

BUSINESS INTELLIGENCE SYSTEM ON ERROR IDENTIFICATION AND QUALITY ASSESSMENT OF PROCESS MODELS

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In today's environment of digital transformation of organizations, business processes are a key element of effective management. Their modeling provides understanding, analysis, and improvement of the enterprise's activities. The most common notations used to describe business operations are BPMN, EPC, and IDEF-based notations such as IDEF0 and DFD [1]. However, BPMN has gradually become the dominant standard due to its flexibility, clarity, and support for automation tools [2].

In today's environment of digital transformation of organizations, business processes are a key element of effective management. Their modeling provides understanding, analysis, and improvement of the enterprise's activities. The most common notations used to describe business operations are BPMN (Business Process Model and Notation), EPC (Event-driven Process Chain), and IDEF-based (Integrated DEfinition methodology used by U.S. Air Force) notations such as IDEF0 and DFD (Data-Flow Diagram) [1]. However, BPMN has gradually become the dominant business process modeling standard due to its flexibility, clarity, and support for automation tools [2].

In the proposed concept of a Business Intelligence (BI) system, business process models are processed for further quality assessment (see Fig. 1):

1. At the initial stage, the business process model is converted into a vector of features $[x_1, x_2, \dots, x_n]$ that reflects the structural and semantic properties of its elements.
2. Each element is compared with the corresponding modeling rules $[f_1, f_2, \dots, f_n]$ that define the permissible combinations of relationships, events, tasks, and gateways.
3. For this purpose, a comparator $K(y_1 = f_1(x_1), y_2 = f_2(x_2), \dots, y_n = f_n(x_n))$ is used to generate a logical result – 1 if the rules are followed, 0 if they are violated.

Next, the evaluation results are aggregated to obtain an overall model quality metric $Q_{BPMModel}$. Each model contains a set of elements, and a compliance indicator is determined for each element. Averaging these results allows to obtaining an integral characteristic of the quality of the entire business process model. This forms a universal indicator that can be used to compare different models with each other or to track changes in quality during business process optimization.

The results of model quality assessment are stored in a data warehouse implemented as an SQL (Structured Query Language) relational database. This enables further analysis, report generation, and visualization of results on the dashboard. The analytics dashboard displays quality indicator dynamics, number of errors, frequency of modeling rule violations, and other statistical parameters. This approach allows you to automate the model quality control process, increase the efficiency of analysts, and reduce the time spent on manual verification.

Therefore, a business analytics system for identifying errors and assessing the quality of business process models is an important tool for supporting management decisions. It integrates methods for formalized verification of modeling rules, analytical aggregation of indicators, and visualization of results. This provides a comprehensive view of the quality of

process modeling in the organization and creates a basis for further improvement of business processes in accordance with modern BPM standards [1–4].

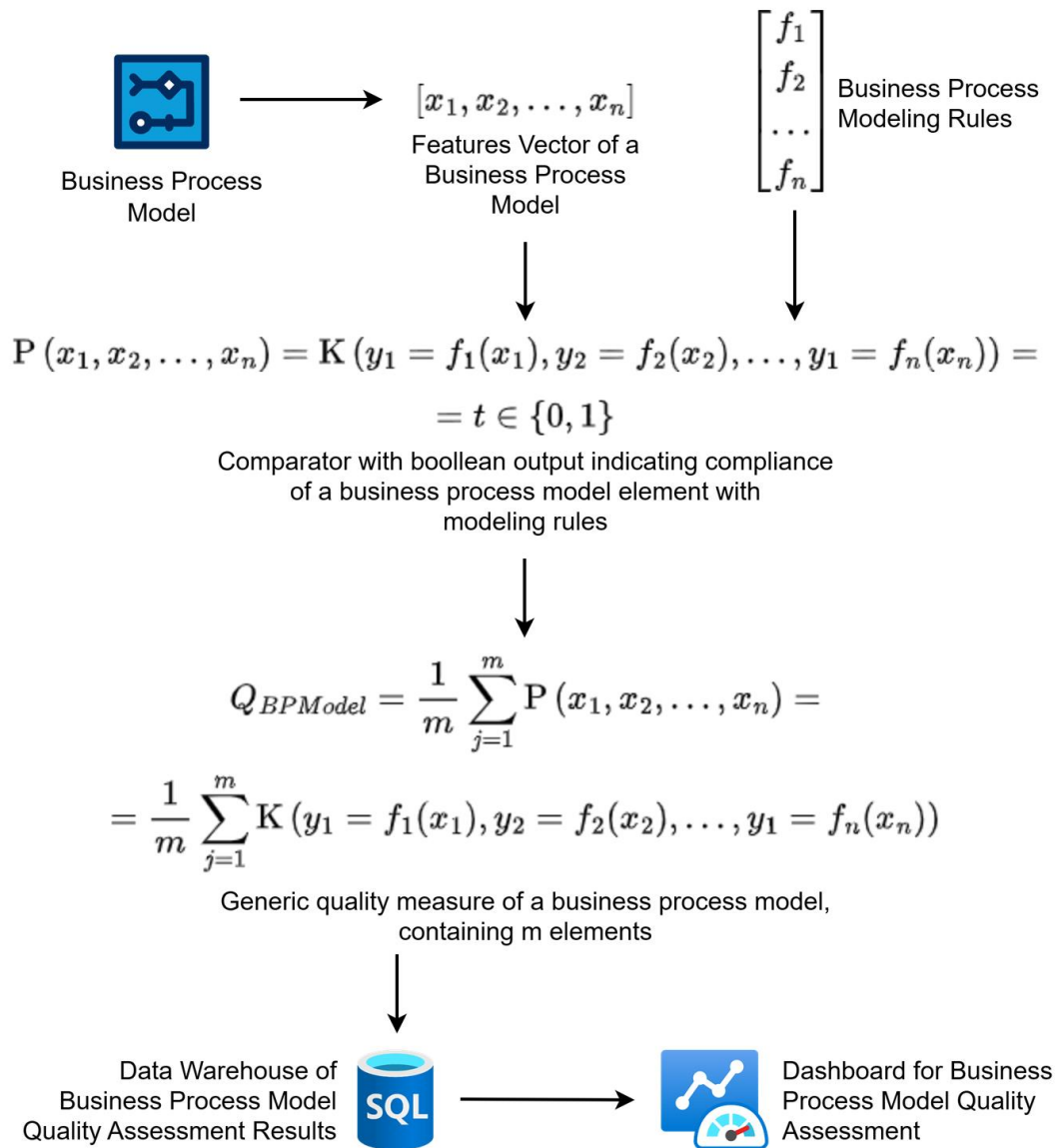


Figure 1 – Concept of a Business Intelligence (BI) system for error identification and quality assessment of business process models

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