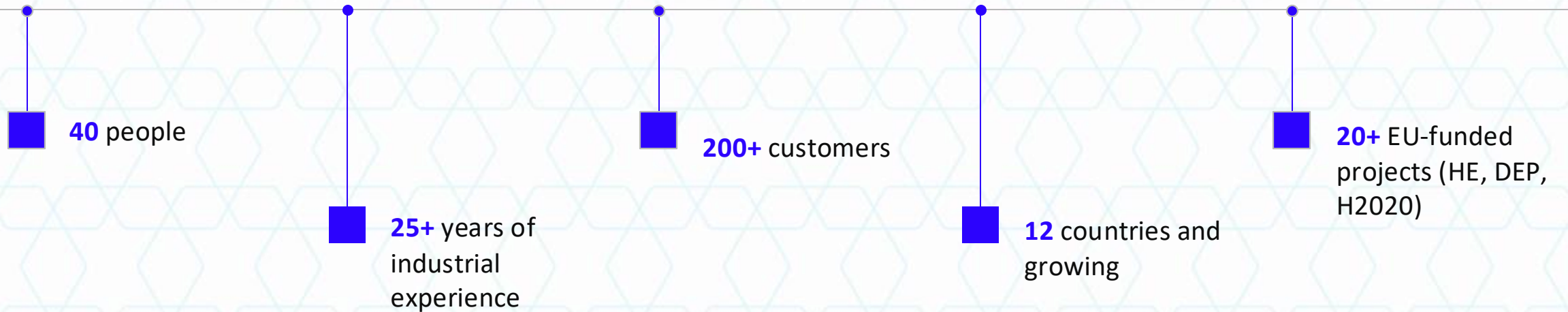
ADDRESS

Lange Marktstraat 1, 8911 AD
Leeuwarden, The Netherlands



Who we are

We offer maintenance software solutions and consulting services for more than 25 years!



Product portfolio & Customers presence

Industrial Data Analysis Platform

Sibyl - Turn-key solution for predicting incidents and optimizing your shopfloor with Industry 4.0 technologies

CMMS/EAM/CAFM

Aimms - A complete solution to simplify operations, processes, and management of your maintenance department

Total Productive Maintenance

TPM - Modern methods and practices to achieve world-class maintenance



Case Study

PHILIPS

PHILIPS Drachten

PHILIPS Drachten: What started in 1950 as a small shaver factory is nowadays one of the largest innovation and production sites of Philips in Europe.

Over 1500 employees of more than 30 nationalities are continuously working on new, innovative products and further improvement of our processes.



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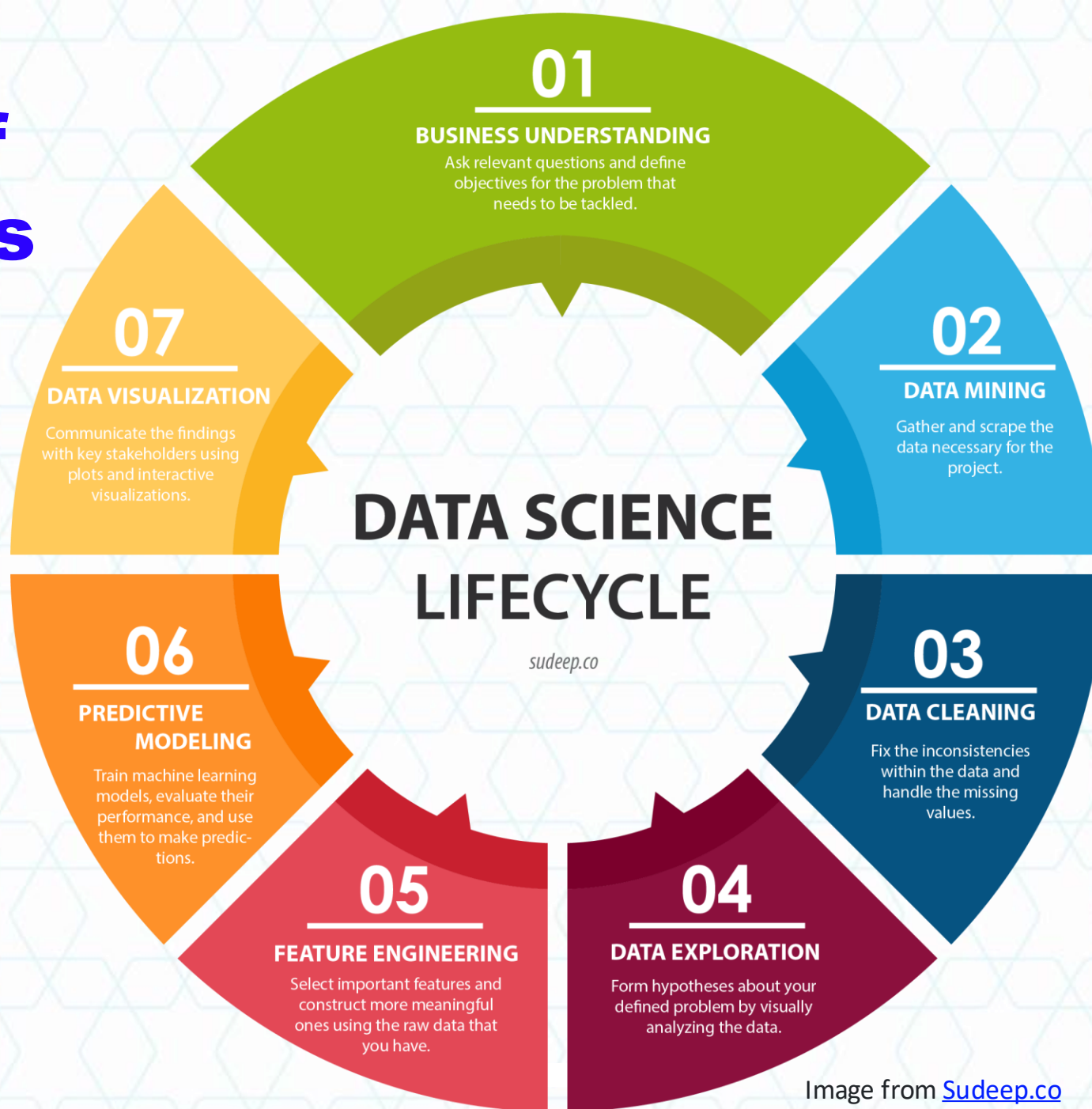
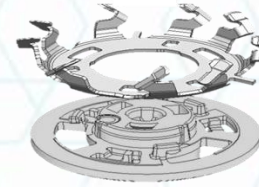


Image from [Sudeep.co](https://sudeep.co)

Cold-forming Cutter



01

BUSINESS UNDERSTANDING

Ask relevant questions and define objectives for the problem that needs to be tackled.



Key Figures

16 machines in flow

800K – 900K products per week

24 hours, 7 days a week

2 operators per shift, 21 shifts per week

1 – 3% fall off

± 150 (machine and quality) datapoints per product



Cold-forming Shaving and One blade



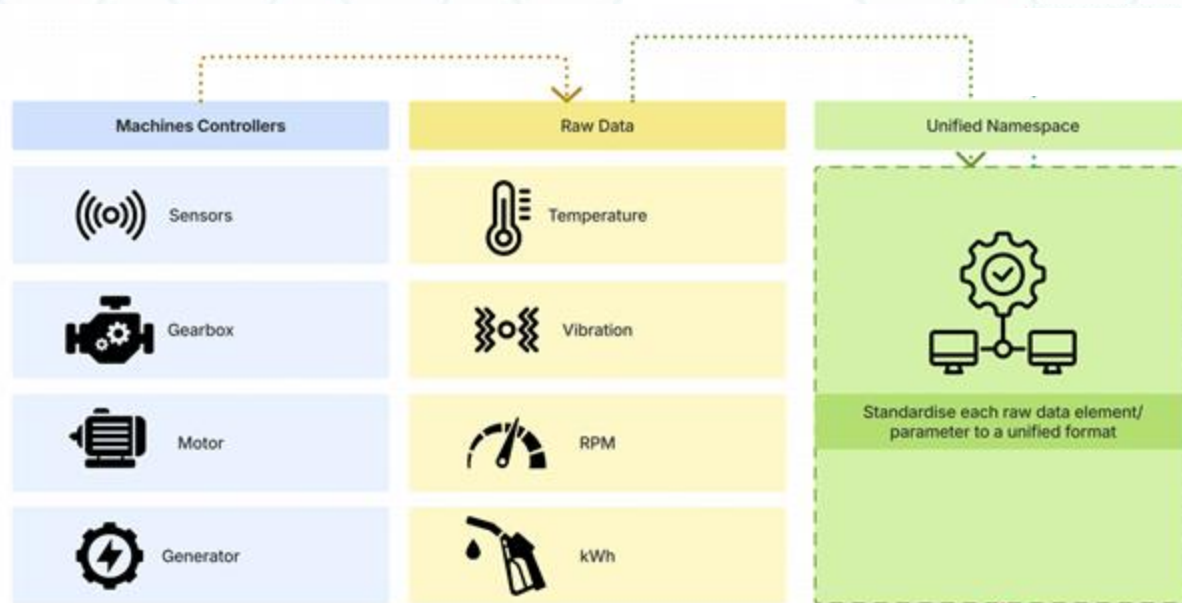
Key Figures

Expand to two different lines

250 to 500 PPM

Micro precision Cold-forming

Data Acquisition



Data Sources

- Production Data (MES)
 - Product
 - Machine status
 - Machine scrap
- Process Data
 - PLCs / controllers
 - Additional sensors
 - Etc.
- Maintenance Data (CMMS/EAM)
- Events

02

DATA MINING

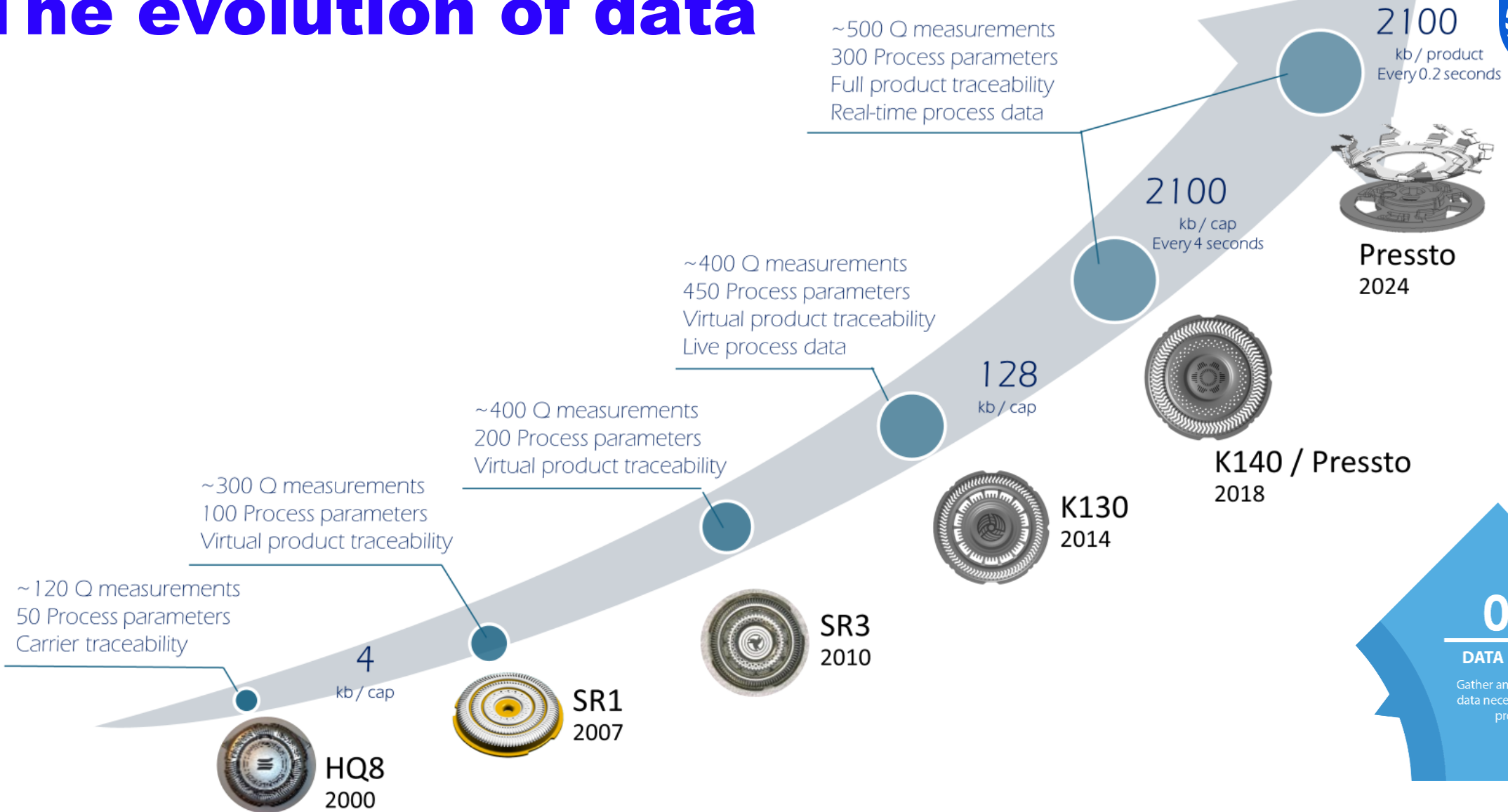
Gather and scrape the data necessary for the project.

03

DATA CLEANING

Fix the inconsistencies within the data and handle the missing values.

The evolution of data



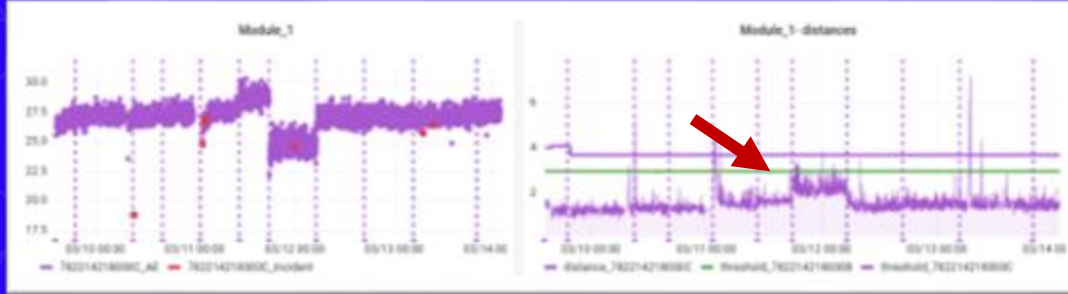
02

DATA MINING

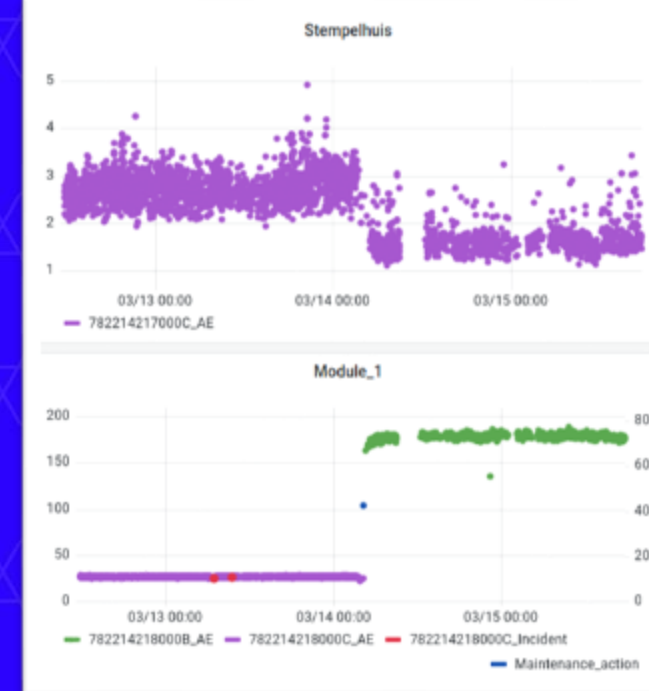
Gather and scrape the data necessary for the project.

Case Study Characteristics

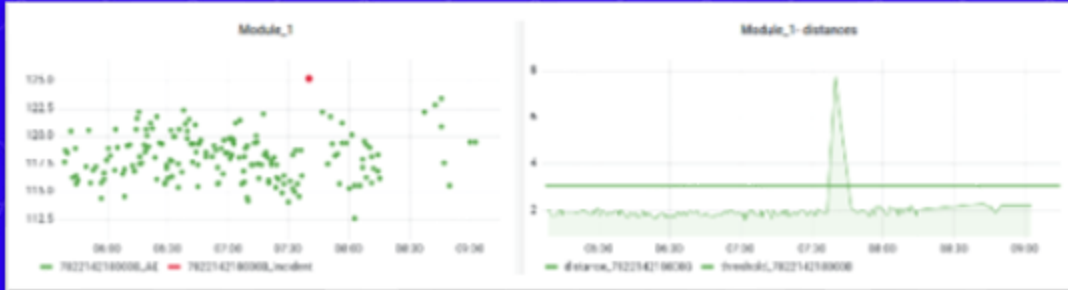
Change of Material



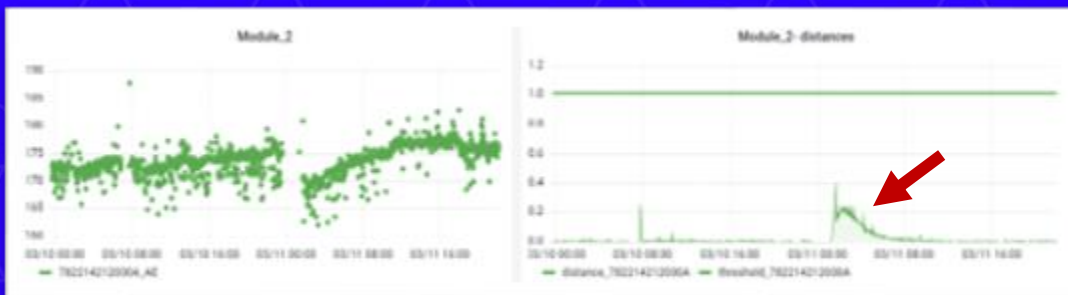
Changes in Modules (tooling)



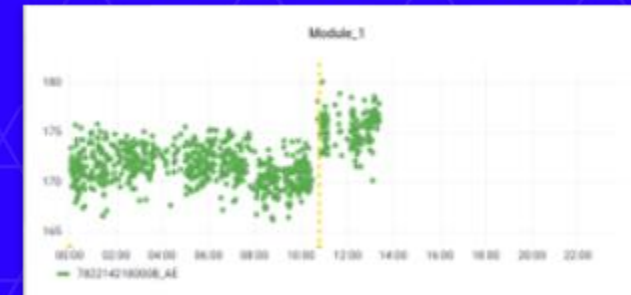
Human Intervention (Periodic Quality Check)



Cold Start



Changes in the Speed



04

DATA EXPLORATION

Form hypotheses about your defined problem by visually analyzing the data.

Sibyl Data Handling Pipelines



06

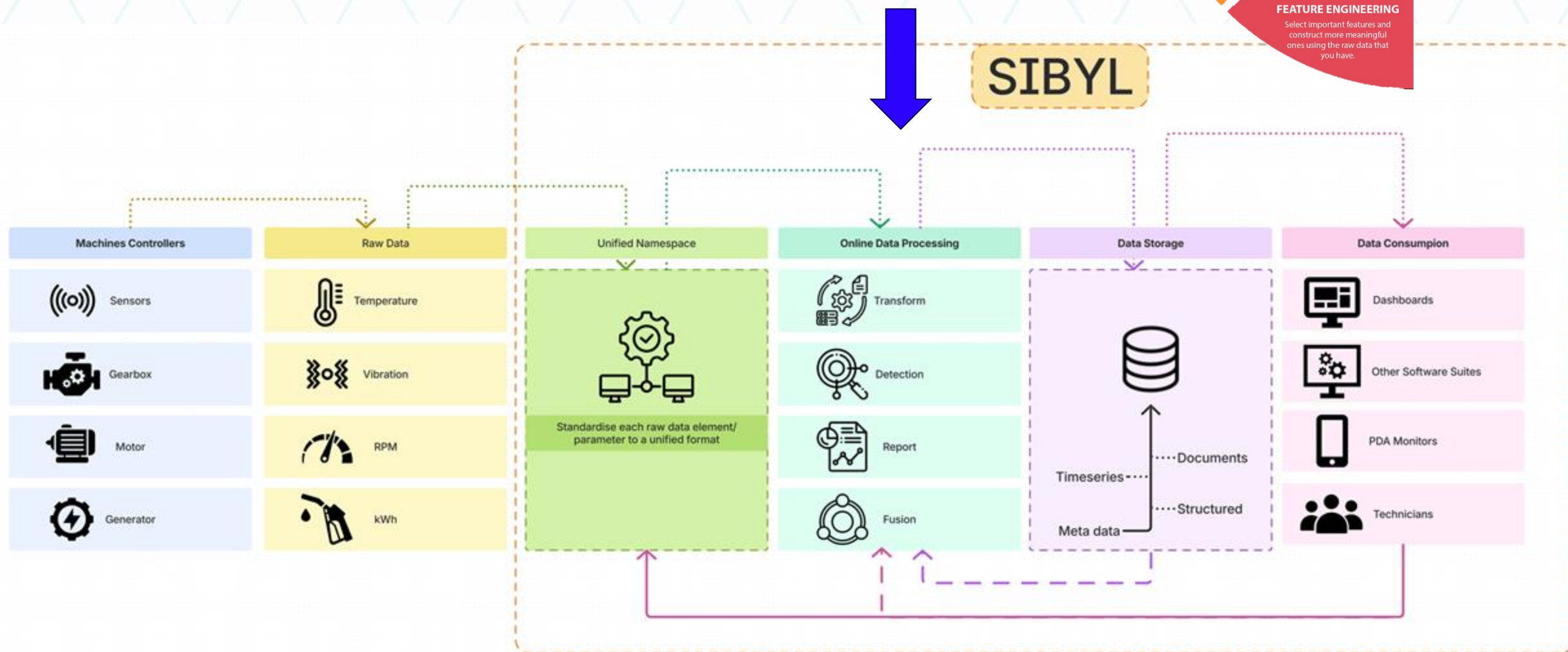
PREDICTIVE MODELING

Train machine learning models, evaluate their performance, and use them to make predictions.

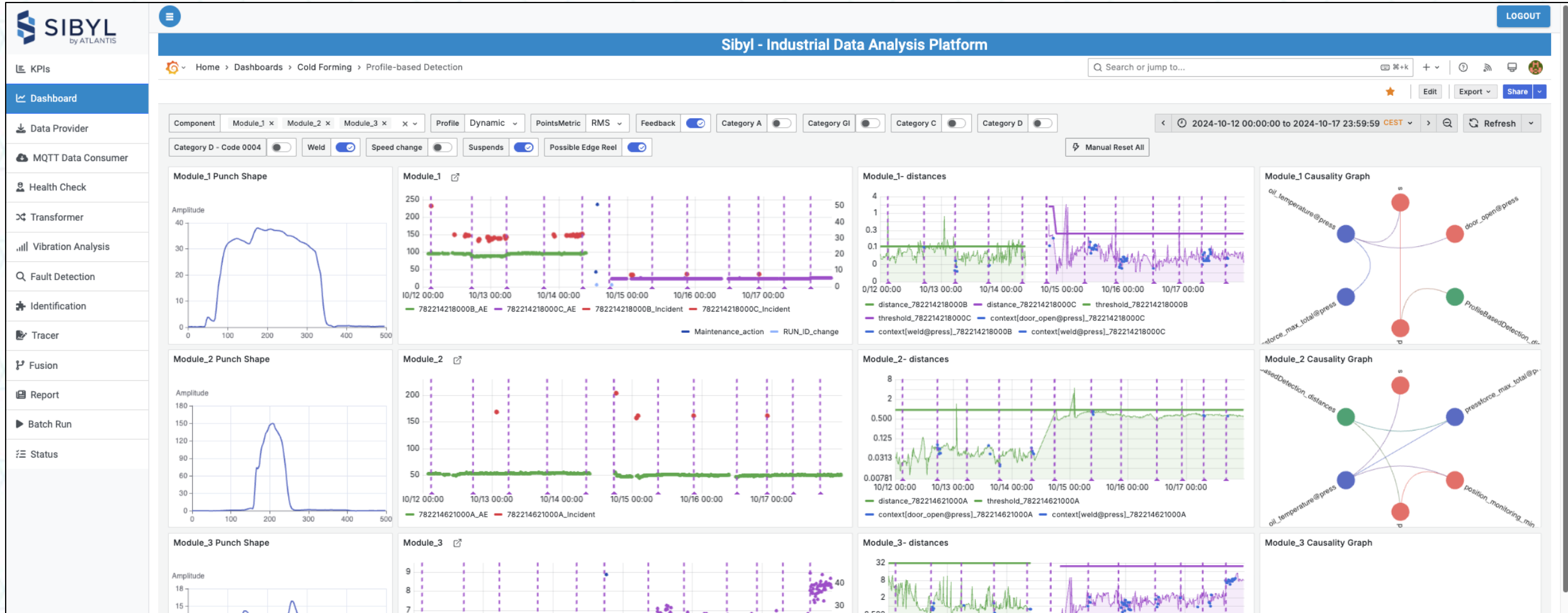
05

FEATURE ENGINEERING

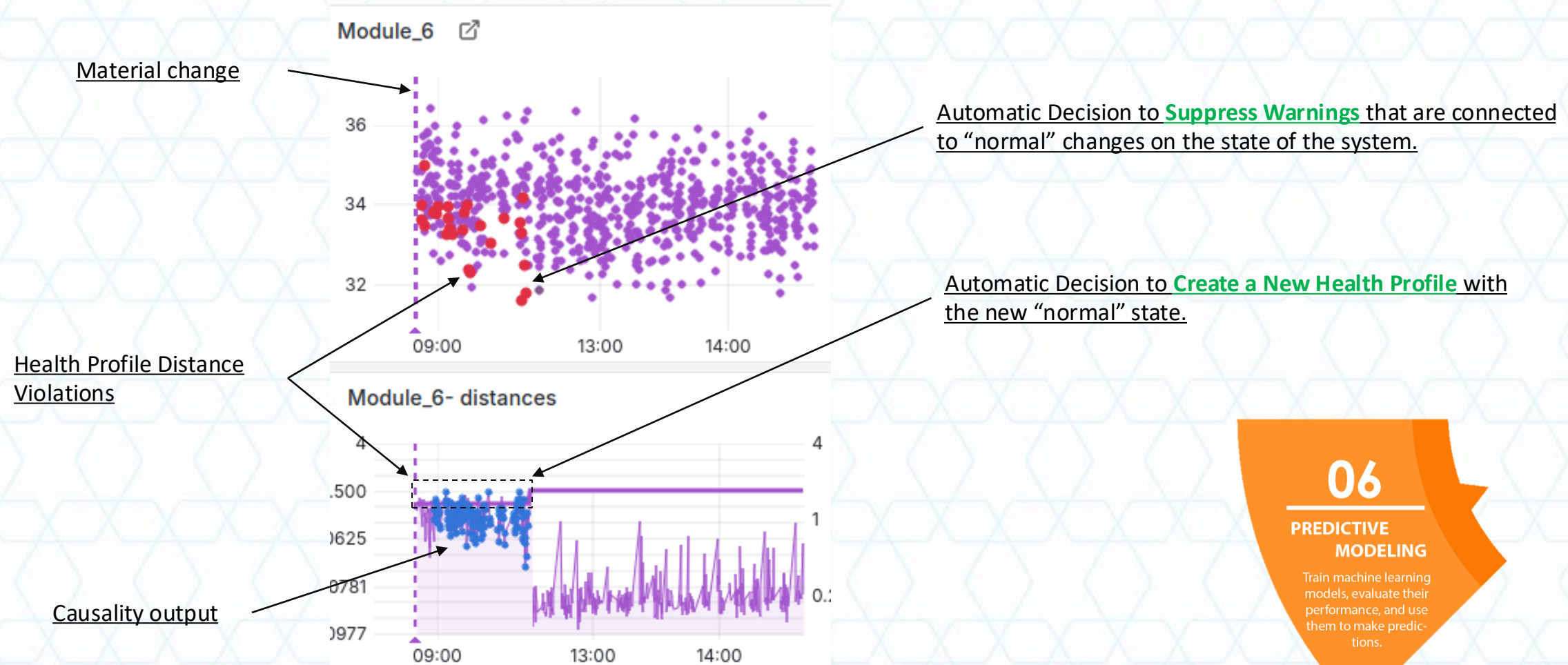
Select important features and construct more meaningful ones using the raw data that you have.



Technical Dashboards



Tackling False Positives



06

PREDICTIVE MODELING

Train machine learning models, evaluate their performance, and use them to make predictions.

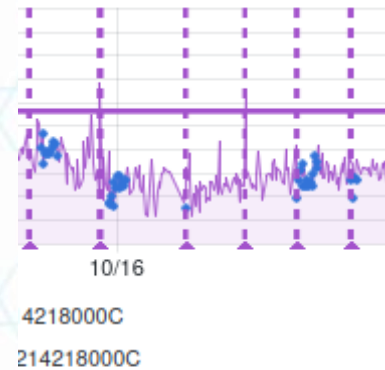
Context-aware Validation

Automated root-cause analysis surfaces the highest-impact problems.

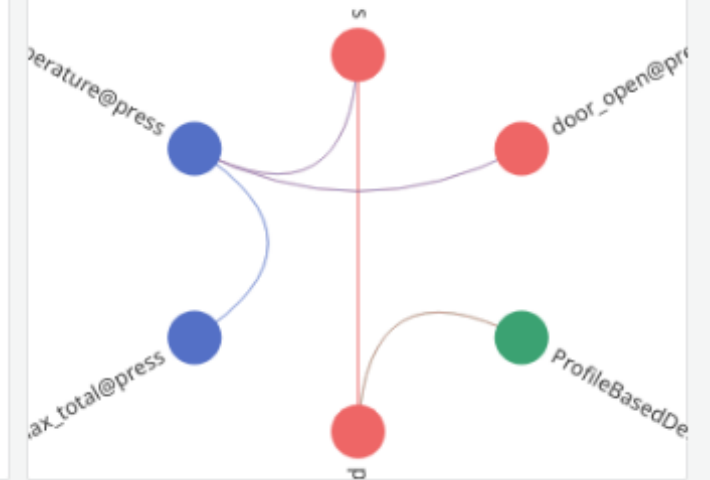
False Positive Alarms identification and suppression

True Positive Alarms enhancement, based on user feedback

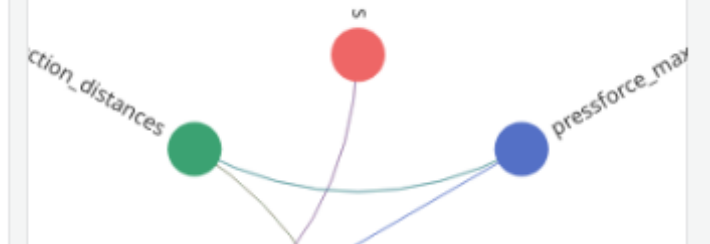
	Predicted: Abnormal	Predicted: Normal
Actual: Abnormal	True Positive	False Negative
Actual: Normal	False Positive	True Negative



Module_1 Causality Graph



Module_2 Causality Graph



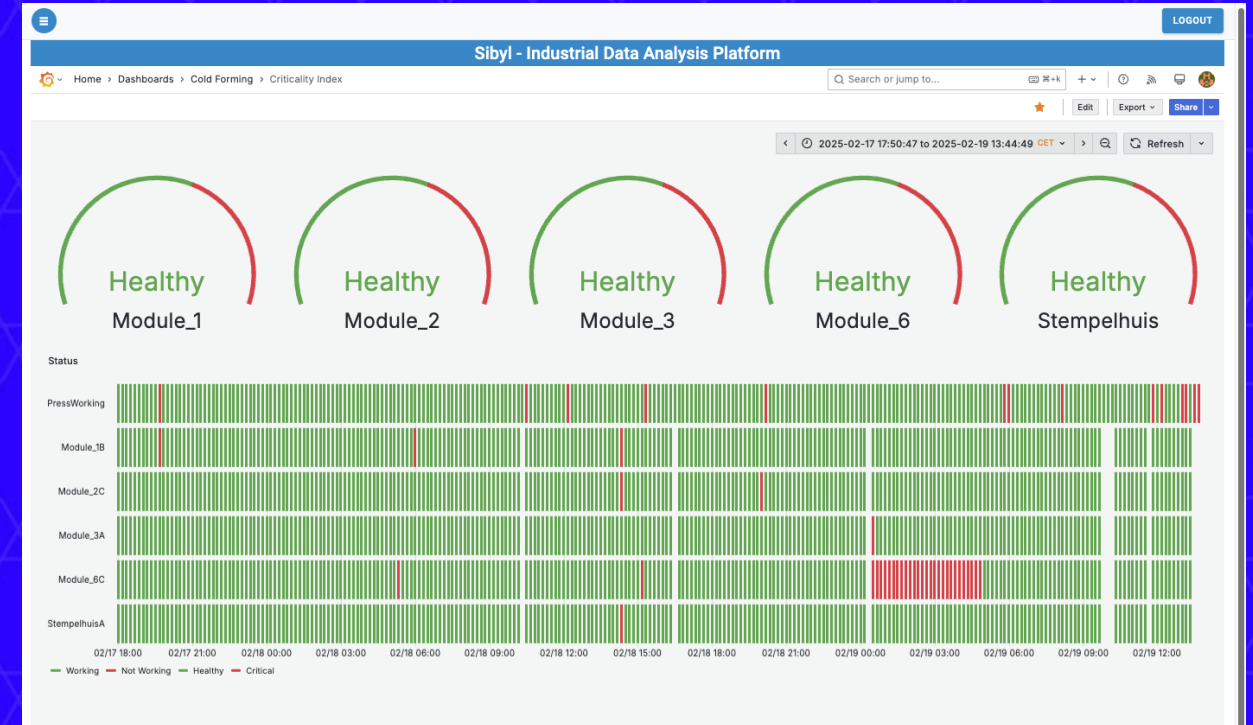
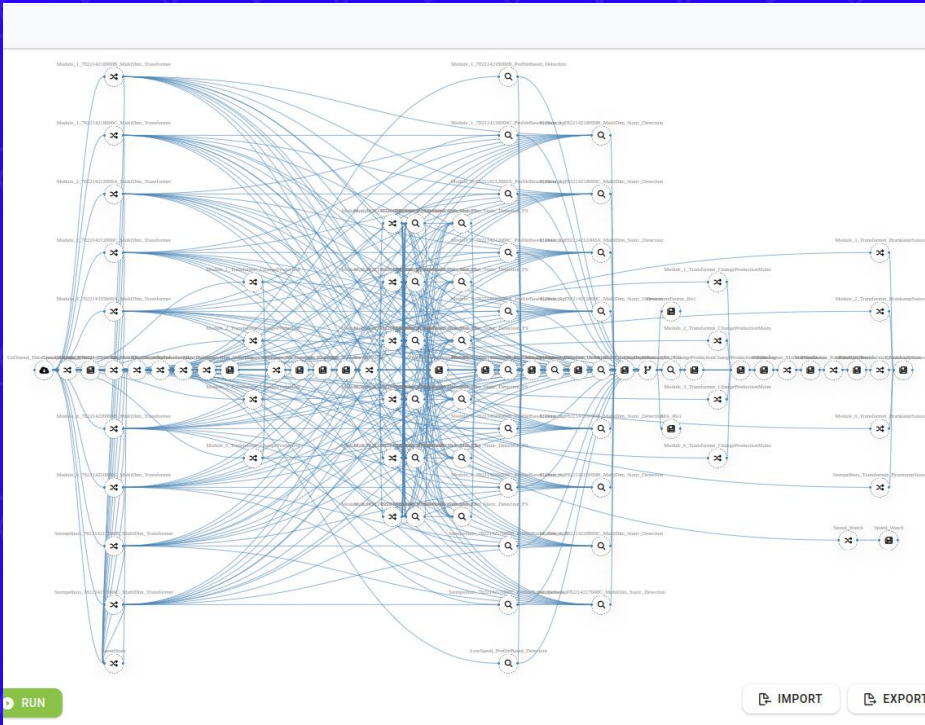
06

PREDICTIVE
MODELING

Train machine learning models, evaluate their performance, and use them to make predictions.



Making Complexity Simple



Complex processes....

...translated to simple results

Combination of multiple results to provide simple output to the end user, with increased accuracy.

Realized benefits

Lifetime extension

The lifetime of tooling has been extended by up to a factor of three.

Early Fault Detection

Act before (hidden) faults escalate into serious damage.

Business impact

Significant contribution to reducing maintenance costs by 46%.





Thank You!

Paving the Way for Sustainable Maintenance

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