

Product Review: Qualitative Labeling as a Basis for the Automated Handling of Business Processes

Deep Qualicision AI Framework

Qualitative Labeling as an integral part of the Deep Qualicision AI framework involves the preparation of raw business process data for machine learning procedures. It is based on a qualitative evaluation of the data that are directly measurable in business processes using KPIs and on an analysis of relations within these data. This automated process establishes an algorithmic bridge between the raw business process data that have not yet been prepared and artificial intelligence (AI) methods. Hence, as a basis for data labeling the effort involved in the highly complex process of manual data analysis is reduced significantly.

Qualitative Labeling is a machine learning method involving the automatic detection of KPI goal conflicts and KPI goal compatibilities in business processes. This is done by evaluating corresponding data using extended fuzzy logic and special clustering methods. Thus, KPI goal conflict analysis allows business process data to be classified automatically to use the data for other AI-related purposes based on the relations identified from the raw business process data.

The automated identification of qualitative labels is vitally important for the application of AI methods to business process data, because such data is continuously evolving as the business processes themselves change. By way of contrast to applications such as image or speech recognition, in which data patterns that have been labeled once remain static, the business process data patterns that need to be labeled are dynamic and characterized by ever-changing structures; the mix of orders and process states are just some of the

attributes that are likely to change on a regular basis.

Qualitative Labeling as part of the PSI Framework for Industrial Intelligence

The general validity of the procedure means that any existing PSI software that operates on the basis of processing KPIs can be used as a KPI labeling

to ensure that extensions of this kind are possible in the future without any exceptions, Qualitative Labeling will form part of the PSI framework for industrial intelligence.

An Easy Way to Get Started with the Qualitative Labeling of Business Process Data

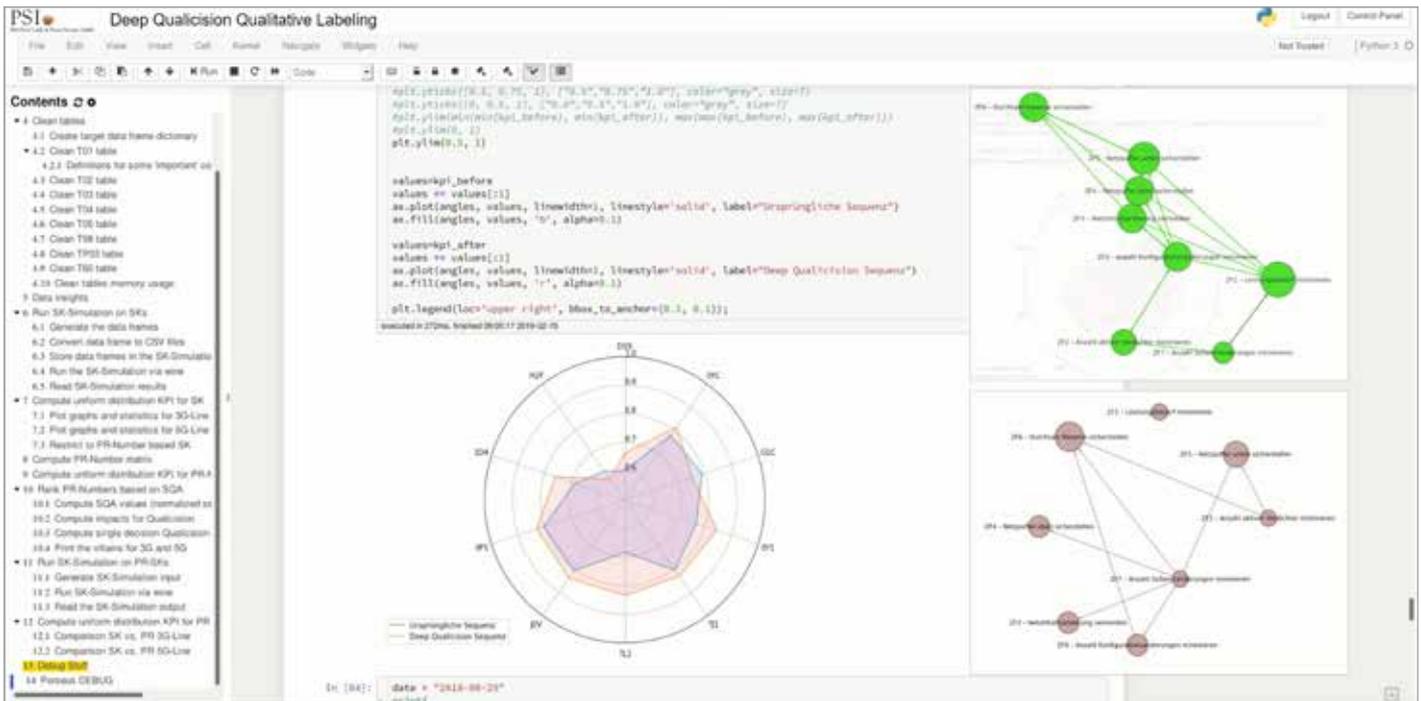
The PSI framework ensures that getting started with the procedure is remarkably easy from the customer's perspective. If a company wants to generate qualitatively labeled data on the basis of a business process, the first step is to determine the key performance indicators (KPIs) and criteria that will be used for quality evaluation. Once this step is completed, raw business process data can be evaluated



Deep Qualicision GUI with visualized clusters of qualitative labels.

machine. This means that any existing PSI application can be supplemented with self-learning labeling capabilities that systematically lay the groundwork for the introduction of additional AI functionalities. In order

with reference to these KPIs, and appropriate qualitative labels added to the data. The business process data labeled in this way is much more readily usable in AI applications. The qualitative labels that have been calcu-



The Deep Qualicision AI framework with qualitative labels (right).

lated also make the results more transparent and easier to explain. In many cases, qualitative labels are used as a basis for triggering self-adjustment by optimization algorithms, transforming the traditional process of optimization into a learning optimization procedure.

Self-Learning Field Force Management 4.0

PSIcommand is an example of a use case, in which the procedure described above is already being used successfully. Here, Qualitative Labeling is used for self-learning identification of configuration parameters for field force optimization in connection with maintenance and troubleshooting of electricity grids. The underlying KPIs describe how teams are efficiently assigned to maintenance operations. Around 30 KPIs are used for the Qualitative Labeling of the business process data.

Over 100000 maintenance and troubleshooting operations are distrib-

uted to hundreds of employees every year. The complexity of the business process means that identifying relevant relations by labeling the data manually would require an unrealistic amount of time and effort.

Machine Learning for all PSI Software Tools

Qualitative Labeling is used here as an extending functionality of a connectable machine learning procedure within the framework of the Qualicision-based multicriteria optimization in order to equip an already running PSIcommand application with learning self-adjustments. This means that the optimization itself can respond to relevant changes in the business process data, without requiring any effort (on the part of the user, for example). The upgrade with the Qualitative Labeling algorithms was a completely smooth process from both a technical as well as a substantive perspective, meaning that this use case will serve as a blueprint for the future in-

tegration of machine learning into a PSI software tool. Hence, the procedure can be transferred to any software application based on the associated framework.

Consequently, all the products offered by the PSI Group can be prepared for use in combination with machine learning methods through the Qualitative Labeling of business process data. Examples include the PSI products PSITraffic/BMS, PSIcommand, PSIsaso, PSIpenta/Leitstand/PSIasm, PSIwms and, of course, all the PSI FLS software products that use the Qualicision technology.

PSI is currently working on a Community Industrial Intelligence (CII) project so that Qualitative Labeling can be integrated into the PSI framework for industrial intelligence. 

PSI FLS

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