

PAT Automation with Machine Learning

Extract value from PAT investments with Machine Learning

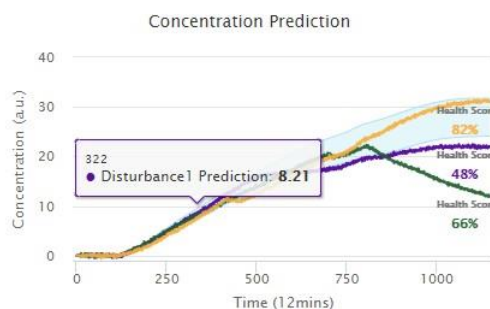
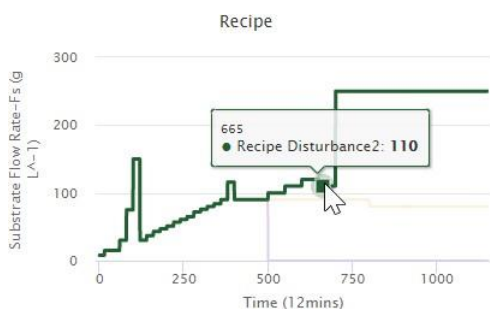
Using automation with machine learning, the Quartic PAT application eases and accelerates PAT integration and adoption. With native connectivity to these instruments and no-code workflow to convert the raw PAT data into multiple soft sensors for process and quality parameters of interest, the PAT application enables in-line, real-time, or near real-time monitoring and closed-loop control of unit operations.

By combining spectral data ingested into the Quartic application with previous discrete measurements for critical process, quality or material parameters, the user can train the model with supervised learning. The model can then automatically analyze spectra from future samples and provide the output variables of interest – such as final concentration, specific impurities etc. This mode can be used to accelerate the availability of key parameter measurements from a unit operation for downstream unit processing and increase overall cycle time.

Multiple no-code options for data pre-processing, filtering and preparation are provided to the user. Both linear and non-linear models can be trained. The multiple parameter value outputs can then be used as soft sensors that can be displayed in the lab as well as to the operator for near real-time use.

When in-line sampling is available, the soft sensors provide real-time measurements of quality, process, and material attributes.

By combining in-line PAT data with other process variables available in the Quartic platform, predictive profile of process performance or an outcome parameter, such as yield, can be built to provide proactive, prescriptive guidance for unit or batch performance.



Differentiators

- ✓ Increase consistency and speed of analysis for offline PAT data with automation.
- ✓ Native ingestion of any spectral data reduces data preparation time
- ✓ Off-line or Online data consumption
- ✓ Flexible deployment – fully automated, or human-in-the-loop
- ✓ UI driven, no-code data filtration and preparation
- ✓ Linear and non-linear modeling
- ✓ Soft-sensor output through OPC-UA for closed loop control or display in existing operator interface.

Benefits

- ✓ Increased speed and consistency of measurements requiring off-line assays reduces cycle time in multi-unit operations.
- ✓ Turn PAT investment into in-line measurement of critical and key process parameters that impact yield or quality for increased process robustness and efficiency.
- ✓ Build predictive quality and yield models to increase consistency and manage variability.
- ✓ Achieve closed-loop control with PAT