SPSS

Statistics for Data Analysis

WHO WE ARE

SPS is an Italian center of statistical data analysis with more than 20 years of experience.

SPS was born in 1994 as SPSS Italia and it was the only reseller in Italy for SPSS software suite, authorised by SPSS inc.

Today SPS is an IBM Gold Business Partner, Software Support Provider and Expert Level in Data Science & Business Analytics.

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DATASHEET

Statistics Forecasting

Statistics for Data Analysis

Highlights Statistics for Data Analysis

- Get support through every step of the analytical process.
- Carry out essential analyses from an intuitive graphical interface.
- Select from more than a dozen integrated products to make specialized analyses faster and easier.

Organizations can solve a wide array of business and research problems with the solution Statistics for Data Analysis.

Compared to other statistical software, the solution is easier to use, has a lower total cost of ownership and more comprehensively addresses the entire analytical process, from planning to data collection to analysis, reporting and deployment.

Organizations of all types rely on Statistics for Data Analysis to help increase revenue, outmaneuver competitors, conduct research and make better decisions. With decades of built-in expertise and innovation, it's a leading choice for reliable statistical analysis.

Statistics Base is part of the solution Statistics for Data Analysis, which consists of:

- Software license
- Add-On
- SPS Service Program

This comprehensive, easy-to-use solution includes many different procedures and tests to help users solve complex business and research challenges.

Statistics for Data Analysis

The solution analytical capabilities to meet the analysis requirements of any type of organization, from basic tools for solving common problems to advanced analytical techniques that enable all type of organization to address complex challenges.

Statistics for Data Analysis can help you:

- Analyze your data with new and advanced statistics, including a variety of new features within UNIANOVA methods
- Integrate better with third-party applications, including stronger integration with Microsoft Office
- Save time and effort with productivity enhancements:
  - More attractive and modern-looking charts in Chartbuilder
  - New groundbreaking features in Statistics Amos 25
  - Data and syntax editor enhancements
  - Accessibility improvements for the visually impaired
  - Updated merge user interface
  - Simplified toolbars

Statistics for Data Analysis can access quickly, manage and analyze any kind of dataset, including survey data, corporate databases or data downloaded from the web.

In addition, the software can process Unicode data. This eliminates variability in data due to language-specific encoding and enables your organization to view, analyze and share data written in multiple languages.

Business Benefit Statistics for Data Analysis

- Support business decisions with data-based analytics for improved outcomes.
- Be more confident in your results by incorporating data from many different sources, including geospatial information, in your analysis and using proven, tested techniques to perform your analysis.
- Save time and effort with capabilities that enable experienced analysts to develop procedures or dialogs that others can use to speed through repetitive tasks.
- Give results greater impact by using visualization capabilities that clearly show others the significance of your findings.

Statistics Forecasting

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Highlights:

- Develop reliable forecasts quickly.
- Reduce forecasting errors.
- Update and manage forecasting models efficiently.
- Allow more people to generate forecasts.
- Give experienced forecasters more control and choices.

Build expert forecasts in a flash

Forecasts provide a solid foundation for your organization's planning. Statistics Forecasting offers a number of capabilities that enable both novice and experienced users to quickly develop reliable forecasts using time-series data.

Statistics Forecasting is fully integrated with SPSS Statistics, so you have all of its capabilities at your disposal, plus features specifically designed to support forecasting. Because they help you develop and manage plans affecting a number of operational areas, forecasts have a major impact on profits. They enable your organization to better anticipate revenues; control staffing, inventory and other costs; and manage other business processes more precisely—all improvements that lead to a healthier bottom line. However, working with the time-series data to develop forecasts can be challenging.

SPSS Forecasting has the advanced techniques you need without the drawbacks of traditional methods. Unlike spreadsheet programs, it enables you to use advanced statistical methods in creating forecasts. But you don't need expert statistical knowledge to do so.

Statistics Forecasting

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People new to forecasting can create sophisticated forecasts that take into account multiple variables. And experienced forecasters can use Statistics Forecasting to validate their models. You get the information you need faster because the software helps you every step of the way.

Efficiently generate and update models

Instead of laboriously building forecasts by re-setting parameters and re-estimating models, variable by variable, you can speed through the process with Statistics Forecasting. You'll save hours, even days, of valuable time, with no compromise in the quality or reliability of your forecasts.

With SPSS Forecasting, you can:

- Develop reliable forecasts quickly, no matter how large the dataset or how many variables are involved.
- Reduce forecasting error by automating the selection of the appropriate models and their parameters.
- Update and manage forecasting models efficiently, so you can devote more time to exploring why some models diverge from the norm.
- Allow a broader group of people in your organization to generate forecasts.
- Give experienced forecasters control over choices affecting models, parameters, and output.
- Deliver understandable and useful information to your organization's decision makers.

Statistics Forecasting

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You have tremendous flexibility in creating forecasts. For example, you can easily convert transactional data into time-series data and convert existing time-series data to the time intervals that best suit your organization's planning needs, with Statistics Forecasting.

You can create forecasts at exactly the level of detail you need— for example, for each product line, for individual products, and across geographic and functional areas. Then, using the Expert Modeler feature, you can:

- Automatically determine the best-fitting ARIMA or exponential smoothing model for your time-series data.
- Model hundreds of different time series at once, rather than having to run the procedure for one variable at a time.

You can also:

- Save models to an XML file so that when data changes, forecasts can be updated without having to re-set parameters or re-estimate the model.
- Write scripts so that updates can be performed automatically.

Statistics Forecasting

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Forecasting in retail

Greg is an inventory manager for a major retailer. He has responsibility for more than 5,000 products and uses Statistics Forecasting to develop inventory forecasts three months out for each product. Because Statistics Forecasting automates the modeling of thousands of variables, the process of generating initial forecasts takes only a few hours instead of several days. And the process of updating models also can be done efficiently.

His company's data warehouse is refreshed monthly with actual sales data, so Greg runs forecasts as a batch job once a month. By doing so, he incorporates the new data and extends his forecast horizon one more month into the future. He is able to do this without re-estimating his models, which speeds the process.

To check model performance, Greg includes Statistics Statistics command syntax in the batch job to identify any series having time points with observed sales outside the confidence intervals established by the original model. For these series, he runs another batch job to Identify a new model that better fits the revised data. By using Statistics Forecasting, Greg conducts sophisticated forecasting efficiently and improves his company's ability to plan effectively.

Statistics Forecasting

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If you're new to modeling time-series data, or only create time-series models occasionally, you benefit from the ability to choose the appropriate model for your data and guide you through the model-building process. Using SPSS Forecasting, you can:

- Generate reliable models, even if you're not sure how to choose exponential smoothing parameters or ARIMA orders, or how to achieve stationarity.
- Automatically test your data for seasonality, intermittency, and missing values, and select appropriate models.
- Detect outliers and prevent them from influencing parameter estimates.
- Generate graphs of your data, showing confidence intervals and the model's goodness of fit.

After your models are created and validated, you can share them with others by incorporating them into Microsoft Office applications. Or, by using the Statistics Output Management System (OMS), write output in HTML or XML formats for posting on corporate intranets. You can also save models as SPSS Statistics data files. This enables you to continue exploring the files for characteristics such as each model's goodness of fit.

Statistics Forecasting

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Provides control for experts

Experienced forecasters benefit from Statistics Forecasting because they can create models from time-series data more efficiently while still controlling key aspects of the process.

For example, you can limit the choice of models to ARIMA models only, or to exponential smoothing models only, through the Expert Modeler feature. You can opt out of the Expert Modeler and choose every parameter of the model yourself. Alternatively, use the Expert Modeler recommendations as a starting point for your selections, or to check your work.

You can limit output so that you see only the worst-fitting models—those that require further examination. This enables you to uncover problems with your data or models quickly and efficiently.

Statistics Forecasting Features

TSMODEL

Model a set of time-series variables by using the Expert Modeler or by specifying the structure of autoregressive integrated moving average (ARIMA) or exponential smoothing models:

- Allow Expert Modeler to select the best-fitting predictor variables and models
  - Limit search space to ARIMA models only, or to exponential smoothing models only
  - Treat independent variables as events
- Specify custom ARIMA models, which produce maximum likelihood estimates for seasonal and nonseasonal univariate models
  - Work with general or constrained models specified by autoregressive or moving average order, order of differencing, seasonal autoregressive or moving average order, and seasonal differencing
  - Use two dependent variable transformations: square root and natural log
  - Automatically detect or specify outliers: additive, level shift, innovational, transient, seasonal additive, local trend, and additive patch
  - Specify seasonal and nonseasonal numerator, denominator, and difference transfer function orders and transformations for each independent variable
- Specify custom exponential smoothing models
  - Four non-seasonal model types: simple, Holt's linear trend, Brown's linear trend, and damped trend
  - Three seasonal model types: simple seasonal, Winters' additive, and Winters' multiplicative
  - Two dependent variable transformations: Square root and natural log
- Display forecasts, fit measures, Ljung-Box statistic, parameter estimates, and outliers by model
- Generate tables and plots to compare statistics across all models
- Choose from eight available oodnessof-fit measures: R2, stationary R2, root mean square error, mean absolute percentage error, mean absolute error, maximum absolute percentage error, maximum absolute error, and normalized Bayes information criterion (BIC)
- Create tables and plots of residual autocorrelation function (ACF) and partial autocorrelation function (PACF)
- Plot observed values, forecasts, fit values, and confidence intervals for forecasts, and fit values for each series
- Filter output to a fixed number or percentage of best- or worst-fitting models
- Save predicted values, lower confidence limits, upper confidence limits, and noise residuals for each series back to the dataset
- Specify forecast period, treatment of user-missing values, and confidence intervals
- Export models to an XML file for later use by TSAPPLY

Statistics Forecasting Features

TSAPPLY

Apply saved models to new or updated data:

- Simultaneously apply models from multiple XML files created with TSMODEL
- Re-estimate model parameters and goodness-of-fit measures from the data, or load them from the saved model file
- Selectively choose saved models to apply
- Override the periodicity (seasonality) of the active dataset
- Choose from the same output, fit measure, statistics, and options as TSMODEL
- Export re-estimated models to an XML file

SEASON

- Estimate multiplicative or additive seasonal factors for periodic time series:
  - Choose either a multiplicative or an additive model
  - Calculate moving averages, ratios, seasonal and seasonal adjustment factors, seasonally adjusted series, smoothed trend-cycle components, and irregular components

SPECTRA

Decompose a time series into its harmonic components, a set of regular periodic functions at different wavelengths or periods:

- Produce/plot univariate or bivariate periodogram and spectral density estimates
- Produce/plot bivariate spectral analyses
- Smooth periodogram values with weighted moving averages
- Smooth, using available spectral data windows: Tukey-Hamming, Tukey, Parzen, Bartlett, equal weight, no smoothing, and user-specified weights
- Produce high-resolution charts: Periodogram, spectral and cospectral density estimate, squared coherency, quadrature spectrum estimate, phase spectrum, cross amplitude, and gain

Statistics for Data Analysis solution

Add more analytical power, as you need it, with optional modules and stand-alone software from the Statistics for Data Analysis family.

Statistics Base

Statistics Base includes the core capabilities to take the analytical process from start to finish. It is easy to use and includes a broad range of procedures and techniques to increase revenue, outperform competitors, conduct research and make better decisions.

Statistics Advanced

Statistics Advanced includes these powerful multivariate techniques: generalized linear models (GENLIN), generalized estimating equations (GEE), mixed level models, general linear mixed models (GLMM), variance component estimation, MANOVA, Kaplan-Meier estimation, Cox regression, hiloglinear, loglinear and survival analysis.

Statistics Bootstrapping

Statistics Bootstrapping enables researchers and analysts to use bootstrapping techniques on a number of tests contained in Statistics for Data Analysis modules. This provides an efficient way to ensure that your models are stable and reliable. With Statistics Bootstrapping, you can reliably estimate the standard errors and confidence intervals of a population parameter like a mean, median, proportion, odds ratio, correlation coefficient, regression coefficient and numerous.

Statistics Categories

Unleash the full potential of your categorical data through perceptual maps with optimal scaling and dimension reduction techniques. This add-on module provides you with everything you need to analyze and interpret multivariate data and their relationships more completely.

Statistics Complex Samples

Incorporate complex sample designs into data analysis for more accurate analysis of complex sample data. Statistics Complex Samples, with specialized planning tools and statistics, reduces the risk of reaching incorrect or misleading inferences for stratified, clustered or multistage sampling.

Statistics Conjoint

Statistics Conjoint helps market researchers develop successful products. By performing conjoint analysis, you learn what product attributes are important in the consumer's mind and what the most preferred attribute levels are, and can perform pricing studies and brand equity studies.

Statistics Tables

Use Statistics Tables to present survey, customer satisfaction, polling and compliance reporting results. Features such as a table builder preview, included inferential statistics and data management capabilities make it easy to clearly communicate your results.

Statistics Preparation
With Statistics Preparation, you gain several procedures that facilitate the data preparation process. This add-on module enables you to easily identify suspicious and invalid cases, variables and data values; view patterns of missing data; summarize variable distributions to get your data ready for analysis; and more accurately work with algorithms designed for nominal attributes.

Statistics Decision Trees
Create highly visual classification and decision trees directly within Statistics for Data Analysis for segmentation, stratification, prediction, data reduction and variable screening, interaction identification, category merging and discretizing continuous variables. Highly visual trees enable you to present results in an intuitive manner.

Statistics Direct Marketing
Statistics Direct Marketing helps marketers perform various kinds of analyses easily and confidently, without requiring a detailed understanding of statistics. They can conduct recency, frequency and monetary value (RFM) analysis, cluster analysis, and prospect profiling. They can also improve marketing campaigns through postal code analysis, propensity scoring, and control package testing. And they can easily score new customer data and access pre-built models.

Statistics Exact Tests
Statistics Exact Tests always provides you with correct p values, regardless of your data structure, even if you have a small number of cases, have subset your data into fine breakdowns or have variables where 80 percent or more of the responses are in one category.

Statistics Forecasting
Improve forecasting with complete time-series analyses, including multiple curve-fitting, smoothing models, methods for estimating autoregressive functions and temporal causal modeling. Use the Expert Modeler to automatically determine

which ARIMA (autoregressive integrated moving average) process or exponential smoothing model best fits your time-series and independent variables, eliminating selection through trial and error.

Statistics Missing Values
If values are missing from your data, this module may find some relationships between the missing values and other variables. In addition, the missing values module can estimate what the value would be if data weren't missing.

Statistics Neural Networks
Use the Statistics Neural Networks module to model complex relationships between inputs and outputs or to discover patterns in your data. Choose from algorithms that can be used for classification (categorical outcomes) and prediction (numerical outcomes). The two available algorithms are Multilayer Perceptron and Radial Basis Function.

Statistics Regression
Predict behavior or events when your data go beyond the assumptions of linear regression techniques. Perform multinomial or binary logistic regression and nonlinear regression, weighted least squares, two-stage least squares and probit analysis.

Complementary product
Use these products with Statistics for Data Analysis to enhance your analytical results.

Statistics Amos
Support your research and theories by extending standard multivariate analysis methods when using this stand-alone software package for structural equation modeling (SEM). Build attitudinal and behavioral models that more realistically reflect complex relationships, because any numeric variable, whether observed or latent, can be used to predict any other numeric variable. The latest release includes a new nongraphical method of model specification that improves accessibility for users who need scripting capabilities and enables large, complicated models to be run more quickly.