All-in-one Multivariate Data Analysis & Design of Experiments software

Overview

The Unscrambler® has set the standard in multivariate analysis (MVA) and design of experiments software for over 30 years. It is the preferred tool for thousands of data analysts, researchers and engineers around the world who need to analyze large and complex data sets quickly, easily and accurately using the power of multivariate analysis.

The Unscrambler® X takes CAMO´s tradition of delivering advanced multivariate data analysis software that is easy to use and with exceptional data visualization to the next level. With the most recent version The Unscrambler® X v10.5 software, you can now increase the efficiency in your work. With improved performance and readily accessible information, you will discover a user interface that reduces the time spent throughout the analyzing process offering:

- Powerful multivariate analysis methods and design of experiments
- Easy data importing options with intuitive workflows and interface
- Outstanding graphics, plots and interactive data visualization tools

Business benefits

Increase ROI in product development, process control, quality control and R&D through:

- Better understanding of processes through multivariate analysis coupled with cheap, indirect observations, reducing the need for expensive measurements or equipment.
- Optimizing product development to increase yield, improve product quality, reduce cost and shorten time-to-market
- Better formulation or classification of products to deliver the desired product quality
- Early fault detection to reduce waste and system downtime

Application areas

The Unscrambler® X can be used by anybody who needs fast and useful insights from large or complex data such as product, process, spectroscopic or consumer data. Usage does not require extensive statistical background or knowledge. It is particularly useful for:

- Engineers and data scientists working in production, R&D or quality control departments of almost any industry.
- Researchers working with process analytics, chemometrics, spectroscopy, metabolomics, sensometrics, data mining, etc.
- Lecturers wanting to introduce MVA to their syllabus with an easy-to-learn, user-friendly package.

Features

- Powerful Multivariate Analysis with an extensive range of multivariate regression, prediction and classification methods, statistical tests, informative visualization and easy-to-use transform options (see table below for methods supported).
- Advanced experimental designs with Design-Expert® to screen for vital factors, locate ideal process settings for top performance or discover optimal product formulations.

- Flexible validation options and plots help you select the optimal model complexity and estimate conservative error estimates.
- Advanced options for combining and utilizing data from different sources in the modelling.
- A range of outlier statistics and automatic marking of samples that are either suspect, extreme or both, or identification of less important variables that may be down-weighted or removed from the model.
- Automatic filtering of observations that are outside of a specified acceptance range such that these will not be included in the model.
- Accepts data from a range of generic and proprietary formats, analytical instruments and process equipment.
- Easy to navigate, and project-based workflows keep all related data sets, results and graphs together to make it easy to find the information you need quickly.
- Plugins for specific methods and file formats provide flexibility to meet the needs of any industry. The Unscrambler® X models can also integrate with 3rd party applications.
- Compliance mode, digital signatures, password access, Windows domain authentication and audit trails provide the necessary security requirements for regulated industries.

Import formats

- The Unscrambler® X offers multiple generic import formats such as ASCII (text), MS Excel, Matlab, JCAMP-DX, NetCDF, JEOL, as well as generic database import.
- In addition there is a multitude of vendor specific formats from Thermo Fisher Scientific (GRAMS, OMNIC), Bruker (OPUS), Perten, rap-ID, Brimrose, ASD (Indico), Varian, Guided Wave (SpectrOn, Class-PA, NIRO JSON), FOSS (NSAS), PerkinElmer, DeltaNu, VisioTec and Viavi (MicroNIR™ Pro).
- Data and models from Design-Expert® and previous versions of The Unscrambler® can also be imported.
- Some formats and database connections that are not listed above may be available as plugins.

Methods supported

Descriptive Statistics	• Missing values • Level (Mean, Max, Min, Median, Quartiles) • Range (Max-Min, Std., Variance, RMS) • Distribution (Skewness, Kurtosis) • Cross correlations • Scatter effects
Statistical Tests	• Equality of means (Paired t-test, Equal variance Student's t-test, Unequal variance Student's t-test) • Equality of variances (F-test, Levene's test, Bartlett's test) • Normality (Kolmogorov-Smirnov test, Mardia's test of multivariate normality) • Contingency analysis
Cluster Analysis	• K-means, K-medians • Hierarchical Cluster Analysis (HCA), including Single linkage, Complete linkage, Average linkage, Median linkage and Ward's method.
Explorative Methods	• Principal Component Analysis (PCA). • Rotated PCA (Varimax, Equimax, Quartimax, Parsimax) • Multivariate Curve Resolution (MCR)
Regression Methods	• Multiple Linear Regression (MLR) • Principal Component Regression (PCR) • Partial Least Squares Regression (PLSR) • Support Vector Machines Regression (SVR) • L-PLS Regression, incorporating three data tables.
Classification Methods	• Projection using PCA, PCR or PLSR models • Soft Independent Modelling of Class Analogy (SIMCA) • Linear Discriminant Analysis (LDA) with Linear, Quadratic, Mahalonobis options. • PCA-LDA, for classification of correlated data by LDA • Support Vector Machines Classification (SVC)
Calibration Transfer	• Interpolate • Bias and Slope correction • Piecewise Direct Standardization (PDS)
Spectroscopic Transformations	• Absorbance to Reflectance/Transmittance • Reflectance/Transmittance to Absorbance • Reflectance to Kubelka-Munk • Attenuated Total Reflectance (ATR) Correction

Scatter Correction and other Spectral Transforms	• Smoothing with Moving average, Gaussian filter, Median filter, Savitzky-Golay • Deresolve • Normalization to common Mean, Median, Range, Area under the curve, Unit vector normalization, Peak normalization • Baseline correction using Offset or Straight line • De-trending • Derivatives using Gap, Gap-Segment, Savitzky-Golay up to 4th order • Standard Normal Variate (SNV) • Multiplicative Scatter Correction (MSC) • Extended Multiplicative Signal Correction (EMSC) • Orthogonal Signal Correction (OSC) • Correlation Optimization Warping (COW)
General and Variance Transforms	• Various Centre and Scale options • Interaction and Square effects • Weights • Compute General, with operations such as log(x), 1/x, etc. • Quantile Normalize • Fill missing • Additive and Proportional Noise
Combining or Reducing data	• Transpose • Reduce (Average) along samples or variables • Reshape using Row/Column major, Sequence wise or Level wise • Augment or Append two or more matrices with matching dimensions • Append two or more matrices based on column header names • Flexible Sample Alignment by Polling, Event, Sample ID, Event within Sample ID • Dimension Reduction for individual blocks of variables using PCA, PCR, PLSR
Input Control	• Variable Limits filtering
Control Charting	• Statistical Process Control (SPC) with Capability analysis • Moving Block methods (Mean, Std., Relative std., F-test)

Available versions and plugins
The Unscrambler® X is delivered in the following version formats:
- Standalone, Network editions
- 32-bit, 64-bit
- Languages: English, Japanese

Some separate plugins are available on request, including:
- Batch modeling (licensed separately)
- Mie scattering correction
- OSIsoft PI import (licensed separately)

Hardware & Software Requirements for The Unscrambler® X
- Windows Vista (32/64-bit), Windows 7 (32/64-bit), Windows 8/8.1 (32/64-bit), Windows 10 (32/64-bit), Windows 2008 (32/64-bit), Windows 2008 R2, Windows 2012 or Windows 2012 R2.

- Any 1 GHz or faster Intel or AMD processor.
- A minimum of 2 GB RAM is recommended. The amount of available system memory will limit the maximum size of the data matrices (maximum size will vary depending on the type of calculations).
- A minimum of 1 GB of free hard disk space.
- .NET Framework 4.0 or 4.5.
- Internet Explorer 7 or higher.
- A minimum screen resolution of 1024 pixels wide is recommended.

More information

www.camo.com

Contact

CAMO Software
Oslo Science Park, Gaustadalléen 21, 0349 Oslo, Norway
Tel: +47 22 39 63 00
sales@camo.com