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TOWARDS THE CONTINUOUS QUALITY ANALYSIS OF BUSINESS PROCESS MODELS INSPIRED BY CODE METRICS

This study considers continuous integration and deployment techniques used in software engineering projects as the source of inspiration for continuous quality analysis of business process models. Modern business process modeling notations and languages are executable workflow descriptions given using also source code files. Thus, they can be put under version control and automated quality analysis by applying metrics also used in software engineering.

Business process modeling helps to describe, analyze, and improve company activities. This allows to increase the efficiency of organizational operations, as well as to reduce their costs and time. Business process modeling helps to capture chains of events, procedures, and documents related to a specific business process and allows to analyze connections between different stages of a business process [1].

A business process model can be given as code, which allows to automate a process of its execution and offers a more efficient and accurate execution of the process. Specialized business process modeling languages such as BPMN (Business Process Model and Notation) or BPEL (Business Process Execution Language) are great examples of such approaches [2].

For example, a business process model can be represented as code using BPMN, which defines information about workflow elements, such as tasks, events, gateways (i.e. decision-making points), etc [2].

However, enterprise business process models could be too large and complicated to be manually checked for quality. Thus, similarly to source code handling in the software engineering field, maintaining large collections of process models requires version control and automated quality analysis [3].

Hence, CI (Continuous Integration) and CD (Continuous Delivery) approaches that are frequently used in software engineering projects [4] are the baseline of the proposed approach. Using these techniques teams can commit business process models to a distributed VCS (Version Control System), such as Git. Here, the VCS will serve as the source for executable BPMN or BPEL files. The quality of business process models should be evaluated using structural metrics and threshold values in the same way, as it is done with software metrics. Business process

models then can be deployed to a workflow execution engine after successfully passing the quality verification stage [4].

Business process modeling metrics inspired by software engineering metrics are the following (Fig. 1) [5]:

– number of activities – NOA;
– number of activities, joins, and splits – $NOAJS$;
– control-flow complexity – CFC.

Here NOA and $NOAJS$ metrics are inspired by the Lines of Code (LOC) metric, CFC is inspired by the McCabe's cyclomatic complexity metric [5]. The threshold values of the considered metrics for moderate eligibility of business process models are the following [5]:

$$12 < NOA \leq 26,\ 17 < NOAJS \leq 33,\ 3 < CFC \leq 9.$$

Hence, we propose the continuous quality analysis of business process models using the workflow is demonstrated in Fig. 1.

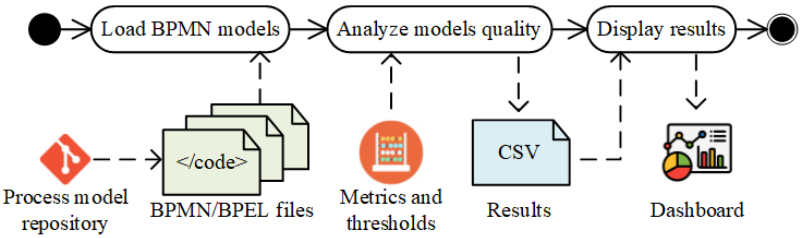

Fig. 1. The continuous quality analysis of business process models

In the future, a software tool for quality analysis of business process models can be developed as part of the CI/CD workflow for process modeling projects.

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