



What is special about JMP® Pro?

JMP Pro is statistical discovery software from SAS that contains everything in JMP plus advanced techniques for predictive modeling, cross-validation, model comparison and one-click bootstrapping. It combines data management, data and information visualization, and statistical modeling in an in-memory application made for the desktop. JMP Pro allows users to gain valuable new insights from data.

Why is JMP® Pro important?

With JMP Pro, your data reveals not just where your organization has been, but also where it's headed. This allows you to discover and maximize new opportunities, creating the best processes, products and offerings to take your business forward. Automated model-fitting and model-comparison capabilities let you build robust predictive models using tens of millions of observations, find the relevant facts and drive better decisions. Tools for cross-validation prevent over-fitting. JMP Pro is the only software that lets you bootstrap a statistic with one click – so you can add this powerful and wide-ranging inferential approach to your toolkit without writing a single line of code. In spite of its increased analytic power, JMP Pro maintains the ease of use and interactivity of JMP itself, so it can serve as the analytic hub for everyone in your organization, from beginners to power users.

Who should use JMP® Pro?

Analysts, engineers, statisticians, data scientists, modelers and data miners in nearly every industry. JMP Pro empowers individual practitioners and analytical A-teams across industries, allowing decision makers to become more proactive and take greater control of the future.

jmp.com/pro

Do you need JMP® Pro?

Visual analytics for creating robust predictive models

Without robust predictions, it's hard to plan. Whether in managing customer lifetime value or monitoring complex engineering processes, the most successful companies are constantly adapting to a continuously changing environment by using historical data to make future projections. That's where JMP Pro comes in.

In your business, you may ask:

- Which Web page would a customer most like to see next?
- Which lots are bound to fail and should be pre-emptively scrapped to avoid waste and release capacity?
- Which customers are likely to upgrade their current products or services?
- What other products would a customer like to buy based on their last purchase?
- Which transactions will prove to be fraudulent?
- How likely is a customer to pay back a loan?

To make good predictions, you need to start with quality data about what's happened in the past. But collecting data from diverse sources often results in overlap and inconsistencies. You want to find the key factors to optimize your model and give robust predictions cost-effectively. To do that, you need a software application that surfaces the latest automated modeling techniques

through an approachable and visual interface that anyone can use.

JMP Pro is this application. It helps you use the data you have now to better anticipate the future and plan well for tomorrow. When you start with high-quality data, the powerful predictive modeling methods in JMP Pro ensure that you'll get a model that fits tomorrow well.

JMP Pro provides all the superior visual data access and manipulation, interactivity, comprehensive analyses,

Algorithms in JMP® Pro include:

- Model comparison provisions for comparing fits across multiple fit predictions.
- Model validation using train, validate and test methodology.
- Bootstrap forests, a random-forest technique.
- Gradient-boosted trees.
- Multilayer neural networks with up to three activation functions.
- Gradient-boosted neural networks with early stopping rules.
- Cross-validated stepwise regression.
- One-click bootstrapping for most statistics in JMP reports.
- Exact tests of associations with multiway contingency tables.
- Exact tests for nonparametric one-way analysis of variance.

and extensible capabilities that are the hallmarks of JMP, then adds modern predictive modeling, cross-validation, exact measures of association, one-click bootstrapping and model comparison features. All of this comes in the in-memory, desktop environment familiar to current JMP users.

Build predictive models that generalize well

Descriptive modeling employs statistics and graphics to help you understand historical data. Useful predictive models have the extra burden of ensuring that they will describe new data just as well. Anyone can do a fair job of describing last year's performance. But without the right tools and the most modern techniques, building a model to predict next year's becomes much more difficult. For effective predictive modeling, you need sound ways to validate your model, and with a large model, you tend to get into trouble over-fitting. Large models should always be cross-validated, and JMP Pro has the features to do that.

JMP Pro provides this validation through data portioning, or holdback, and visual comparison tools. Dividing the data into training, validation and test data sets has long been used to avoid over-fitting, ensuring that the models you build are not reliant on the properties of the specific sample used to build them. This produces models that generalize well to tomorrow's data – about new customers, new processes or new risks – so you can make data-driven inferences about the future.

Choose your model form

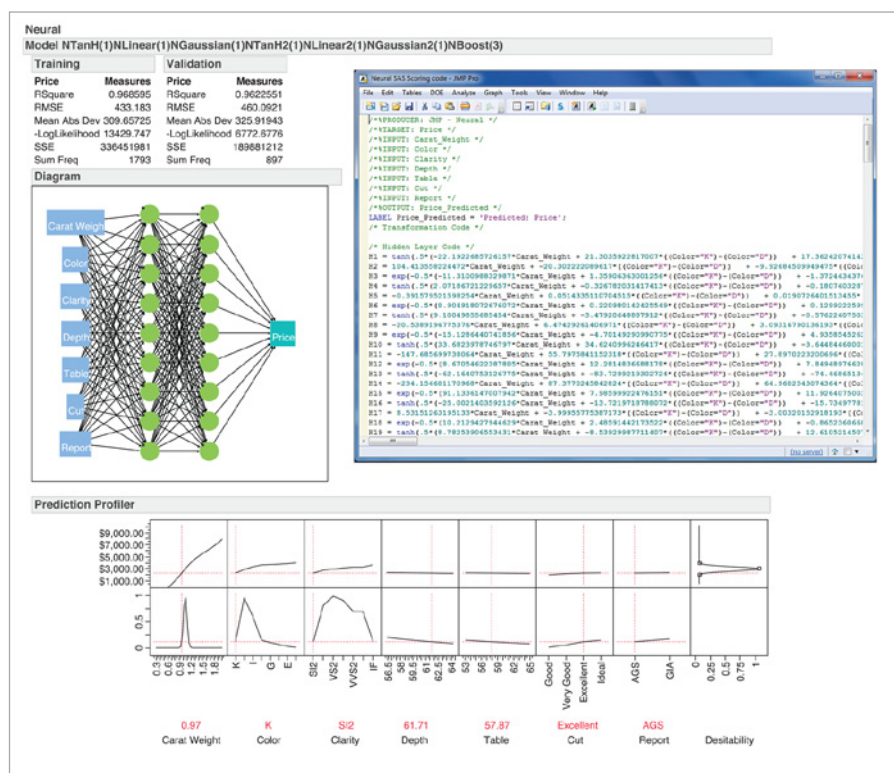
If your goal is to find the best predictive model, you'll have your choice of model forms. JMP Pro has all the linear and nonlinear modeling capabilities that JMP offers, and also adds cross-validated stepwise regression, automated decision-tree building in the Partition platform, partial least squares (PLS) regression in the Fit Model platform as well as advanced PLS features, an enhanced platform for neural networks, and one-click bootstrapping of statistical quantities.

The Partition platform in JMP Pro automates the tree-building process with modern methods. A bootstrap forest grows dozens of decision trees using random subsets of the available data and averages the computed influence

of each factor in these trees. The boosted tree technique builds many simple trees, repeatedly fitting any residual variation from one tree to the next.

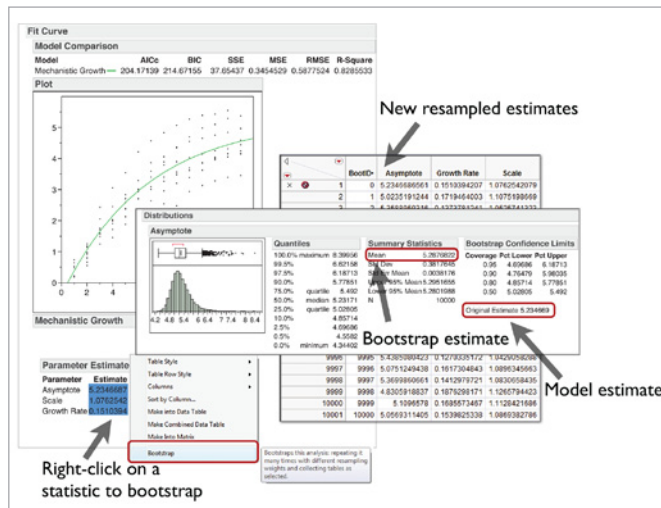
The advanced Neural platform in JMP Pro lets you build one- or two-layer neural networks with your choice of three activation functions and automatic model construction using gradient boosting. This platform automatically handles missing values and transformation of continuous X's, which saves time and effort. In addition, it includes a rich set of penalty functions to apply to X's and provides capabilities to model responses with multiple categories.

In the advanced PLS platform, JMP Pro gives you the same kind of control over cross-validation of PLS models as other modeling forms, as well as your



Use cross-validation to build boosted neural network models and automatically generate the resulting SAS score code.

Bootstrap any statistic in a report directly via the option on the context menu. One-click bootstrapping will create a new table with the resampled estimates.



choice between NIPALS and SIMPLS algorithms. In the Fit Model platform, a PLS personality can include categorical factors, as well as interactions and higher-order polynomial terms. Finally, holdback cross-validation lets you fit useful PLS models to large data sets with many collinear input factors of mixed types.

Assign measures of precision to model predictions

Bootstrapping approximates the sampling distribution of a statistic. The data is resampled (with replacement), and the statistic is computed. This process is repeated to produce a distribution for the statistic. JMP Pro is the only statistical software package that lets you bootstrap a statistic without writing a single line of code. One-click bootstrapping means you are only a click away from being able to bootstrap any quantity in a JMP report.

This technique is useful when parametric assumptions are in doubt, or if you are not sure whether they are. You can use one-click bootstrapping as

an alternative way to gauge the uncertainty in your predictive models. For example, try applying bootstrapping techniques to nonlinear model results that are being used to make predictions. Bootstrapping lets you assess the confidence in your estimates with fewer assumptions – and JMP Pro's one-click bootstrap allows you to harness this powerful analytic technique without being forced to write complex, looping code.

Compare predictions across many modeling techniques

In the real world, you may find that some kinds of models fit well in certain situations, but fit poorly in others. With JMP Pro there are many ways to fit, and you need to find out which one is most appropriate in a given situation. Sometimes an ordinary linear model from Fit Model works best, but even then you must decide which terms to include in the model. At other times the data mining models, such as neural nets and decision trees, fit better, but choosing the most appropriate model is not always straightforward.

Using the new Model Comparison platform in JMP Pro, you can compare all the saved prediction columns from various fits and pick the best combination of good fit, parsimony and validation. JMP Pro can make this comparison almost automatically and then compare the models in many ways, using traditional or alternative measures of fit. At the same time, you can interact with model profilers to see which important factors each model is picking up. Measures of fit, diagnostic plots and profilers are reported for easy comparison of models to help you determine the right path forward.

Visual discovery

JMP has always been about discovery. JMP Pro includes all the visual discovery features of JMP, making your data accessible in ways you might have never experienced. Through dynamically linked data, graphics and statistics, JMP Pro brings your investigation alive in a 3-D plot or an animated graph showing change over time, generating valuable new insights that inform your model building. Once you have constructed a narrative, the same interactivity allows you to tell the story in a way others can readily understand and act upon.

Like JMP, JMP Pro has an attitude toward data – even big data – that is close and personal. One challenge is getting data in shape to build useful models. With extensive reshaping, reconfiguring and recoding tools, JMP Pro and JMP ease data pre-processing – the most time-consuming aspect of model building – to quickly ensure high-quality data that's ready for

analysis. In addition, using the JMP Scripting Language (JSL), you can call SAS and R to expand your data management and analytic repertoire as needed. For a completely custom solution, JMP supports tailor-made applications for your specific requirements with the Application Builder, which serves as an interactive development environment for JSL. Its drag-and-drop user interface design and full control of back-end scripting let you create an application that uses just the right JMP Pro features to tackle your most difficult statistical problems.

SAS® user?

As one of SAS' offerings for predictive analytics and data mining, JMP Pro can easily connect to SAS if needed, expanding your options and giving access to the unparalleled depth of SAS Analytics and data integration. With or without an active connection to SAS, JMP Pro can output SAS code to score new data quickly and easily with models built in JMP.

Operating systems guidelines

JMP Pro, Version 10 runs on Microsoft Windows and Mac OS. It includes support for both 32- and 64-bit systems. See jmp.com/system for complete system requirements.

Key features exclusive to JMP® Pro, Version 10:

Validation column role in many modeling platforms
Bootstrapping for most statistics in JMP reports
Fit Model platform
Partial least squares implementation allows specification of model terms
Stepwise regression uses train, validate and test methodology
Partition platform
Bootstrap forest and boosted tree techniques
Uses train, validate and test methodology
Model Comparison
Compares the fit of different models
Provides measures of fit, ROC, diagnostic plots and profilers
Contingency platform
Exact measures of association
Oneway platform
Nonparametric exact tests
Neural platform
Automated handling of missing data
Automatic selection of the number of hidden units using boosting
Automated transformation of input variables
Outlier-resistant loss function
Ability to fit both one- and two-layer neural nets
Ability to choose from three activation functions
Ability to save transformed covariates
Ability to save randomly generated cross-validation columns
Uses train, validate and test methodology
PLS platform
Choice of k-fold or Holdback validation methods



SAS Institute Inc. World Headquarters

+1 919 677 8000

JMP is a software solution from SAS. To learn more about SAS, visit: www.sas.com
For JMP sales in the US and Canada, call 877 594 6567 or go to www.jmp.com

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