Katharina Lankers, SCHOTT Research and Development Scientist

CHALLENGE

To develop more efficient production processes.

SOLUTION

JMP Scripting Language is being used in production processes to automate data access, analysis and visualization.

RESULTS

JMP Scripting Language allows SCHOTT engineers to bypass previously redundant tasks and arrive at more-informed decisions faster than ever. The result is consistent improvement in the quality of products and an increase in yield.

A stitch in time

A SCHOTT AG research and development scientist is using JMP® Scripting Language to troubleshoot, optimize and stabilize production processes.

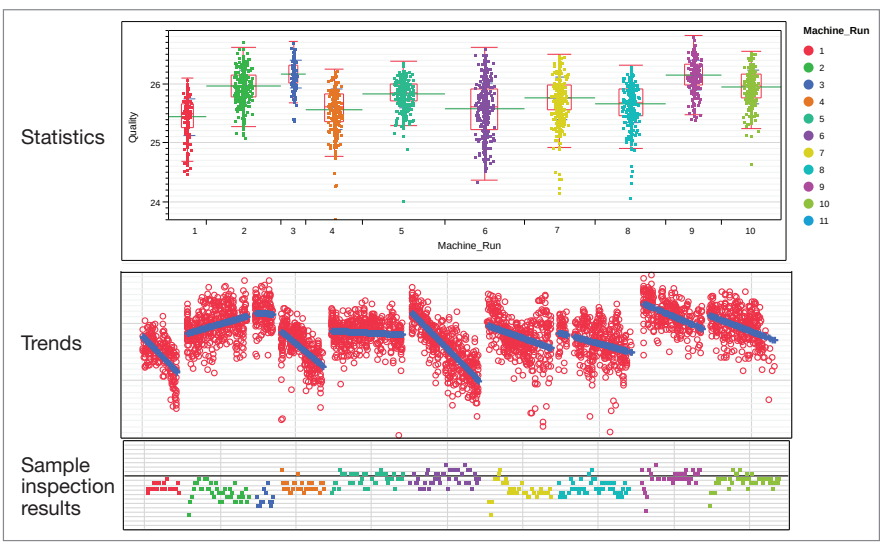
JMP software allows engineers at SCHOTT AG, a Germany-based manufacturer of high-quality industrial glass products, to make more-informed decisions more quickly. In its production processes, SCHOTT engineers gather enormous quantities of data that they then can use for process optimization – that is, if those engineers are able to draw the proper conclusions within a reasonable time period.

JMP Scripting Language allows them to do so.

JMP Scripting Language (JSL) is an interpreted scripting language that's executed at run time. It allows JMP application platform objects to be manipulated in a coherent and coordinated way. JSL is capable of creating complex object-oriented GUI and data-visualization toolsets in the JMP application environment.

SCHOTT uses JSL to troubleshoot, optimize and stabilize its production processes. Data access, analysis and visualization are automated according to specific requirements. Customized user interfaces help manage these procedures quickly and easily, and output reports allow SCHOTT engineers to make timely and appropriate interpretations and, therefore, better-informed decisions.

"JMP is helping stabilize and optimize processes with no loss of time. Yield data, machine settings, inspection results and possible correlations are made available with a few clicks of the mouse."



An automatically generated report shows all relevant process information needed for further decisions.

"They (SCHOTT engineers) very much like the scripts, which help them to get quicker results, avoid annoying routines or solve more complex tasks."

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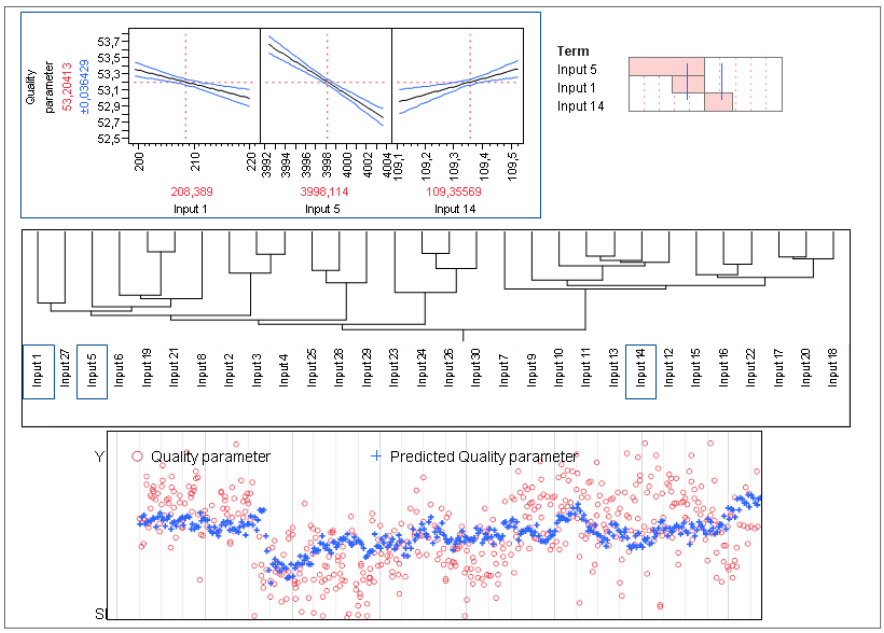
SCHOTT AG



SCHOTT has automated the selection of relevant process variables with a script combining partitioning, clustering and modeling.

The result, says Katharina Lankers, a SCHOTT Research and Development Scientist, is daily time savings and optimal analysis. The bottom line is a consistent improvement in the quality of SCHOTT products and an increase in yield.

Ever improving

SCHOTT AG employs some 17,500 people in 45 countries, producing glass products for a wide range of industries, primarily household appliances, pharmaceuticals, solar energy, electronics, optics and automotive.

SCHOTT products include glass-ceramics for fireplaces and stoves, tubing for syringes, glass-ceramic mirror substrates for use in astronomy, LED lighting systems for the aviation industry and receivers for solar power plants.

For more than a century, SCHOTT has been defined by its quest for innovation. It now has a research and development staff of more than 600, located across the globe. New products – including improved glasses and glass-ceramics and new coating technologies – consistently account for more than 30 percent of sales.

Lankers works in SCHOTT's Mathematical Simulation and Optimization department in Mainz, Germany. Her group's expertise lies primarily in fluid and structural mechanics, thermodynamics, electromagnetism, chemistry optimization and process control. Lankers is responsible for data analysis, supporting all production units.

Lankers began using JMP about seven years ago to develop model-based process controllers. She was dealing with a tremendous amount of data. "I was using several other software packages, got to know JMP, and switched almost immediately. It was so intuitive," Lankers says. "Ever since, I've worked almost exclusively with JMP."

JMP provides the foundation for informed discussions and decisions. "It's an extremely interactive tool," she says.

JSL is now allowing SCHOTT engineers to get right to the heart of their data. "Very often," Lankers explains, "you have to do the same things over and again with your data – always the same things over and again for another process, another day – and it can get to be very tedious."

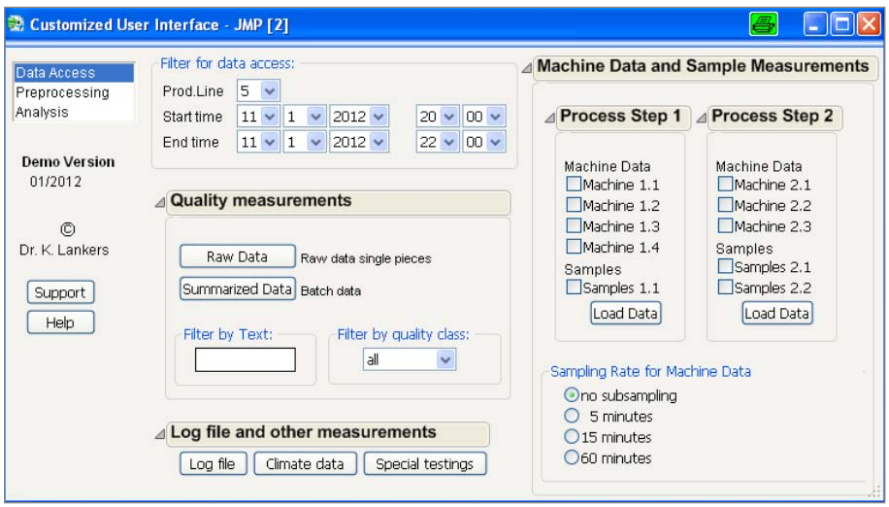
JSL allows Lankers to automate the preparation of routine analyses and reports. It's used to visualize and analyze a number of processes: machine monitoring, evaluation of sample inspections and special testings, readjusting machine parameters and determining the best settings – all for the purpose of continuous quality improvement.

With a few mouse clicks, engineers can extract from a database all relevant process parameters, preprocessed and analyzed, and JMP presents the results in a customized summary report saved as a basis for further discussions.

"When our engineers come to work in the morning, they start a script, receive a report and can decide immediately what to do without spending a lot of time on analysis. They have more time for doing more important things. JMP helps them optimize the production process.

"That's why I say, 'Let JMP work for you.' Just write a script and tell JMP what to do for you. Then you can start with more interesting things, not always the same analysis again and again," Lankers says.

A recent example involved the production of solar cells for photovoltaic modules. Using JSL, Lankers developed a comprehensive library of scripts, which the engineers employed in their daily work. The resulting reports and statistical evaluations generated by the scripts helped them to adjust process settings very quickly, and SCHOTT has now gained a much-improved yield and enhanced quality.



A customized user interface manages data access, analysis and visualization.

Another JSL application concerned the problem of feature selection, which arises in many production processes: determining – from among a great many potential influences – a few possibly relevant parameters. Using JSL scripts, Lankers combined analytical methods like partitioning, clustering and modeling to develop a universal tool that treats this problem. This otherwise tedious search within a huge variable set is performed automatically, and the user of the tool can quickly focus on a handful of relevant process variables that are extracted and visualized by the script.

When in a hurry …

"I use JMP for everything," Lankers says, and she uses the full gamut of the tools it offers. A frequent application is for multivariate analyses or modeling tasks. "It's very easy to construct models," she says. "I like that you don't have to enter code into the graphical user interface, like with some software. You simply click something and choose the columns of your tables, and you immediately see the results. That's what makes the software so easy to use, even for colleagues who are not familiar with mathematical analyses and programming."

In fact, Lankers' colleagues have embraced JMP: "They like it very much. They find it helpful in quickly analyzing their data. For example, they do a special test during a process in which they change some parameters, and a few hours later they get results, and they can immediately load the data into JMP and look at what has happened. And they can see if it was better or worse and decide whether to change anything.

"And, of course, they very much like the scripts, which help them to get quicker results, avoid annoying routines or solve more complex tasks."

Lankers always uses JMP to present her findings to management. "I like having all these tools together in one software package – the data preparation and visualization tools, the design of experiments, SPC and various modeling. It's very easy to handle, and so intuitive. You see what you're doing by simply clicking on your data. We like the interactive component a lot."

The payoff: JMP is helping stabilize and optimize processes with no loss of time. Yield data, machine settings, inspection results and possible correlations are made available with a few clicks of the mouse.

At SCHOTT, the use of JSL has been a classic case of "a stitch in time saves nine."

Or, as Lankers puts it, "When you're in a hurry, walk slowly. Write a script."

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