AI-METRIX

CLOUD BASED MANAGEMENT OF OPTICAL SPECTROMETERS

BY INFOMETRIX, INC.

AUTOMATING OPTICAL CALIBRATIONS

with Ai-Metrix

The purpose of a service like Ai-Metrix is to provide automated processing to save time, plus insure uniformity and high-quality assessments of any consumer goods, natural products, or chemical process.

Ai-Metrix is a database solution built on amalgamation of experience from 44 years of Infometrix process optimizations and a lot of R&D effort over the last 8 years to ease and automate processing and maintaining of fragmented data, allowing for better chemometrics, more experimentation, more frequent model updates, and optimized use of personnel. Compare and see the difference.

COMPETITIVE WITH EXPERT ANALYSIS

Ai-Metrix outperforms experts with more than 25 years experience doing calibrations for commercial purposes.
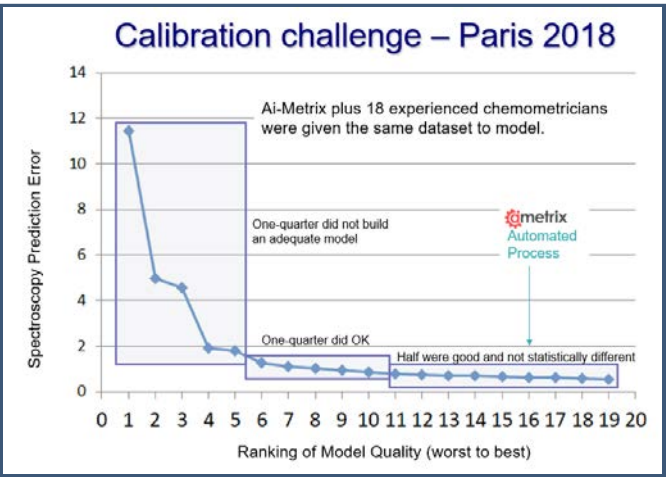
100 TIMES FASTER PROCESSING TIME

Speed of processing is considerably faster making the approach more reactive to process changes at 20% of the cost.

REPEATABILITY AND CONSISTENCY

Organized workflow delivering the highest quality models automatically and consistently.
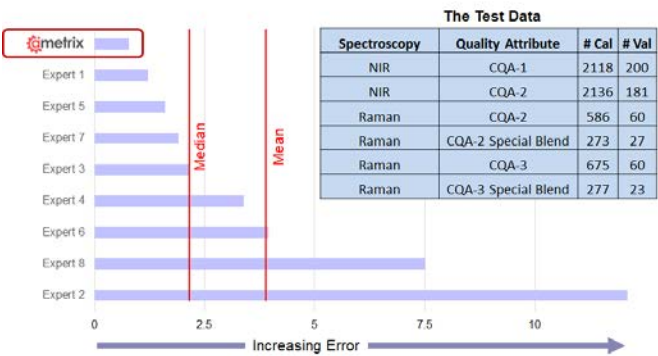
Automated Calibration vs Experts

How does automated calibration compare to the experts? Graph below shows quality of models created by 18 experienced chemometricians compared to Ai-Metrix automated processing at a Paris Conference in 2018.

The Ai-Metrix process performed consistently with the best experienced chemometricians.

For further comparison, six datasets were sent to eight world-class experts for analysis with only the calibration samples and rank to be determined. These experts average over 25 years of experience doing this type of calibration for commercial purposes. Ai-Metrix scored the highest with the lowest prediction error.
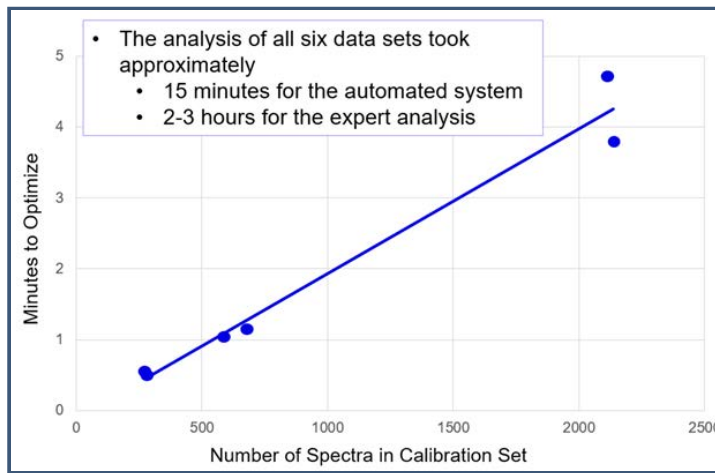

Calibration challenge – Paris 2018

Ai-Metrix plus 18 experienced chemometricians were given the same dataset to model.

One-quarter did not build an adequate model

One-quarter did OK

Half were good and not statistically different

The Test Data			
Spectroscopy	Quality Attribute	# Cal	# Val
NIR	CQA-1	2118	200
NIR	CQA-2	2136	181
Raman	CQA-2	586	60
Raman	CQA-2 Special Blend	273	27
Raman	CQA-3	675	60
Raman	CQA-3 Special Blend	277	23

BENEFITS OF AI-METRIX

Great return on investment

Ultimately, the quality of spectroscopy-based quality control is dictated both by the quality of the spectral measurement and by the quality of the calibration model. By combining a smart, interactive database to manage all the data needed with a best-in-class calibration, Ai-Metrix sharpens, standardizes, and streamlines the process to ensure that the reported data is accurate and timely.

Responsiveness is often critical when you have a changing process situation. The earlier example comparing model quality against 8 experts can also be viewed in terms of responsiveness. The experts spent between 2 and 3 hours to develop the 6 models. Ai-Metrix took 15 minutes to optimize the models, write a comprehensive report, and create the models in the user-specified format.

The analysis of all six data sets took approximately
- 15 minutes for the automated system
- 2-3 hours for the expert analysis

X-axis: Number of Spectra in Calibration Set. Y-axis: Minutes to Optimize.

Any Instrument/Analyzer

Works with all types of spectroscopy (IR, NIR, Raman) and with any manufacturer's system: a simple, uniform user experience.
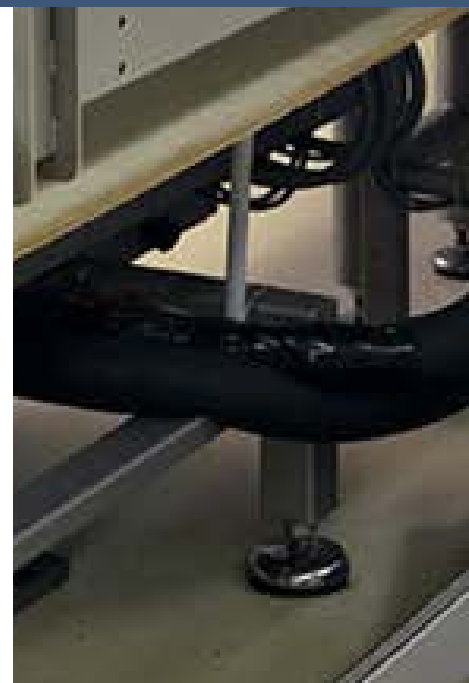
Any Legacy Software

Ai-Metrix can build models using any calibration software you have in use – Plug and Play.

Company Benefits

With the universal utility of the Ai-Metrix service, we can define a solution to meet the individual needs for all levels of expertise and disciplines in petroleum and chemical product QC/QA. Ai-Metrix service:

- Improves calibration quality, reduces operator time to near zero
- Manages data organization and improves communication
- Simplifies training and adapts to personnel turnover
- Speeds the delivery of models
- Manages all legacy systems
- Optimizes calibration for any product
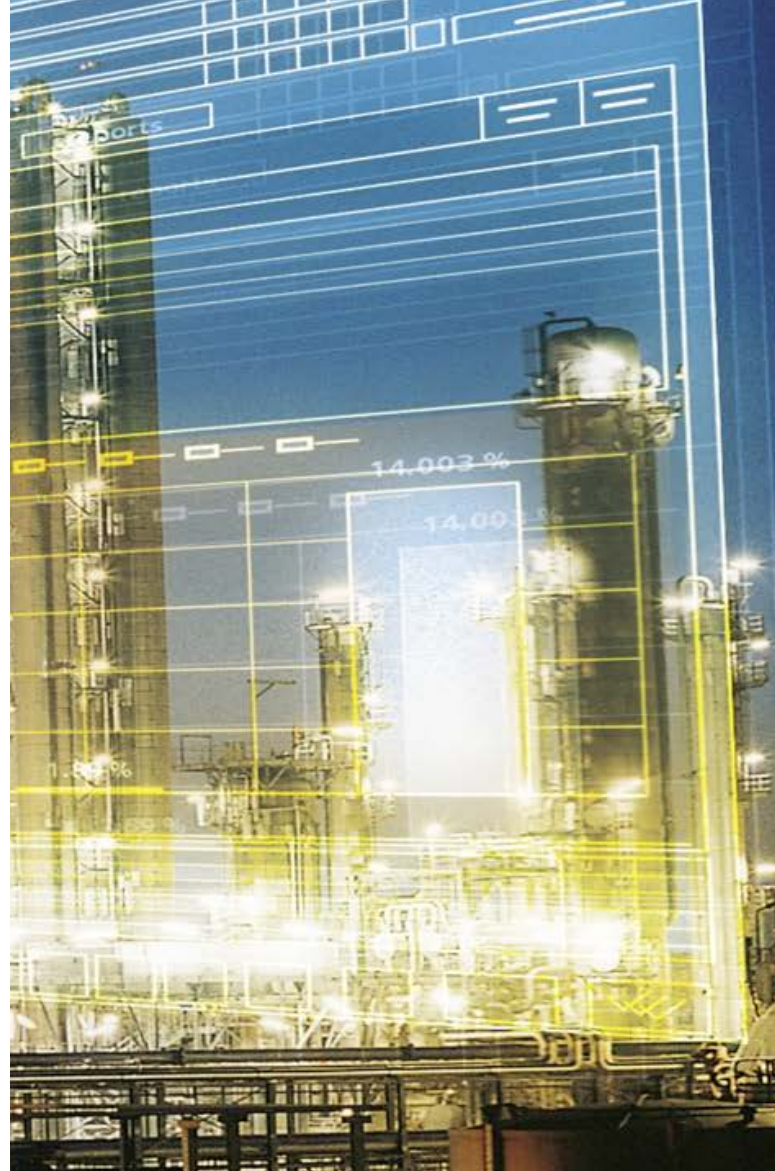- Eliminates the need to force hardware or software standards
- Lowers cost

HOW DOES AI-METRIX WORK?

Preserves all Legacy, Instrument and Software

Software Components for the Workflow

The following components make up the Ai-Metrix service, to organize, share, process, optimize, manage and document data information.

- Ai-Metrix conductor
- Tableau database system
- Dropbox sharing
- Excel request
- SQL Server
- Multivariate analysis software

The purpose of Ai-Metrix is to save time and to insure uniform, high-quality assessments of a chemical process.

User Interface in Excel

Regardless of the instrument control software, all calibrations are initiated using an Excel GUI which:

- Is context sensitive to the application;
- Enables the recalibration to be performed anywhere in the world
- Manages calibrations of any type of instrument running any brand of software; and
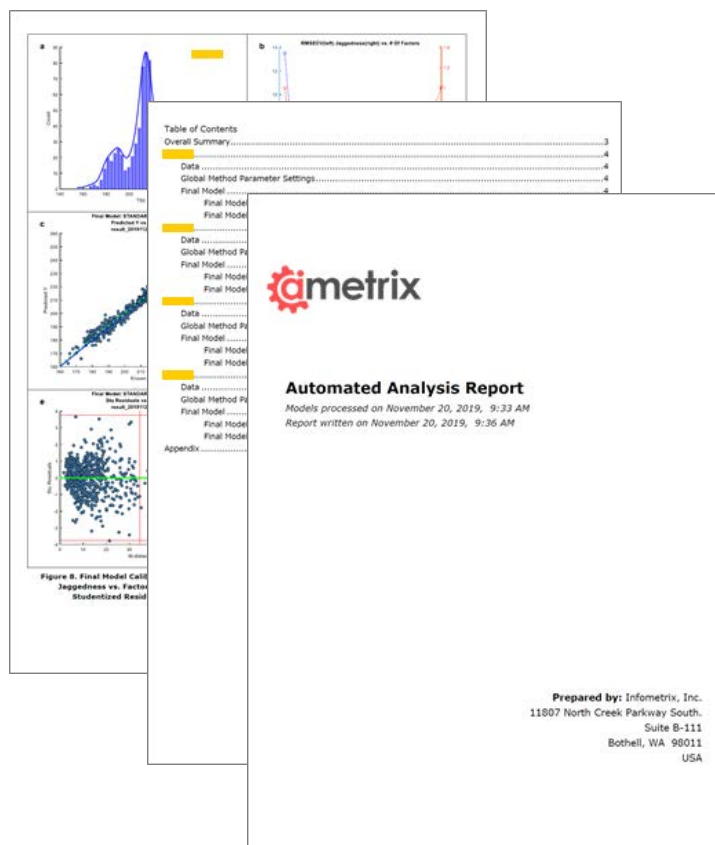- Facilitates training.

AUTOMATED ANALYSIS REPORT

with Ai-Metrix

Reports in PDF with complete documentation of the model creation and quality control are generated automatically as part of every process, providing:

- Objective technical detail of the quality of the calibration models
- A full evaluation of the instrument performance
- Consistent evaluation across products and manufacturing location

Documents span calibration, validation, and prediction. There are no limits to the number of laboratory values being assessed, nor are there limits to how many times the modeling process is triggered. The system is available 24/7/365 and responds to a new modeling task within minutes. Reports are consistent for Raman and for dispersive or Fourier transform NIR and IR. This enables comparison across time and location for all analyzer technologies.

Comprehensive, yet easy to use solutions for all levels of expertise and disciplines in product QC/QA

ONLINE INTERACTIVE DASHBOARD

STAYING COMPETITIVE AND GETTING AHEAD

Featuring:

TABLEAU INTERACTIVE DATABASE

Ai-Metrix Tableau database matches values to spectra and outputs a custom on-line dashboard allowing for database organization, comparative visualizations updated in real time and query abilities to organize many years' worth of data for comparisons, which is a huge time saver.

COMPARATIVE VISUALIZATION

Visualization is performed through a customizable dashboard where years' worth of archived and current data can be compared for all collected measurements of quality, physical property, and product grades. The system is highly interactive allowing the user to investigate and understand product quality.

DATABASE ORGANIZATION

Using an evaluative process that provides a database with search and matching capability and a dashboard interface allowing a user to visualize trends and comparisons of the data through a graphical output; the matching of such data being essential to calibration studies and future predictive models used in laboratory and process environments.
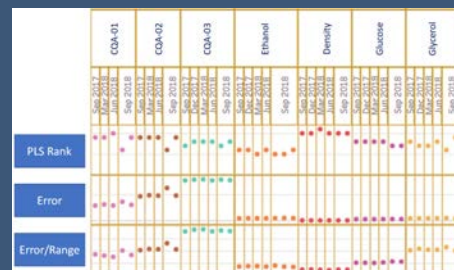
The service includes customized graphical displays that allows the user to spot inconsistencies and plot trends for any range of dates.

Tracking model quality over time

The visualization and the ability to easily select for better model building results in greater quality control, reduced operator time, and greater profits.

Tableau customizable dashboard

A FUTURE-PROOF CALIBRATION ENGINE
FOR OPTICAL SPECTROSCOPY

CONTACT US

For evaluation, quotation, presentation or additional information

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