



Analytics

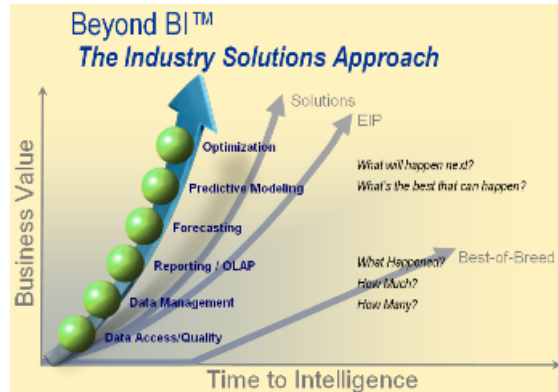
SAS Intelligence Platform

At SAS, we've spent more than a quarter of a century building and refining comprehensive business intelligence and analytics software. "In a time of rapid change, success or failure depends on how quickly information becomes knowledge and knowledge fuels decisions," says SAS CEO and founder Dr. Jim Goodnight. "Business intelligence and business analytics help create this knowledge and intelligence for faster, more accurate decision making."

SAS delivers the industry's widest portfolio of analytics – ranging from simple data exploration to advanced modeling capabilities. SAS Analytic Intelligence is a versatile, integrated platform for a wide range of analysis. Its capabilities include predictive modeling and descriptive analytics, data and text mining, time series and forecasting, operations research and more. SAS analytics are being used extensively in education. SAS partners with universities and business schools to incorporate our award-winning analytics into courses and subjects as diverse as marketing, finance, molecular biology, geology, engineering, life sciences, business studies and, of course, statistics to prepare students for the workplace. SAS analytics are, after all, the industry norm in life sciences, and over 40 000 businesses use SAS to acquire, disseminate and analyze information to drive decision-making.

Dr. S.C. Mukherjee, Director, Central Institute of Fisheries Education in India says, "The advanced functionalities and versatility of SAS solutions, coupled with its global recognition of being the solution for scientific data analysis in general and breeding data analysis in particular, made SAS an obvious choice to meet our research data analysis needs at CIFE." Dr. Fay Cobb Payton, Assistant Professor of Information Technology at N.C. State University comments, ""SAS keeps me current in a field that changes every day. And it gives my students a leg up when they go into the work force because they can make decisions from a data warehousing or data mining perspective or a data analysis and data quality perspective that they wouldn't have gotten from a regular database class."

SAS' analytical tools build on each other. To begin, this article will touch on the tools that help us explore data, then move on to those that help us predict and forecast and finally to the pinnacle of optimization.



Exploring Data with SAS/STAT, SAS Enterprise Miner and SAS Text Miner

Descriptive modeling uses summary statistics and graphics to describe the distribution of the data as well as cluster the data into more homogeneous groups. Predictive modeling tries to find good rules (models) for predicting the value of one or more responses in a data set from the value of the other explanatory variables in the data set. Collectively both techniques provide the means to explore the data - summarize data, analyze data and make intelligent business or research decisions based on the data.

Use SAS STAT (<http://www.sas.com/technologies/analytics/statistics/stat/index.html>) for statistical data analysis to take you from the first stages of study planning and design, through the knowledge discovery process, and on to the final goal of using your data to make informed inferences and action plans for the future. Existing procedures are constantly being enhanced and new procedures are being developed in order to reflect the latest advancements in statistical methodology.

With SAS/STAT you can do:

- Analysis of variance
- Regression
- Categorical data analysis
- Multivariate analysis
- Psychometric analysis
- Cluster analysis
- Survival analysis
- Nonparametric analysis
- Survey Data analysis
- Multiple imputation
- Study planning
- Power and Sample Size Computation
- Point-and-click interfaces

Dr Miguel Usabel, vice deacon at Carlos III University in Spain, a university that teaches SAS in numerous courses in order to best prepare students for the workplace, recognizes the strength and leadership of SAS for statistics. He says, "SAS stands out because of the

power of its statistical analysis”.

SAS’ integrated data mining and text mining capabilities uncover insights quickly from information contained in structured data as well as unstructured data in large document collections. Furthermore, with new releases of both SAS Enterprise Miner and SAS Text Miner shipping this autumn, predictive analytics from SAS just got even better.

SAS Enterprise Miner (<http://www.sas.com/technologies/analytics/datamining/miner/>) helps provide you with the ability to go beyond reporting **what has happened** in your business, research or academic organization to discovering **why** it has happened. SAS Enterprise Miner streamlines the entire data mining process from data access to model assessment by supporting all necessary tasks within a single, integrated solution. With SAS Enterprise Miner, a comprehensive set of algorithms enable you to build descriptive and predictive models of the real world based on data collected from a variety of sources.

The key features of SAS Enterprise Miner are:

- Multiple interfaces
- Easy-to-use graphical reports
- Scalable processing
- Accessing data
- Sampling
- Data partitioning
- Transformations
- Web mining

In addition, SAS Text Miner

(<http://www.sas.com/technologies/analytics/datamining/textminer/index.html>) provides a rich suite of tools for discovering and extracting knowledge from text documents. It transforms textual data into a useable, intelligible format that facilitates classifying documents, finding explicit relationships or associations between documents, clustering documents into categories and incorporating text with other structured data to enrich predictive modeling endeavors and drive research initiatives forward.

Text mining can be described as a three-step process: accessing the unstructured text, parsing the text and turning it into actionable data and analyzing the newly created data. For each step, SAS Text Miner provides state-of-the-art tools that enable organizations to efficiently extract intelligence from large text collections.

SAS Text Miner offers:

- Universal data access
- Support for multiple languages and text parsing in eight languages
- Self-documenting interface
- Comprehensive text pre-processing capabilities
- Extensive feature extraction
- Dimension reduction techniques
- Text clustering algorithms

- Interactive results window
- Data categorization

Forecasting with SAS Forecasting Technologies

SAS Forecasting Technologies

(<http://www.sas.com/technologies/analytics/forecasting/brochures.html>) enable you to gain an accurate picture of the future and reliably measure the impact of any given factors. In the case of strategic business planning, for example, you must be able to model and simulate any process and the factors that impact those processes - no matter how complex.

With SAS forecasting technologies, you can accurately analyze and forecast processes that take place over time. This is useful in research projects to identify previously unseen trends and anticipate fluctuations in order to effectively plan for the future. Factors that, for instance, impact a given organization such as the economy, market conditions, customer demographics, and marketing activity and so on, can be identified, quantified and included in your forecasting processes for improved results.

SAS/ETS enables you to forecast and analyze processes that take place over time. It is designed for forecasters, econometricians and analysts responsible for or supplying information to business planning processes and decisions. SAS/ETS is desirable for anyone needing breadth and flexibility to address their modeling, forecasting and simulation needs. SAS/ETS offers a broad array of time series, forecasting and econometric techniques enabling you to model, forecast and stimulate business processes.

SAS/ETS is complemented by SAS High-Performance Forecasting, a product designed for large-scale automated forecasting. SAS High-Performance Forecasting automatically selects the best-fitting model, mathematically optimizes the model parameters and forecasts. SAS High-Performance Forecasting uses not only the past history of each item being forecast, but will also determine if any additional information supplied to the system is relevant to the forecasting process.

The latest forecasting product from SAS, which is designed for enterprise-wide forecasting tasks, is SAS Forecast Server, to be released by the end of 2005. SAS Forecast Server is a large-scale automatic forecasting solution that offers unsurpassed scalability enabling automatic diagnostics and statistical forecasting of millions of data series in batch or through the user friendly interactive graphical interface. The new SAS Forecast Studio user friendly interface addresses the needs of novice forecasters while still meeting the needs of the more experienced analyst, providing layers of sophistication that can be accessed as needed. SAS Forecast Server automatically selects the best forecasting model from an unlimited repository of candidate models, mathematically optimizes all forecasting model parameters, and generates high-quality forecasts as well as a broad offering of automatic and statistical capabilities. The SAS Forecast Server bundle includes SAS High-Performance Forecasting, SAS/ETS and the new SAS Forecast Studio interactive graphical interface.

Optimization with SAS/OR

Operations research, also known as Management Science, can be defined as the use of mathematical models, statistics and algorithms to aid in decision-making. SAS/OR software enhances the value of the descriptive and predictive information created elsewhere in SAS and extends the decision-making power and reach of its users. The product enables users to consider alternative actions and scenarios, handle more intersecting requirements and restrictions on available actions, and add structure and repeatability to decision-making processes.

SAS/OR software brings together essential modeling, optimization, and scheduling capabilities in an integrated and adaptable environment:

1. Mathematical programming and optimization
Sophisticated mathematical programming solutions that can help determine the best use of limited resources to achieve objectives. With these methods you can solve a wide range of problems, including resource allocation and distribution, product mix and blending, production planning, capital budgeting, asset allocation, portfolio selection and staffing.
2. Project and resource scheduling
The project management capabilities give you the flexibility to plan manage and track projects through a single integrated system. The software is adept at handling complicated situations such as multiple project record keeping, resource priorities, complex project calendars, substitutable resources, multiple precedence relationships and activity deadlines.
3. Powerful simulation modeling environment
SAS/OR's QSIM application provides a graphical drag-and-drop modeling environment for modeling and analyzing queuing systems using discrete event simulation. QSIM requires no programming and provides an extensive menu of prebuilt sampling, queuing, logical routing, and monitoring components so you can build sophisticated models quickly.

SAS/OR provides a broad array of optimization, scheduling, and simulation techniques for strategic and tactical planners. The depth of detail and realism in SAS/OR's modeling capabilities and control in optimization and scheduling processes, along with SAS' integrated approach to data access and information delivery, enables organizations to identify, understand and distribute the best answers to their complex planning problems, providing the basis for better decision making. SAS/OR is designed for people in any Industry with operations research/management science or similar training who are seeking to build and solve decision guidance models

All of these analytical products and tools are used in more than 2,000 academic institutions worldwide that are members of the SAS Academic Program. If you would like to know more about these or any other of our academic offerings, email

aigeditor@sas.com, and we'll put you in touch with the Academic Program Manager in your country.

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