

Manufacturing 4.0: Is US industry lagging?

- TAPPI Weekly July 11, 2019

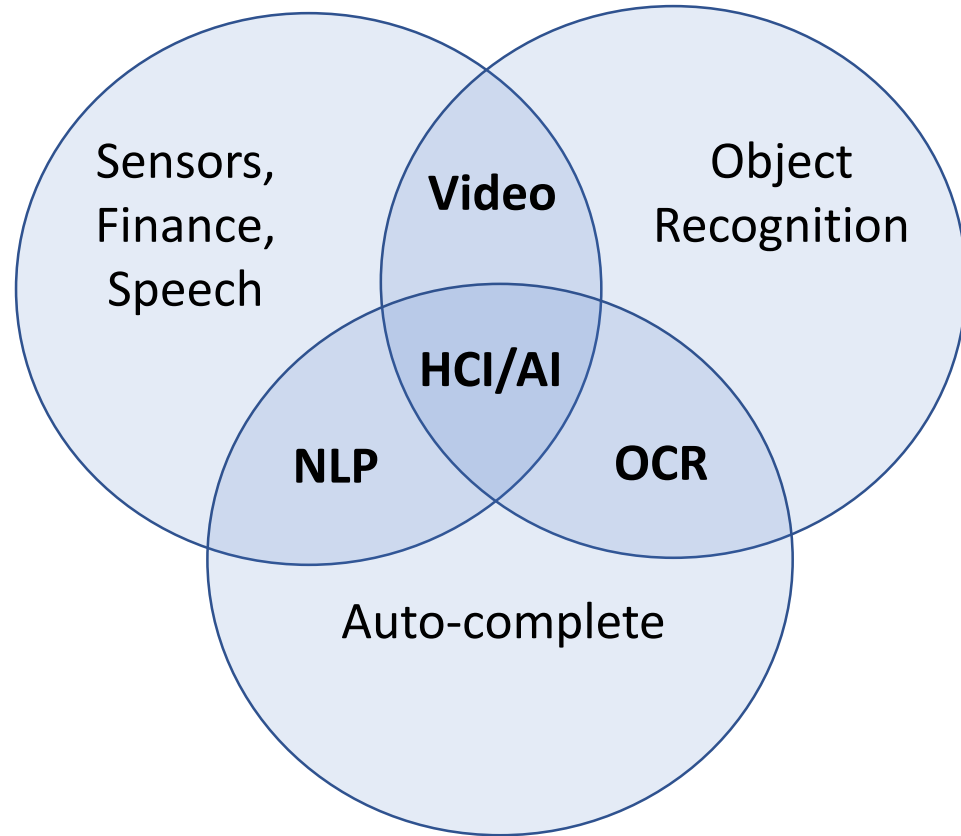
AI for Wet-end Optimization

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Data

Sequential



Image

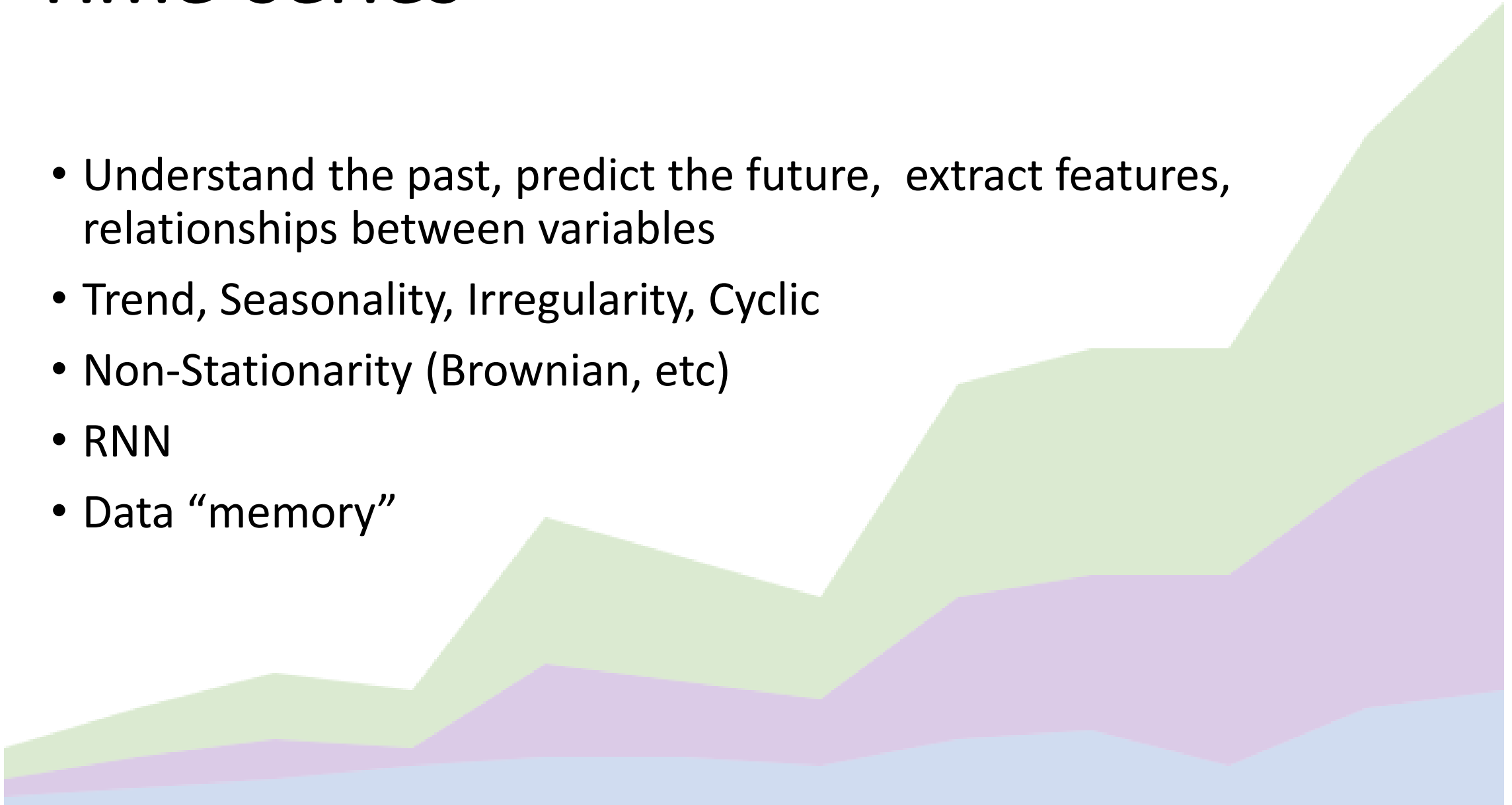
Text

Without data you are just another person with an opinion.

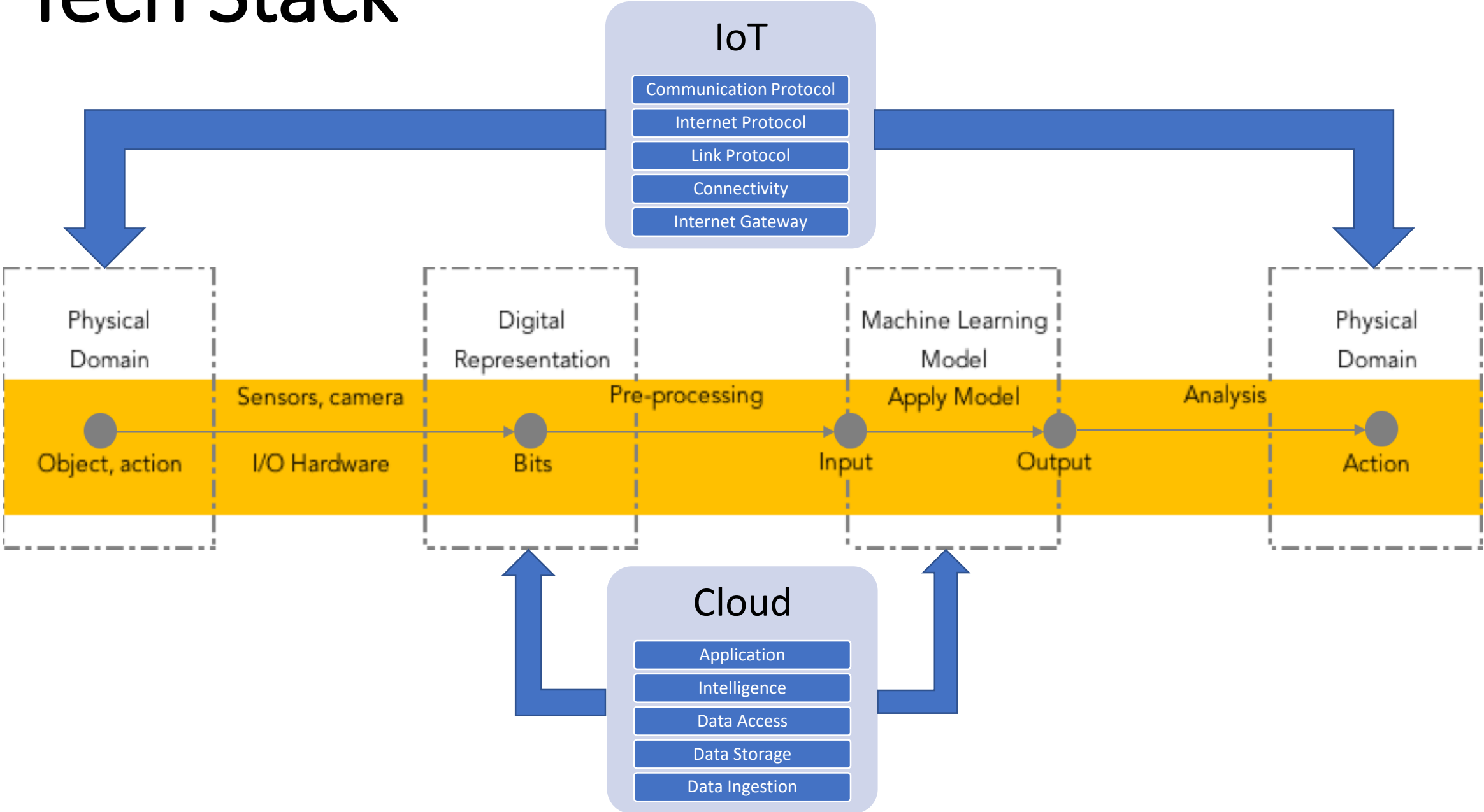
- Deming

Time-series

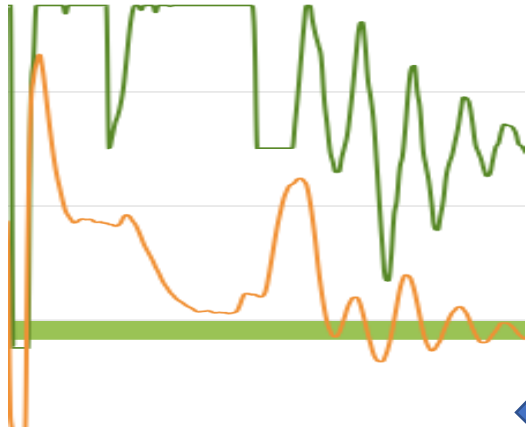
- Understand the past, predict the future, extract features, relationships between variables
- Trend, Seasonality, Irregularity, Cyclic
- Non-Stationarity (Brownian, etc)
- RNN
- Data “memory”



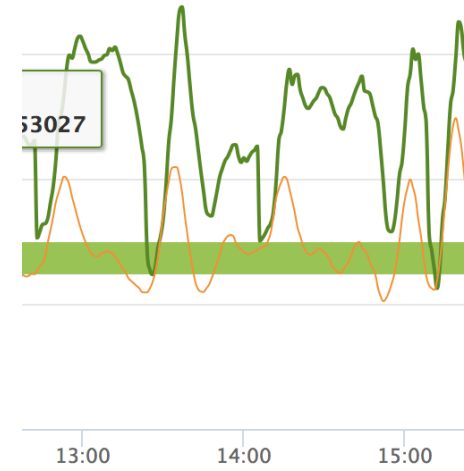
Tech Stack



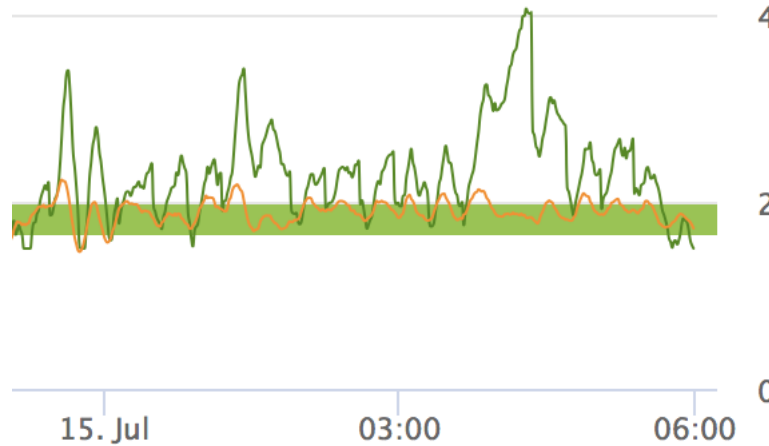
Hybrid Chemistry



Slow acting
Longer to bring in
range

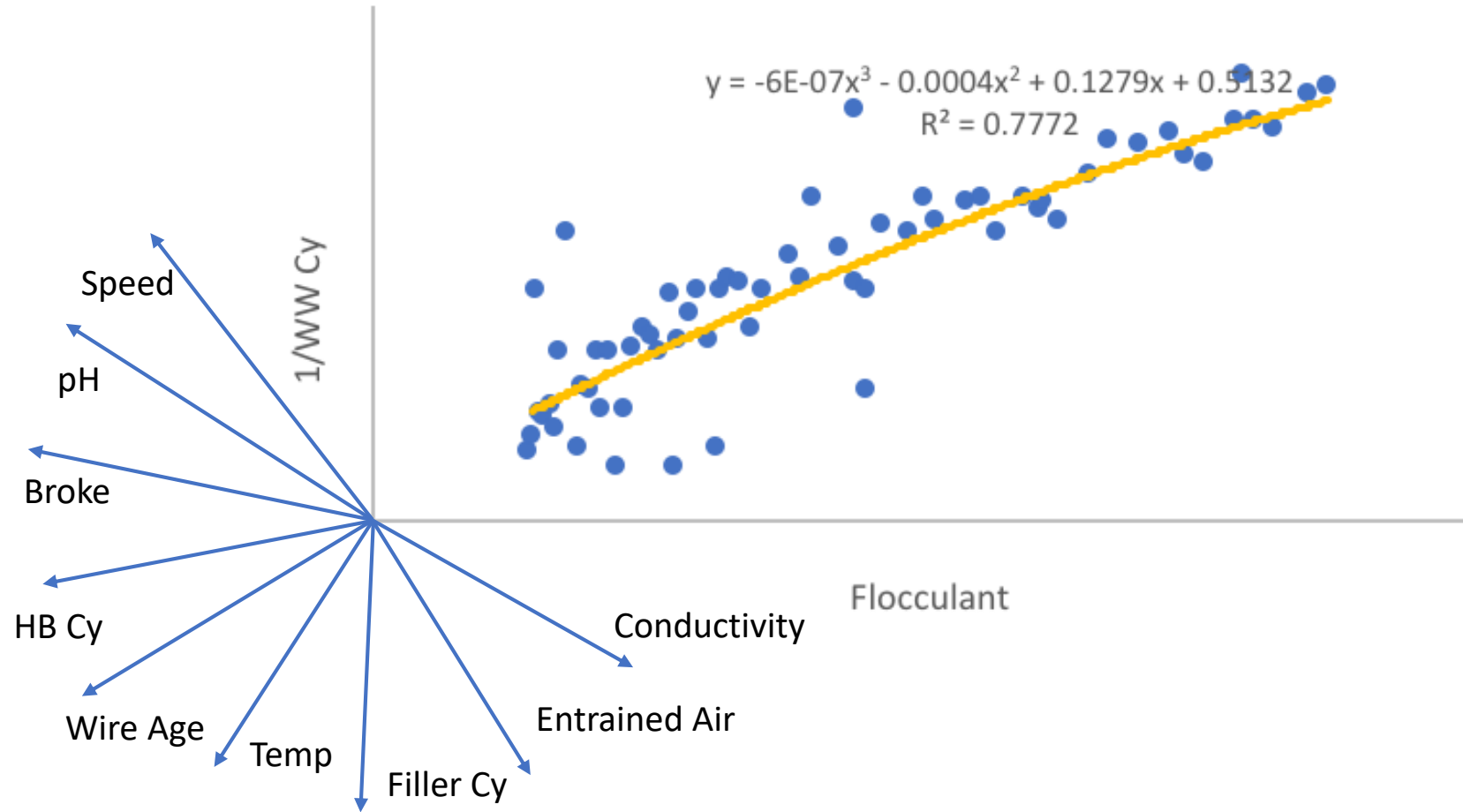


Fast acting – too
sensitive
Below and above
range a lot

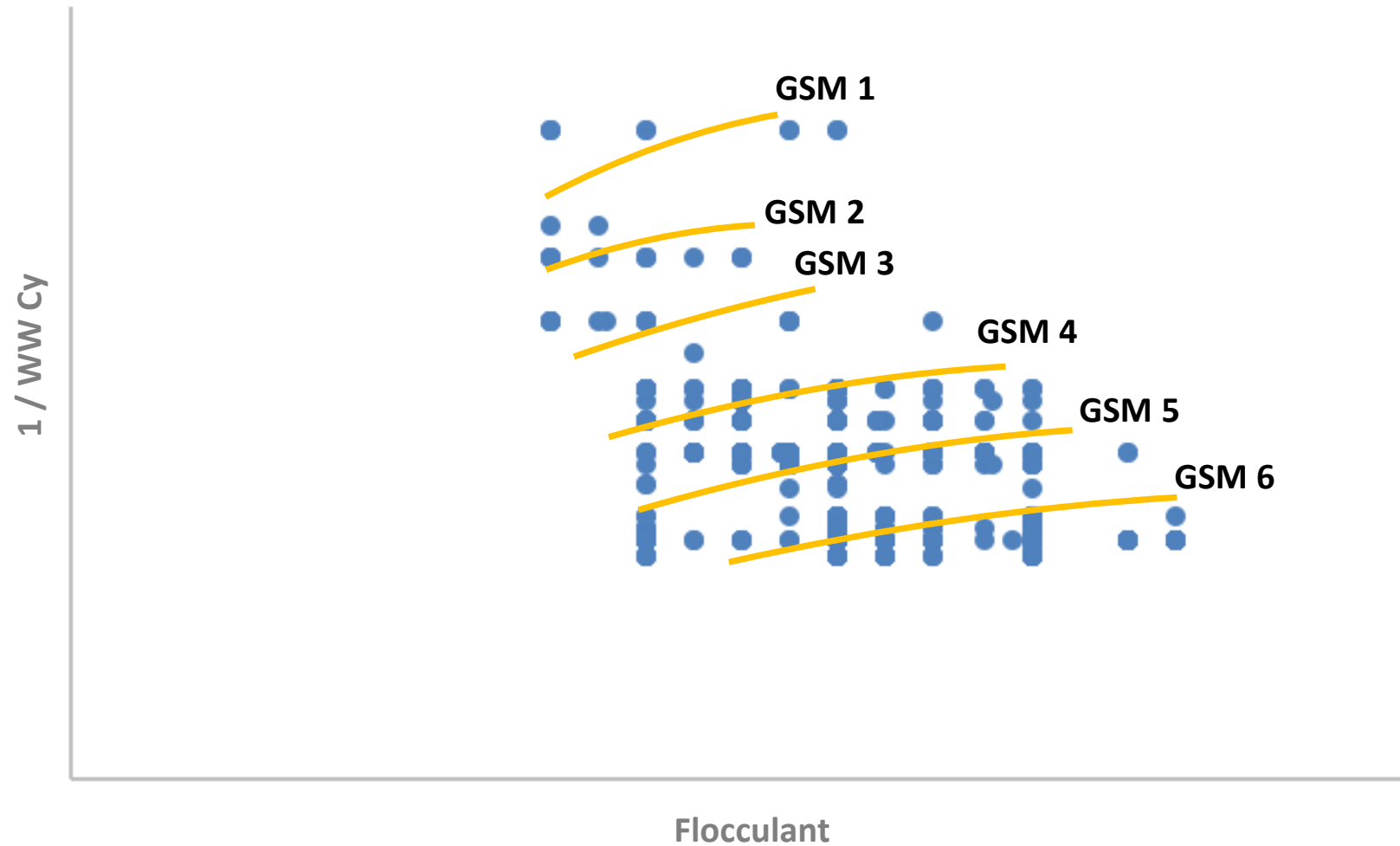


Hybrid – fine control
Within goal range most of the time

AI in the wet-end

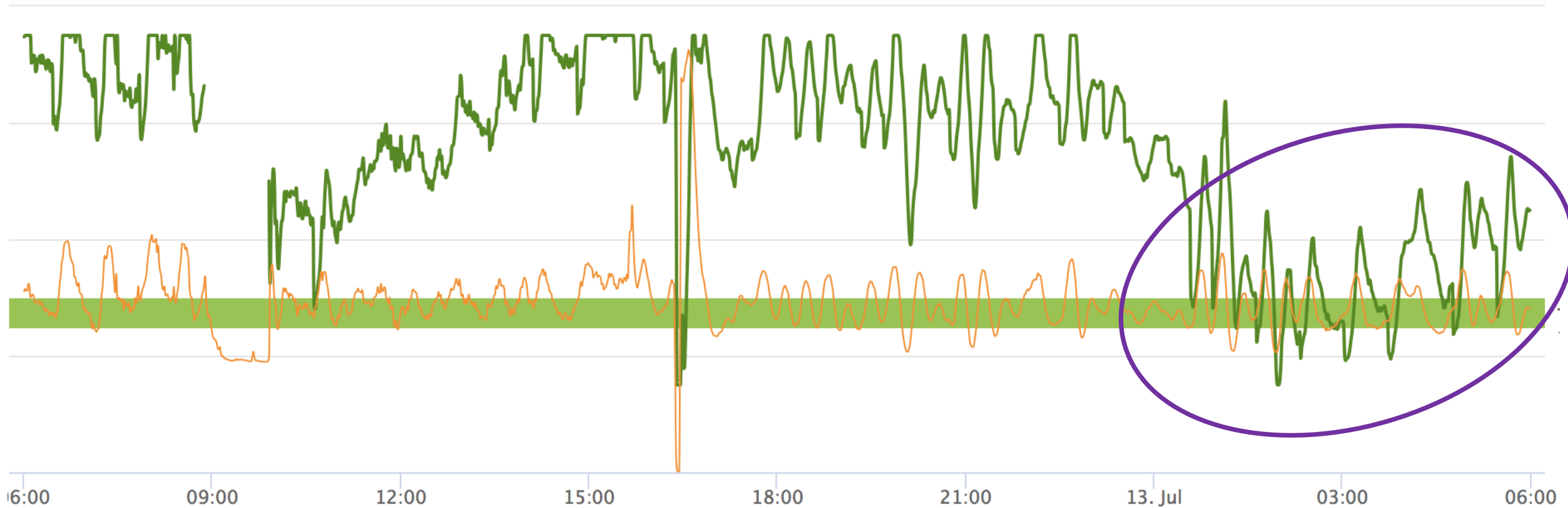


Automatic grade-wise classification

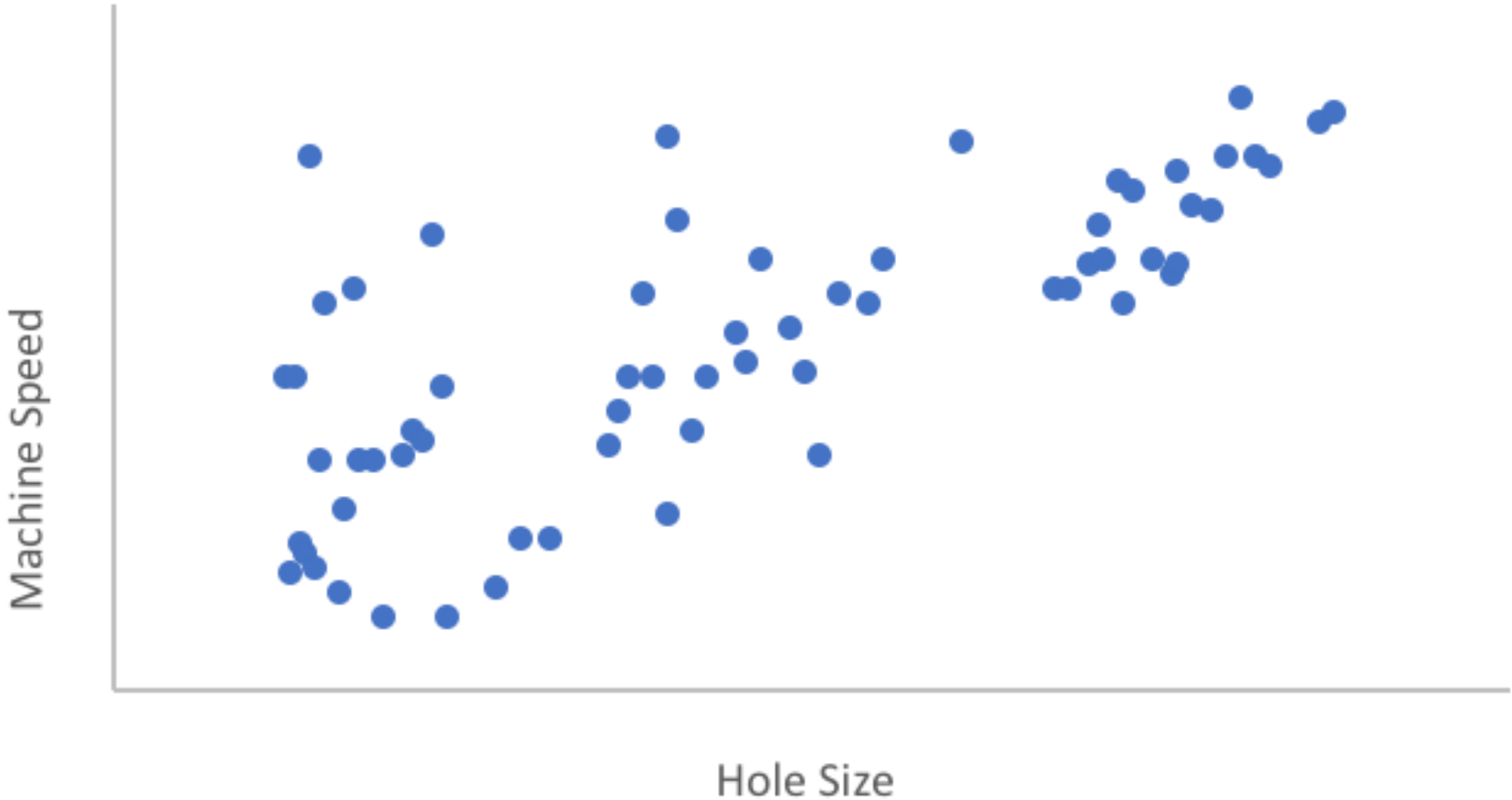


Furnish Change Detection on the fly

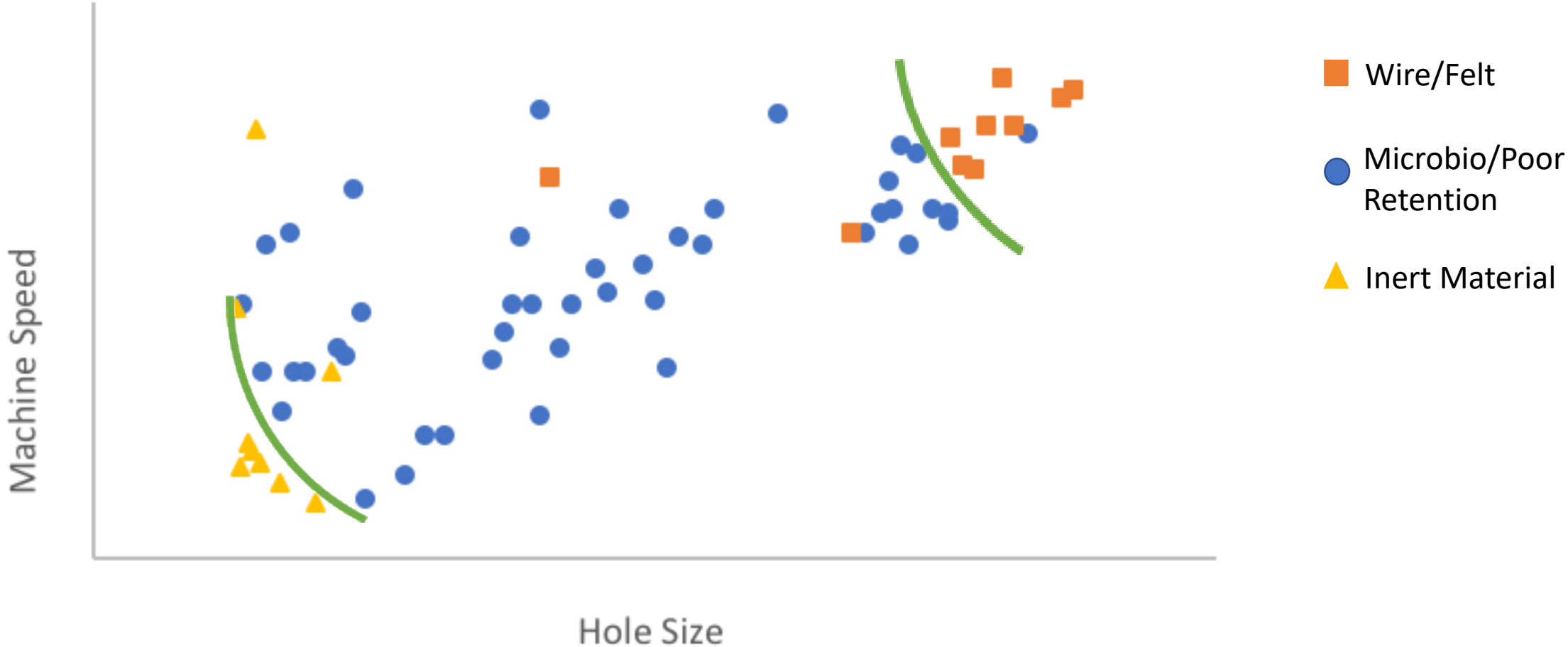
Goal Chemical dosing



Classification – root cause



Classification – root cause



Other Use Cases for AI



Refiner operations optimization
(consistent freeness)



Water recycling



Microbial control

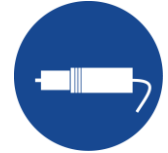


Real-time control of pulp & paper
properties (consistent quality)

Why AI now



Computational power



Data



Storage

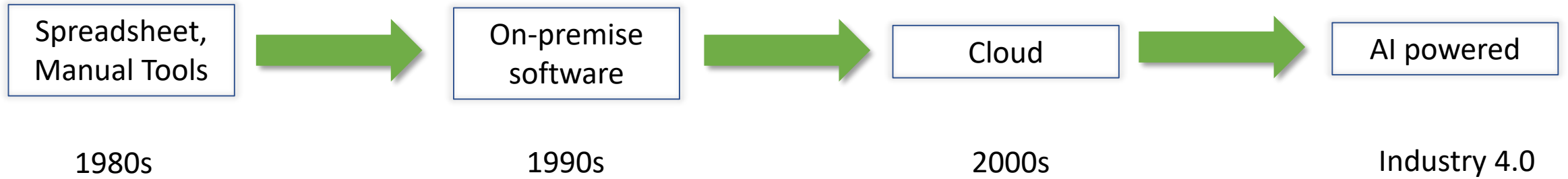


Algorithms



Investment

Tech Evolution



#AdoptOrLose

Questions