International DATALYZER
Partners in Continuous Improvement

Optimizing Automatic SPC Import

Marc Schaeffers
DataLyzer International
USA, Netherlands, India

1 Introduction

DataLyzer was the first company to ever offer an automated SPC software solution back in 1979. In the first decades, control chart data was mainly entered manually or through gages. In the last decade we see a strong increase in automatic import due to new available technology and strong reduction in cost of sensors.
This raises a few new challenges. Some technical and some organizational.
Technical Challenges:

- The number of special situations and customizations during import is growing fast
- Even small customizations require time and money because program cycles need to be followed and for each change everything needs to be tested

Organizational Challenges

- How do we inform the operator when a process is out of control
- How can we inform the operator real-time
- How do we ensure that operators will follow the out of control procedure

2 Special import

A company has many data sources in many different formats. Some examples:

- PLC
- CMM
- Test equipment
- Gages, cameras, sensors with different kind of outputs
- Visual inspection and manual data entry
- Suppliers
- Etc etc

Most suppliers of measurement systems export information to ASCII (txt, csv, Json, XML) or Excel files. The flexibility is of course very appealing, but it results in many exception rules. The fact that a specific customization is required during the import is more the rule than an exception.
In theory it is possible to offer a user interface which handles all these exceptions, but it will make the user interface very complex and most exceptions will never be used.

So, in DataLyzer we came up with a very simple and elegant solution. We allow the end user to program the exceptions themselves.
In our Import Service Manager, you can now integrate a Python script to customize the import

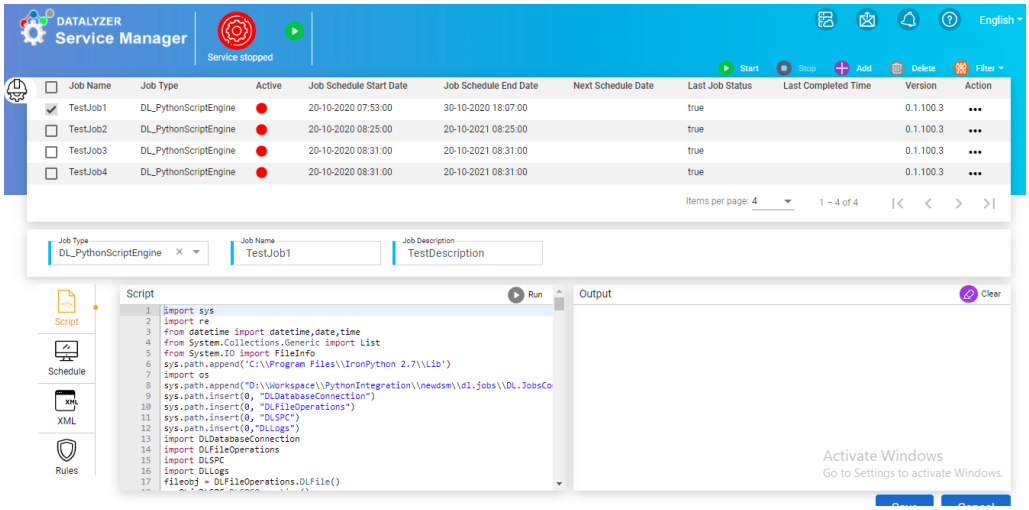

Figure 1: Webbased service manager with Python job

How does it work?

DataLyzer provides a script which will import from any source. Most implementations are based on importing from ASCII or Excel files. The script offers libraries to read from files and write to DataLyzer. The part where the data is read and configured to send to DataLyzer is available in source code. Even without much experience an end user can make small customizations to solve specific needs.
If the end user doesn't have programming capacity DataLyzer can alter the script but the advantage is that we don t have to develop and test a full new version of the service manager.

The advantages for the end user are:

- More flexibility in customizations
- Much faster implementation of customizations
- Cost reduction for customizations

3 Out of Control Procedure with Automatic SPC

The risk of implementing automatic data collection whether it is a control system, a camera system, a quality measurement system or an SPC system is that the operator is not involved in the out of control cycle.
Automatic SPC will make it much easier to detect an out of control condition, but the operator must be actively involved in the out of control loop, otherwise we will only know at the end of the day when exactly something went wrong and how much scrap was produced, but no action was taken to find the root cause and correct the problem when it happened.
It is also important we adjust SPC rules to minimize the amount of false alarms (Please see our whitepaper Big data and SPC).

On the shop floor we present the control charts to the operator. The number of charts can be very large so we must have an option to provide a view for the operator with only the charts with recently added data.
The operator has an option to activate a special recent status page. On this page the charts will be visualized which were measured in the last X minutes and will be sorted in time.

Dashboard / Grid view

Dashboard

Automatic import status | Machine 1 | Machine 2

Sequence/Characteristics	Date/Time	LastAvg	LastRng	LSL	Target	USL	LCLX	Average	Range	UCLX	C
PLC machine 1											
DC0815	29/10/20 10:18	14.3333	1.0000	0.00	10.00	20.00	12.3602	13.4235	1.0394	14.4868	
DC333	29/10/20 10:18	14.0000	2.0000	0.00	10.00	20.00	13.1839	14.8889	1.6667	16.5939	
DC4711	29/10/20 10:19	15.3333	1.0000	0.00	10.00	20.00	13.2069	13.8889	0.6667	14.5709	
Keyence import											
16 Diameter Ø44.6 F8	29/10/20 10:17	44.64000	0.01000	44.625	44.600	44.664	44.63337	44.64667	0.00500	44.6599	
21 Diameter Ø60	29/10/20 10:17	60.01000	0.01000	59.400	60	60.600	59.97840	60.00500	0.01000	60.0316	
6 Linear 4.9	29/10/20 10:17	5.50000	1.00000	4.900	4.900	5.100	4.25310	5.20250	0.50500	6.15190	

Figure 2: Recent status automatic import

Within 5 seconds after an import is finished the recent status page will be updated with the latest measurements and these charts will stay on the screen for the user defined period.
When operators see an out of control, they can open the chart and follow the out of control action procedure.

If the operator is not regularly in the area of the PC an Andon light can be activated to notify the operator to look at the recent status page.

4 Conclusion

Full automatic data collection is being used more and more in manufacturing, but standardization for data exchange is still far away so customers need a flexible solution which also supports involvement of the operator in the out of control procedure.
DataLyzer offers a new solution to integrate a programming option in Python in the DataLyzer tools and which also provides special screens to alert the operator about out of controls in full automatic data collection

5 Contact

For further information, please contact DataLyzer International:

Europe

DataLyzer International bv
Eindhoven
Netherlands
Tel : +31-40-2940980
Email: sales@datalyzer.com
https://www.datalyzer.com

USA

DataLyzer International Inc.
Wixom, MI 48393, USA
Tel : +1-248-960-3535
Tel : +1 800-553-4772 USA only
Email: sales@datalyzer.com

Asia

DataLyzer India
Bangalore
India
Tel: + 91 8026615292
Email: salesindia@datalyzer.com