Production & Maintenance Advanced analytics

How increase and warrant relaiability and performances for industrial assets

Dubai 19-21 November 2019

What's weather on my assets tomorrow?

New opportunity to increase assets performances with advanced analytics

Fails production losses without forecast every day

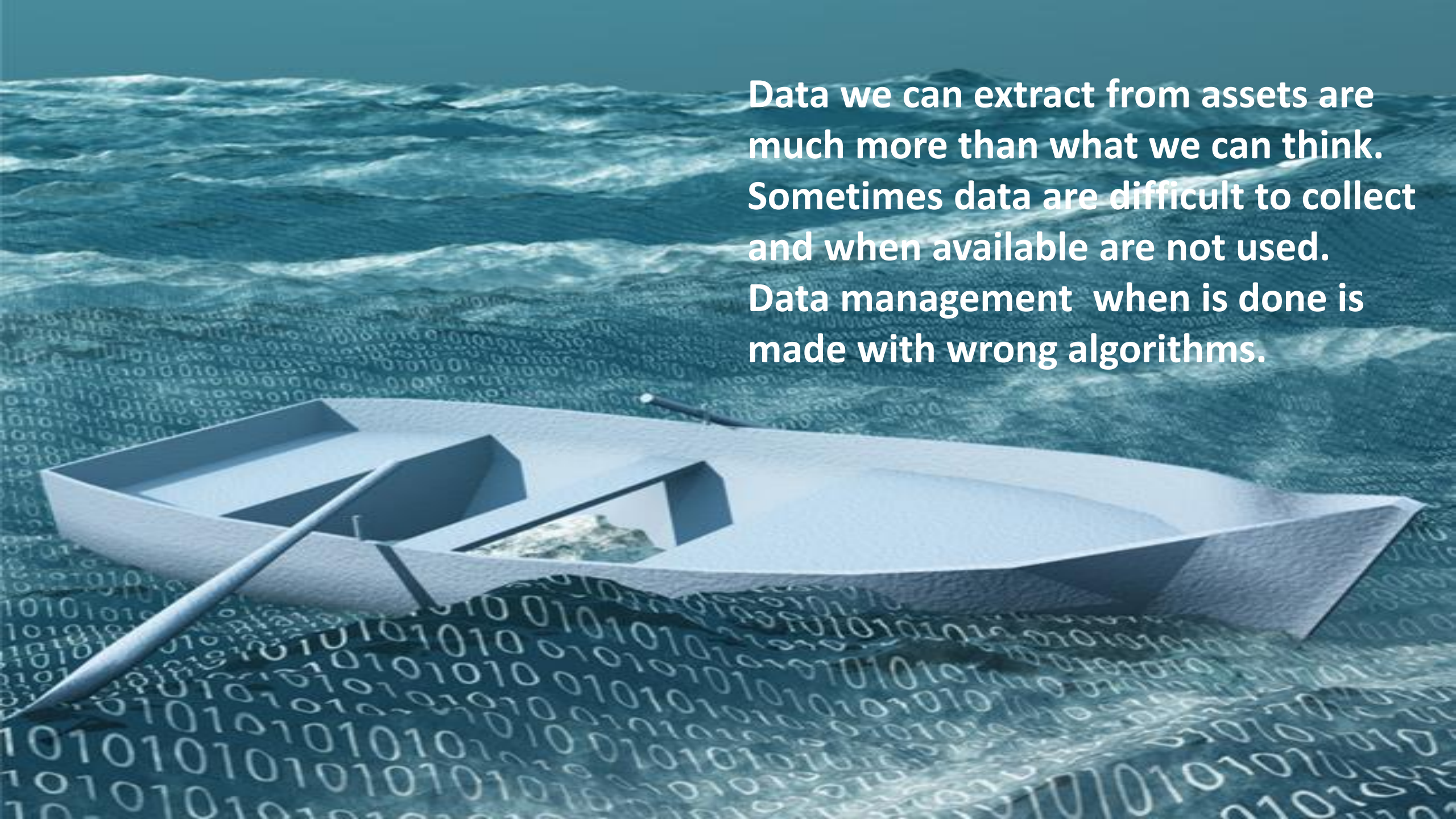
Scrap increase, Quality decrease.

Difficult to have prediction on time.

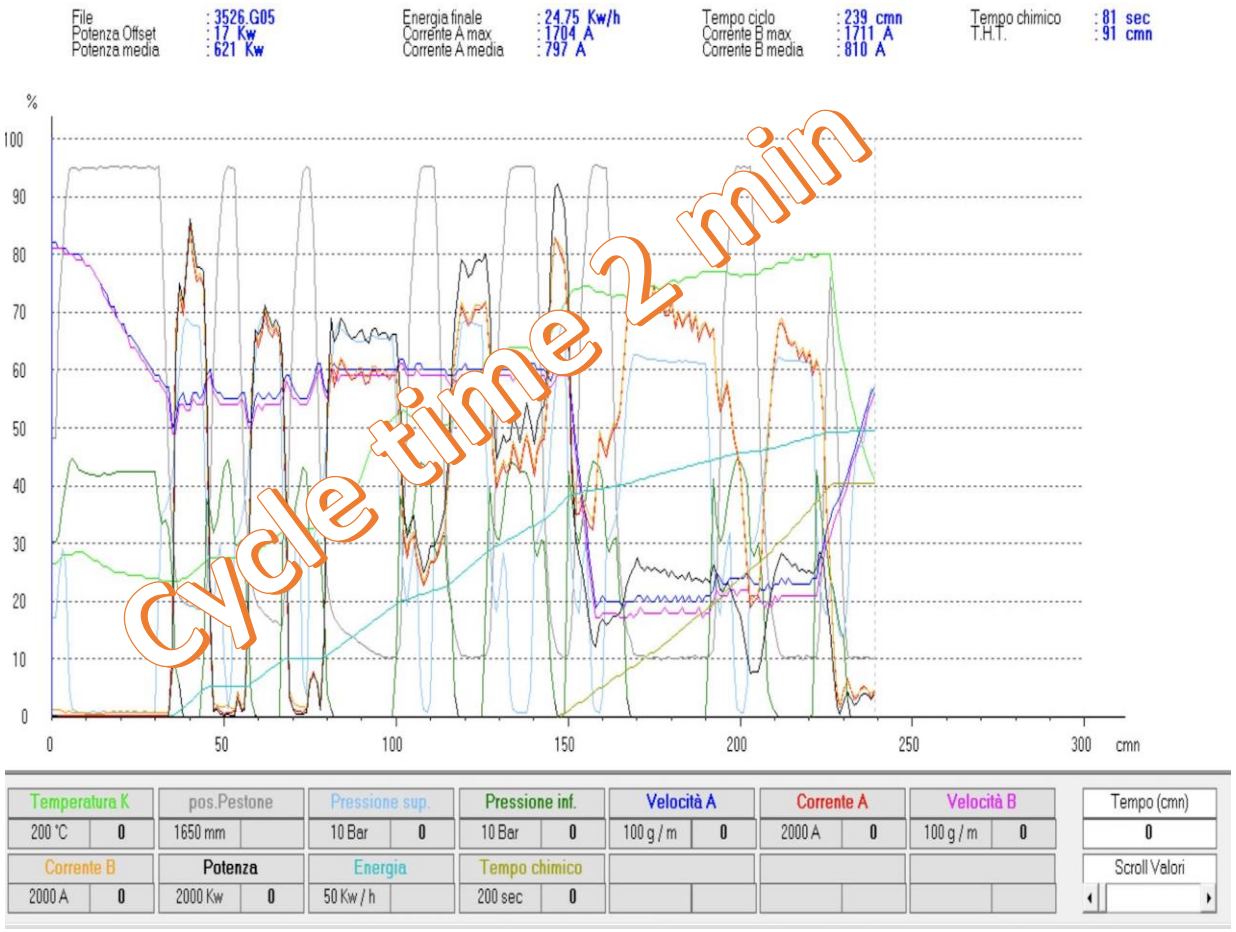
. How read different parameters and link them together.

Sampling and SPC management doesn't give signal enough for maintenance policy

TODAY YOU CAN WITH ADVANCED ANALYTICS.


Data we can extract from assets are much more than what we can think.
Sometimes data are difficult to collect and when available are not used.
Data management when is done is made with wrong algorithms.

Process data



416
1805
21.24
0
1780
1776
156
140
7500

Data source

Can we use them?

033 1572 00.18 04.68 081 0034 081 0041 0000 00.00 000 0000 0000 0034
033 1567 00.19 04.69 081 0029 081 0036 0000 00.00 000 0000 0000 0034
033 1568 00.17 04.70 081 0023 081 0033 0000 00.00 000 0000 0000 0034
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034 1571 00.19 04.77 065 0023 064 0027 0000 00.00 000 0000 0000 0035
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WHAT COMPANY NEED ?

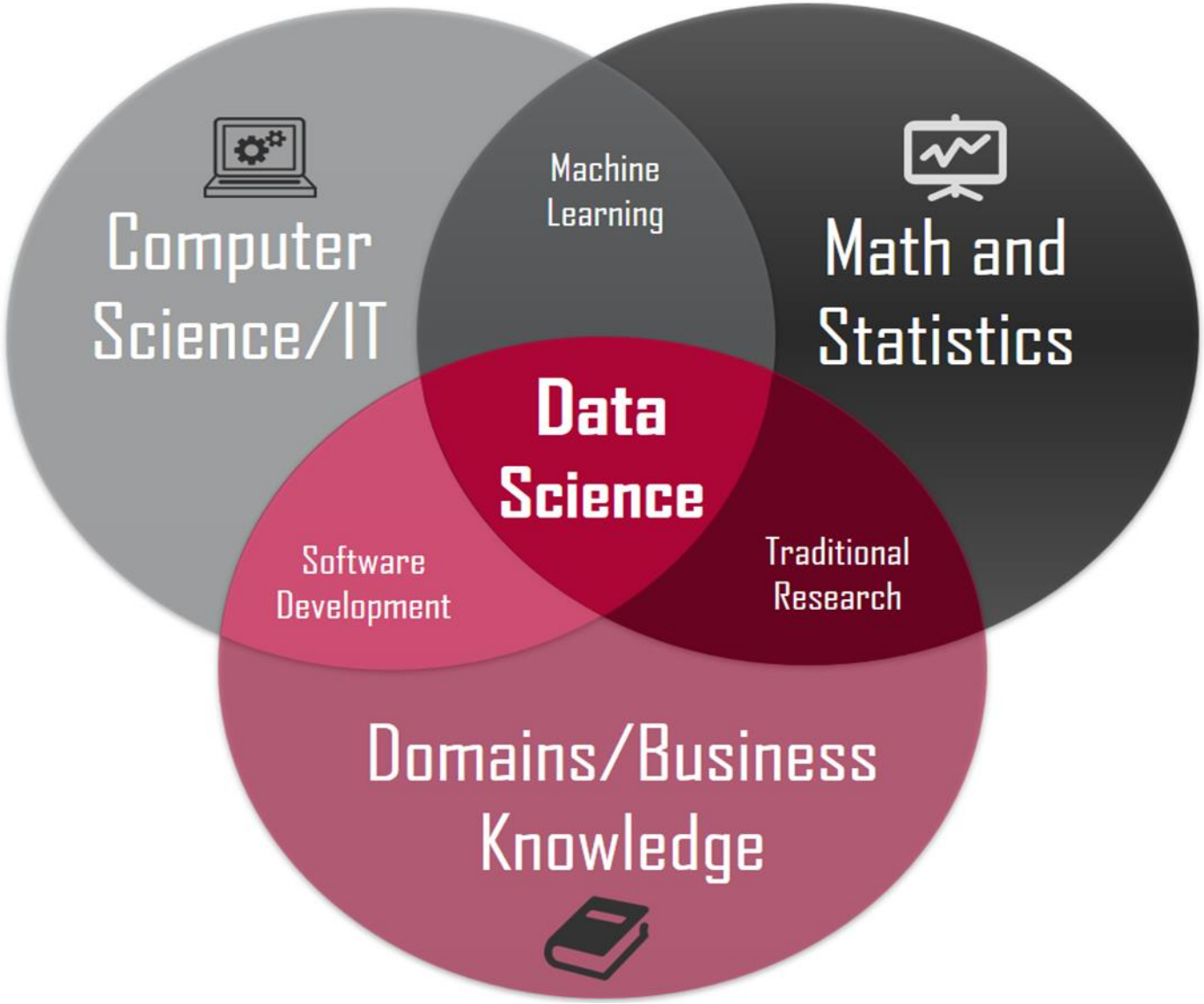
Let data chat with Advanced Analytics and Data Science

Data Science is a science and somethime an art to transform data in turnover.

BI, analytics, data
mining e DWH are old concept

Different scientific areas can not be separatated, but must have common point

Common point is Data Science team.



Data Science layer

Data Science is always **business oriented.**

There are 3 different competence layer and activity

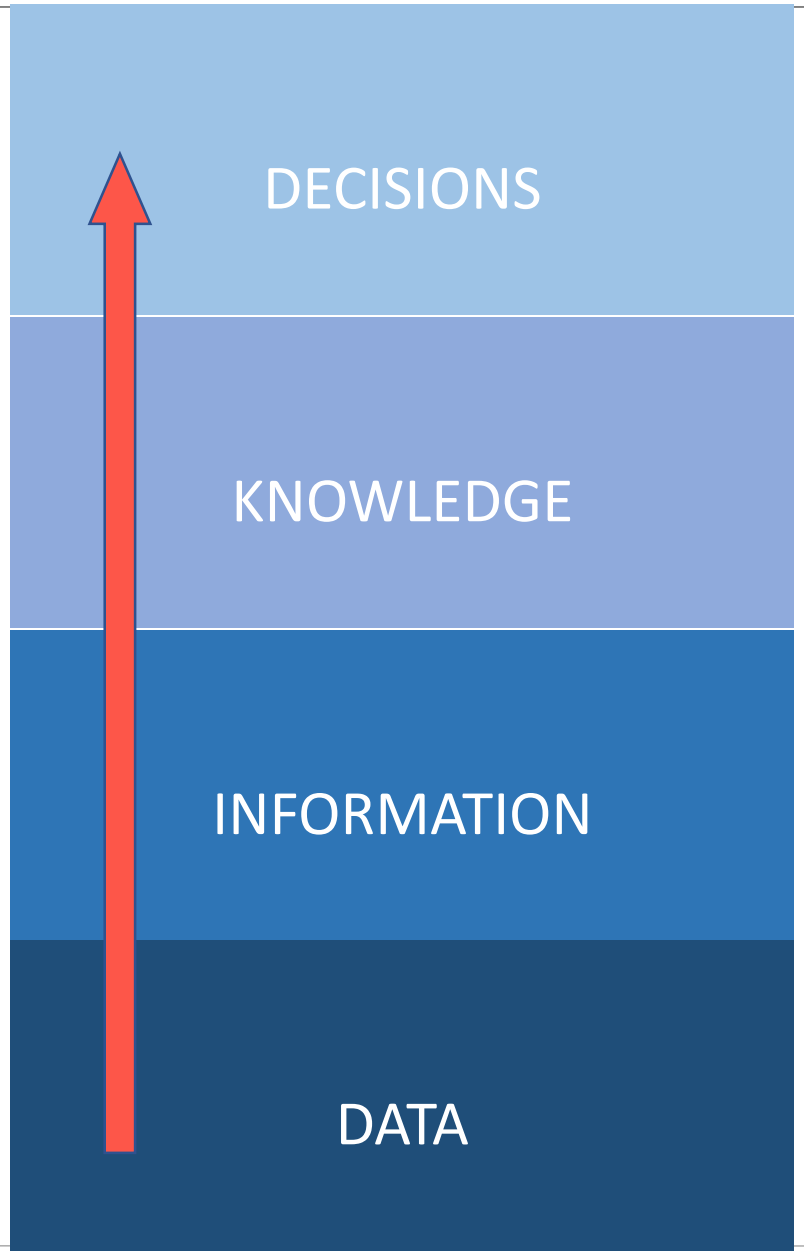
Each layer is fundamental and decisive and their hierarchy must be carefully respected

The data an asset to be valued

The data itself contains only a potential value, but if untreated they really are unnecessary

Through mathematics and statistics we can extract useful information

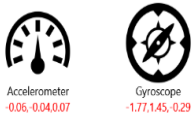
These create knowledge. Knowledge then comes used to make decisions data drive



Data sources for predictive state of assets

Fails story what appened and when

Machine caractheristics - data sheet



Machine status and mode of use – data from machine sensors

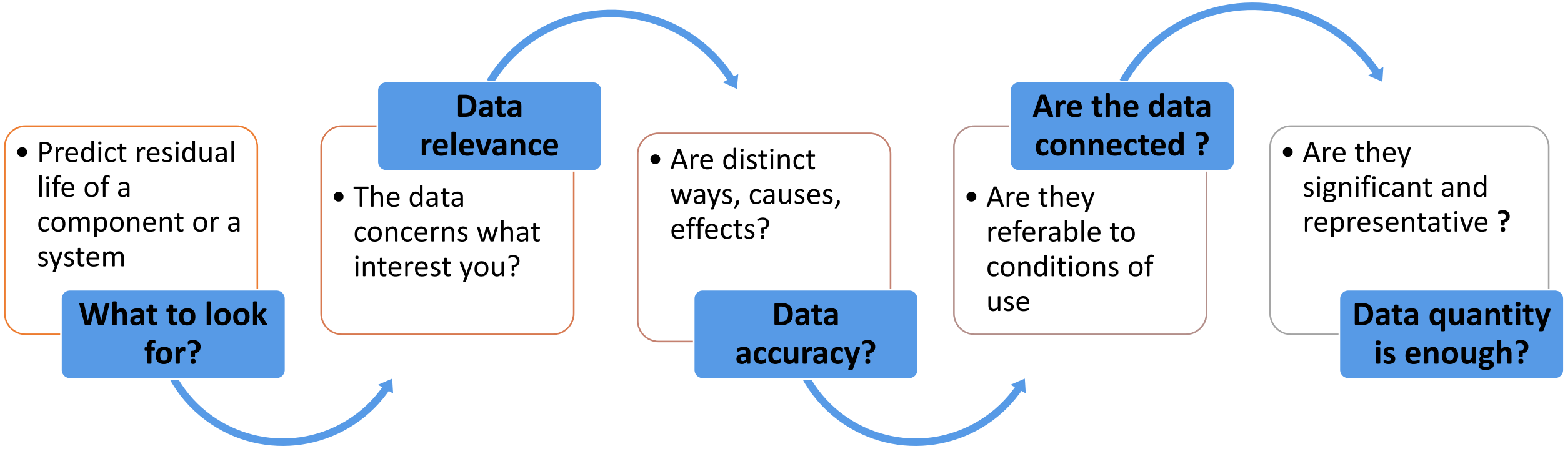
Operating conditions – environment and operating context

Operator features – skills and involvement

Maintenance story how the fault was solved

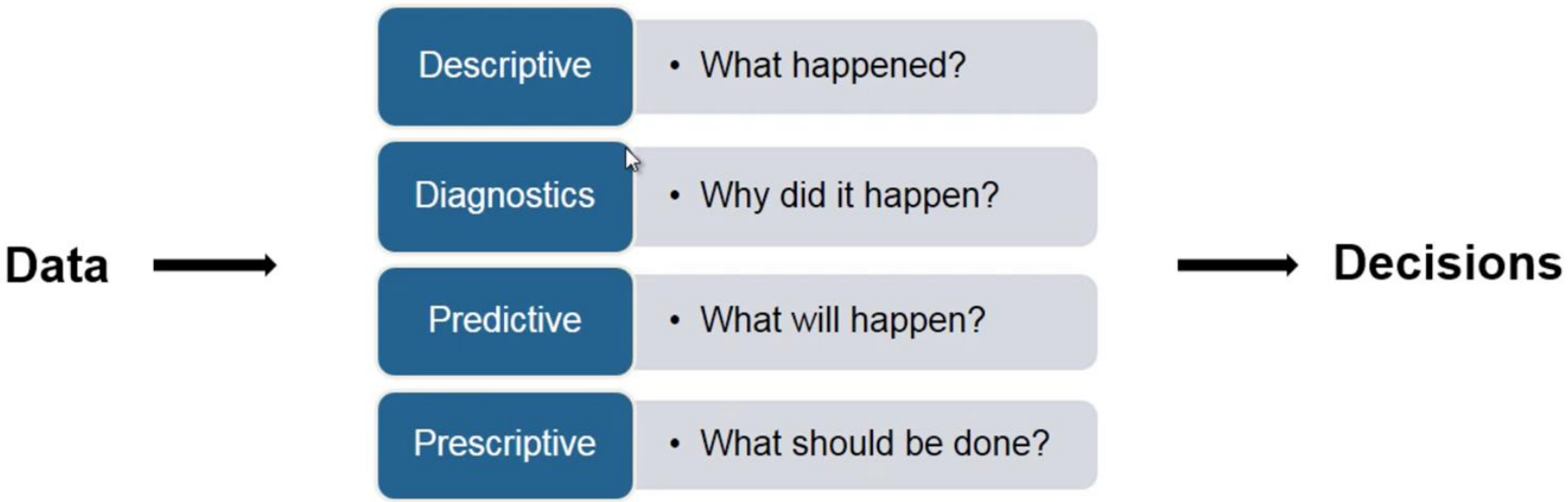
How to start?

Preliminary questions



What is Data Analytics?

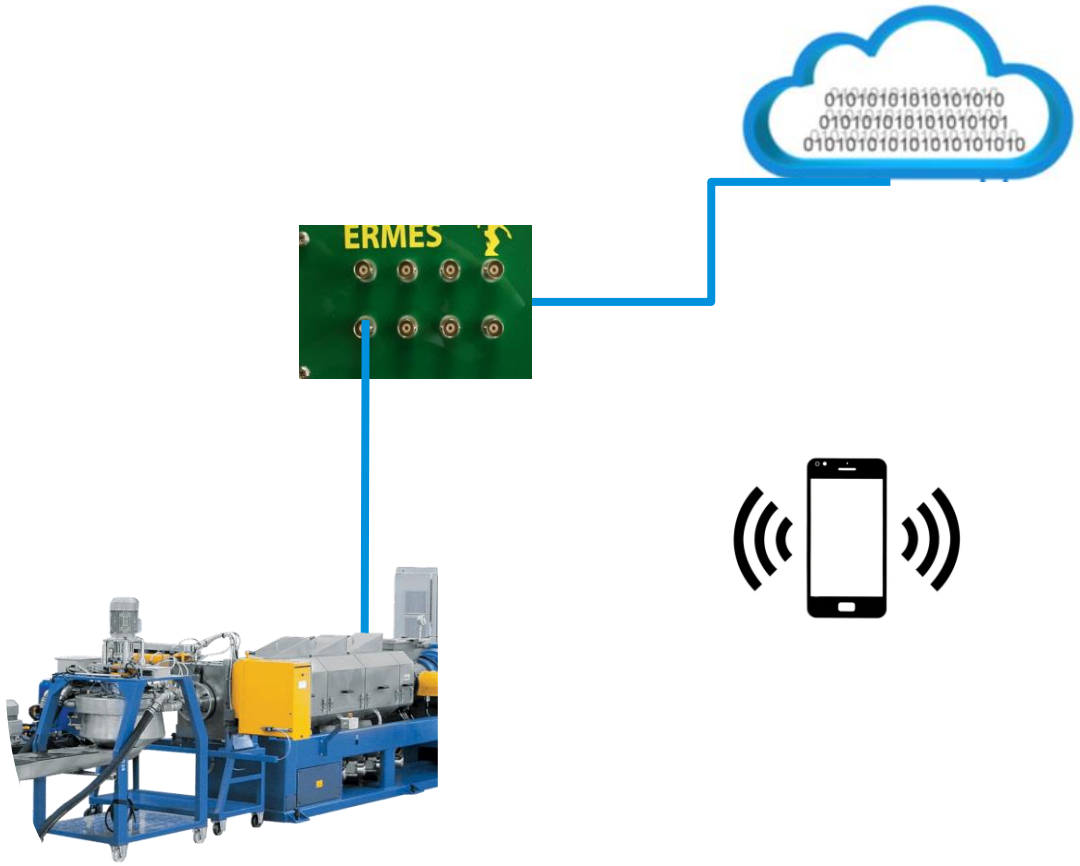
Turn large volumes of complex data into actionable information



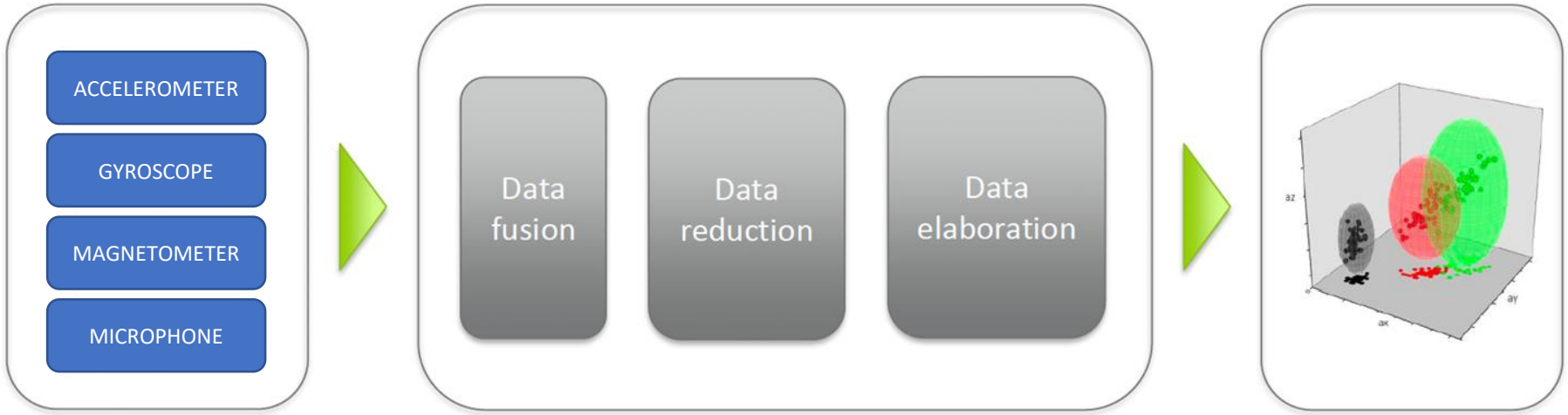
Data path: from factory to cloud

Excluding the old machines, the most modern means of production are all managed by PLC, and they have different sensors for detecting the processing data and the machine status.

Collecting these data, processing them (making them talk) can provide useful information to understand what needs to be done and when



How to guarantee and increase the reliability and performance of industrial assets

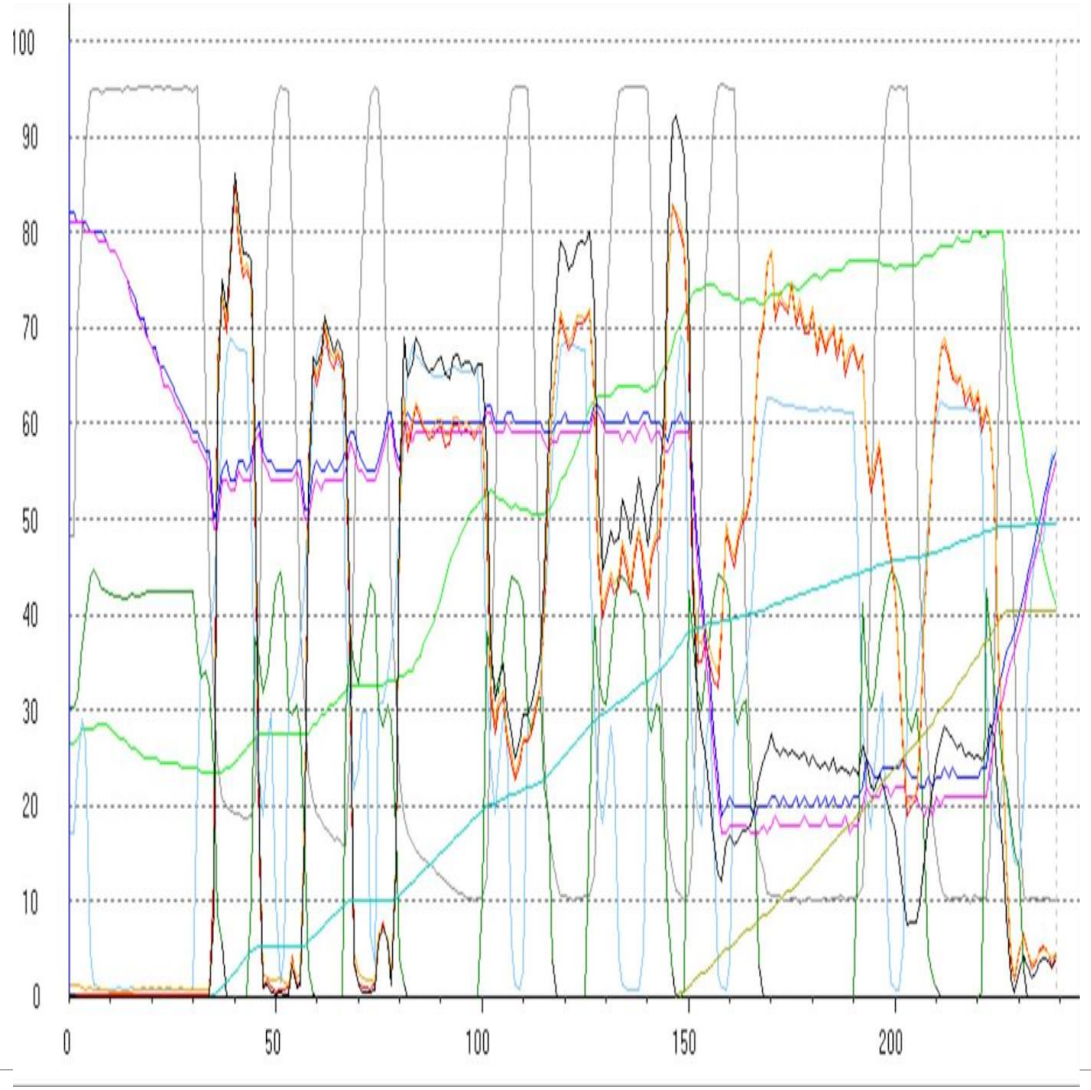


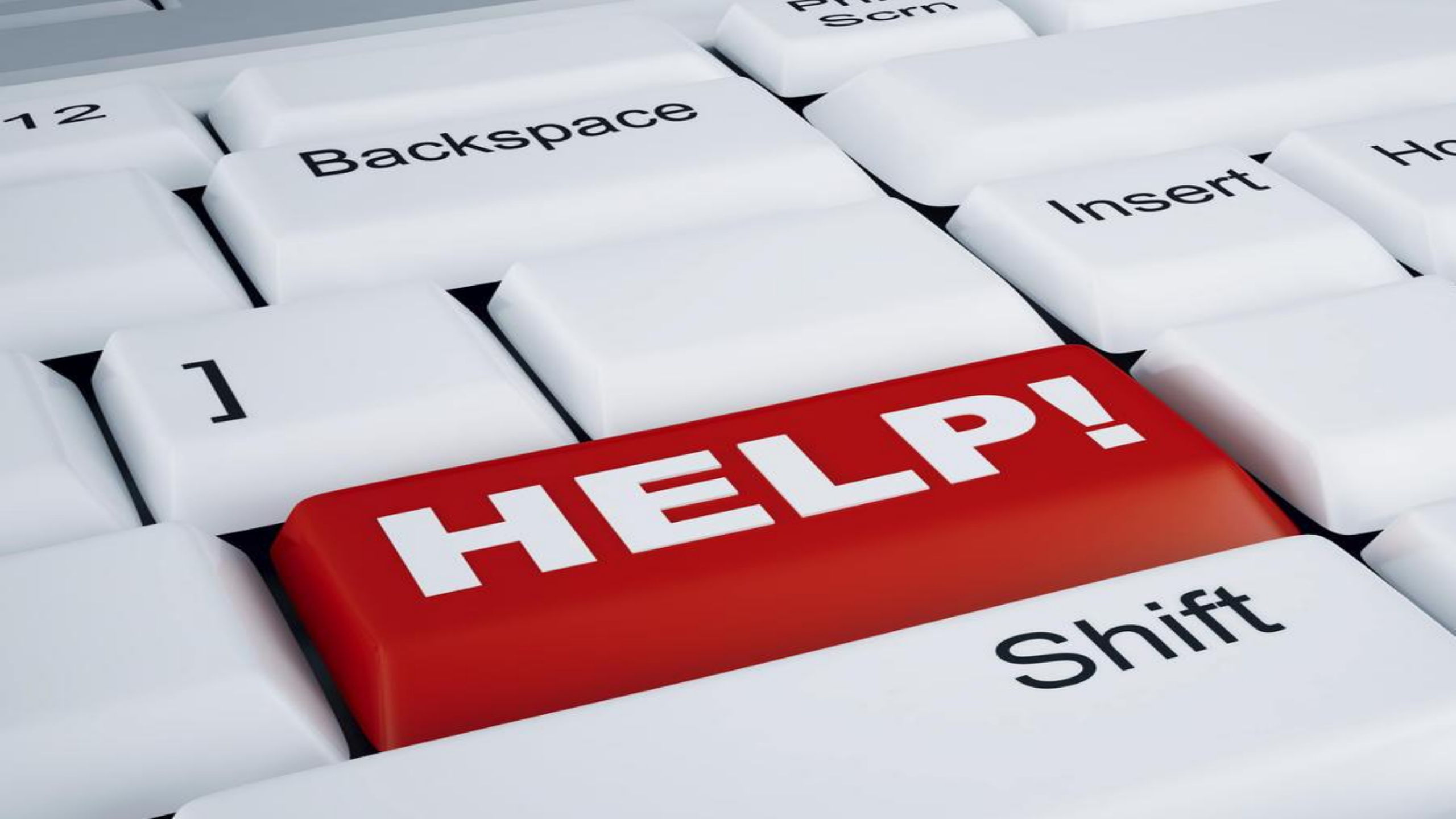
WHY IS NOT DONE ?

Frequent reasons

The most common answers are:

There's no time.
There are no resources.
Sampling campaigns (thermography and predictive in general) are useful but not systematic.
Processes have too many variables, such as analyzing ?

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HELP!
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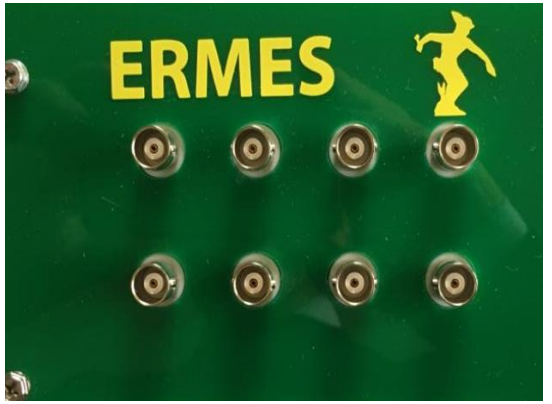
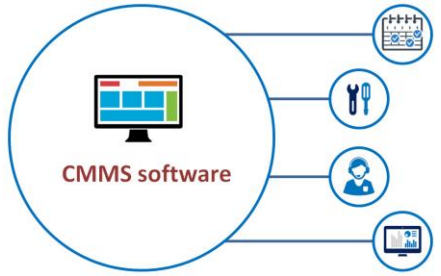
We understand that data can tell us a lot, but ...

What are we starting with?
Where are?
Who can help us process them?
What commitment is required?



Here are some answers

We begin to exploit the available data, usually relating to production and quality.
They are in the PLC memories, stored on the information system servers, they are Excel files.
It is necessary to work in a team consisting of internal resources (field knowledge) and external resources (data processing).
The commitment can be modulated according to the extension of the chosen area

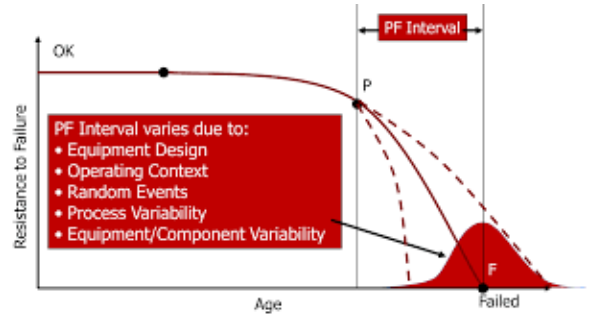


What can we ask for our data?

If the working vehicle is operating in "normal" conditions
If a drift is in progress
What are the causes that most affect degradation
What is the degree of correlation between causes (failure root) and effect (failure)
When the working medium will break (estimate with known confidence)

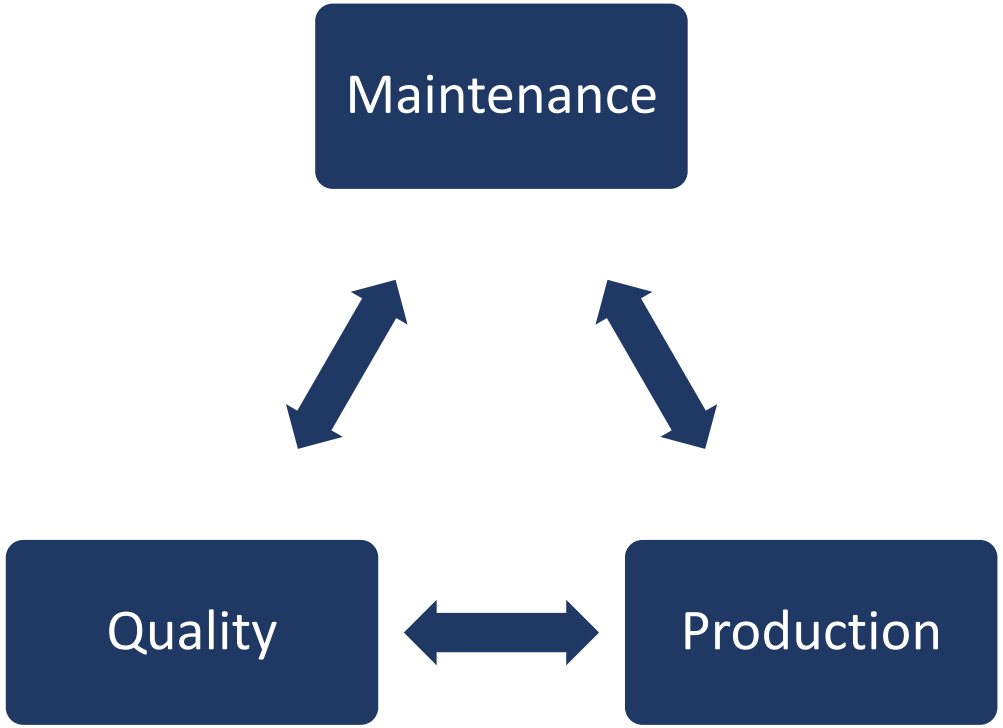
but also

If the production process takes place according to the standards, both in terms of productivity and quality
What causes have most affected the decline in productivity and / or the increase in the rate of rejectio
….



Remember that : data have not barriers

Maintenance data contain informations useful for Quality and Production as well. Just need to link all them together.



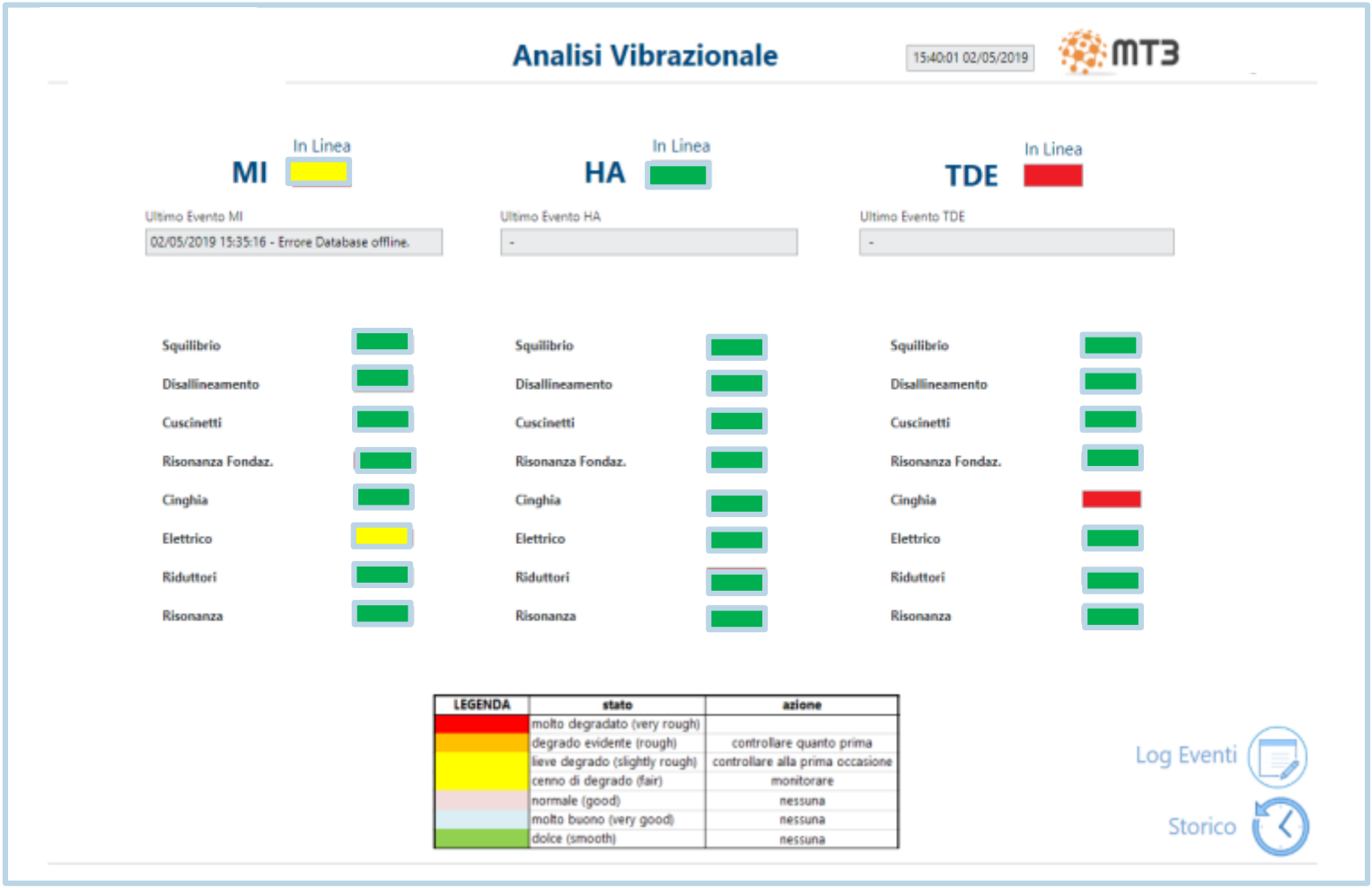
Examples

Data collection made easy

ERMES - IIOT device for data collecting and cloud transfering

User interface

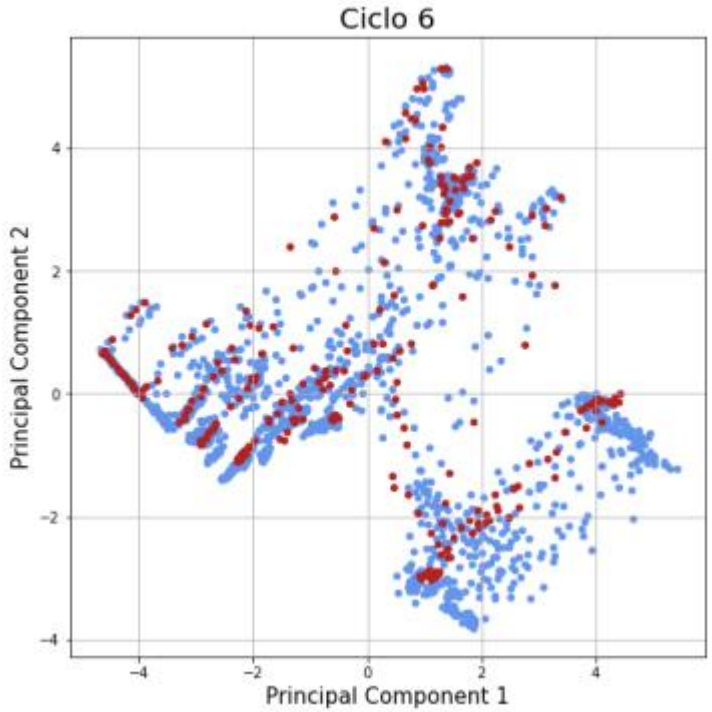
high level indicating the machine status



User interface

detail
for vibrational
analysis

Evaluation of machine current operation and process state (productivity, energy efficiency quality)



The blue points represent the reference condition (cycle), the red ones represent the current condition.

The overlapping of the red dots on the blues indicates: «compliant condition»

Machine Learning Tool

14:24:43 31/10/2019

MT3

Distanza Centroidi vs. Varianza | Tempo vs. Distanza e Varianza | Influenza Variabili su Ciclo

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Filtro Fine

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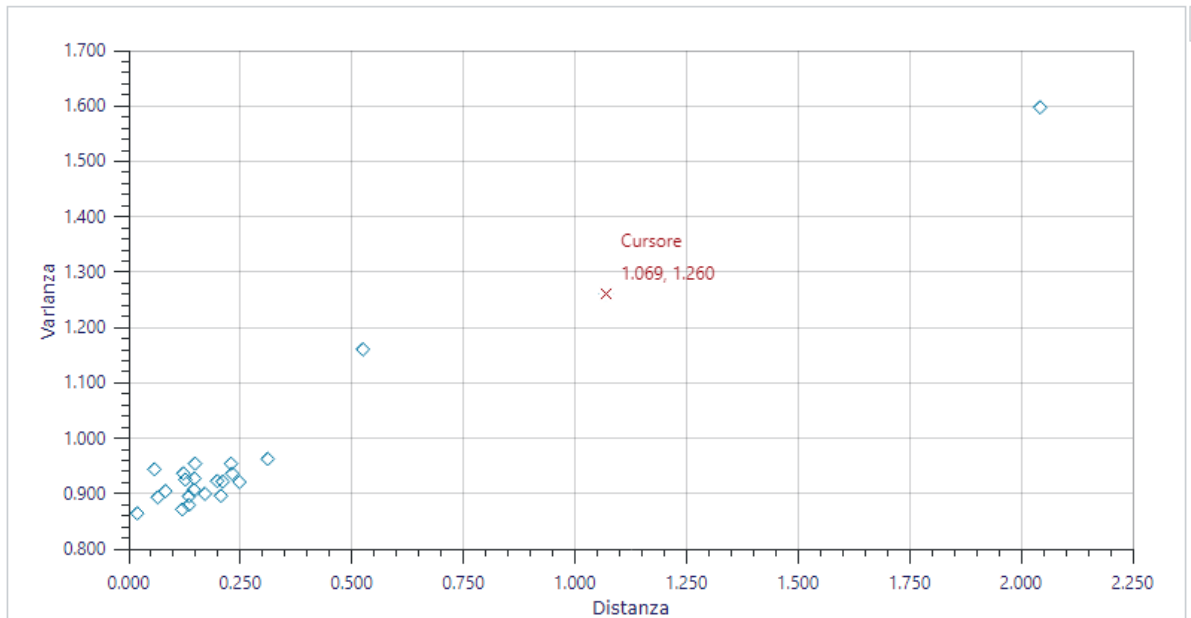
Filtro Anagrafica

Esito Elaborazione:

OK.

Carica da DB



Visibilità Cursore

Nessuna

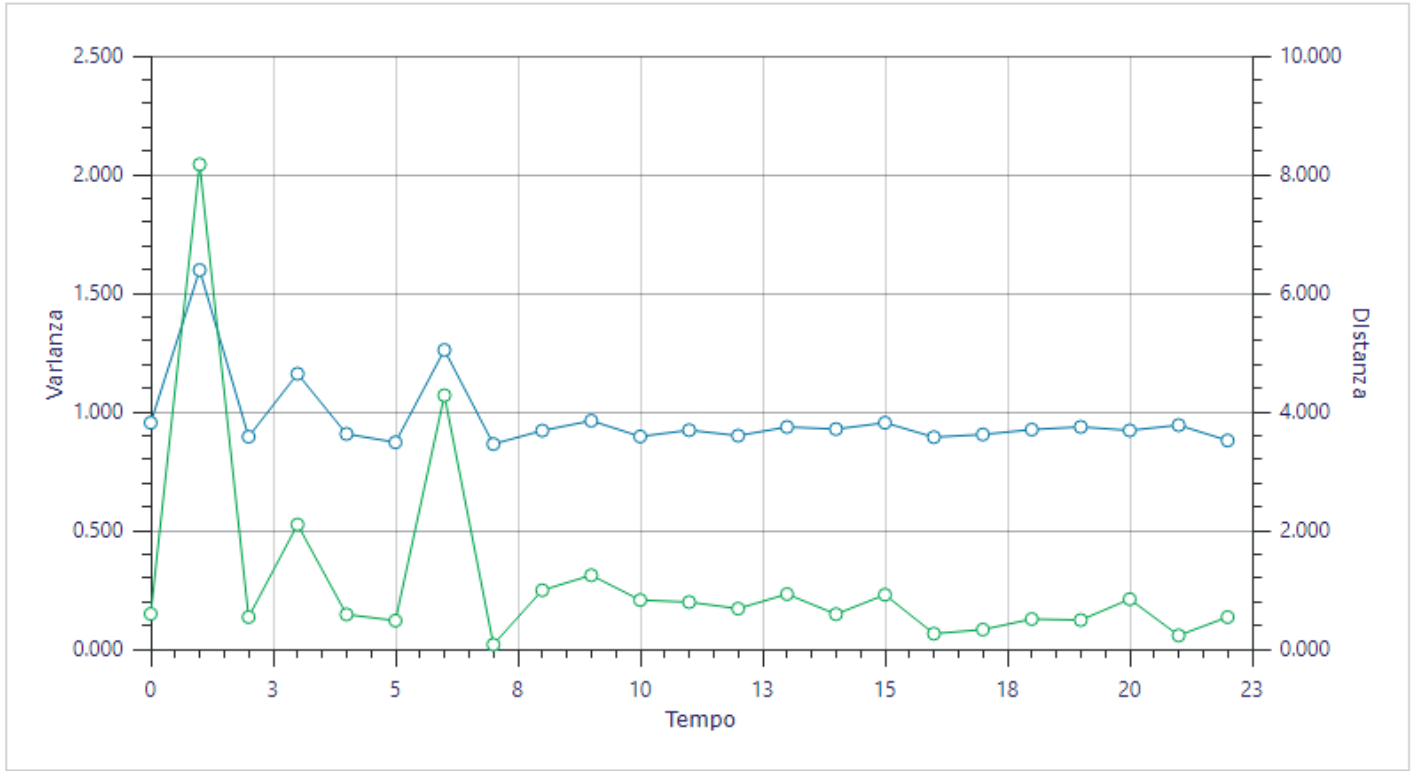
Visibile

Cursore 1.069 1.260

Cursore: Dato Selezionato

Indietro

Distanza Centroidi vs. Varianza | Tempo vs. Distanza e Varianza | Influenza Variabili su Ciclo



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Primo Campione (0)

Ultimo Campione

Thank you for your attention