TOWARDS CORRECTNESS ANALYSIS OF BPMN PROCESS MODELS

Kopp Andrii, Sapozhnykov Illia
National Technical University
«Kharkiv Polytechnic Institute», Kharkiv

The study considers the urgent task of ensuring the understandability of business process models by identifying structural errors. The object of the work is the process of identifying structural errors in business process models. The subject of the work is algorithmic and software solution for detecting structural errors in business process models. The purpose of this research is to ensure the understandability of business process models by identifying structural errors and eliminating them. In the study, we used Python programming language and Scikit Learn library to identify structural errors in business process models using the K-nearest neighbors (K-NN) classifier trained on the BPMAI [1] data for BPMN (Business Process Model and Notation) diagrams (Fig. 1). The initial error detection was done using the error probability analysis according to [2]. The basic structural characteristics of business process models considered as connected, directed, labelled graphs [3] were used for classification: numbers of nodes (i.e. process elements) and arcs (i.e. process flows).

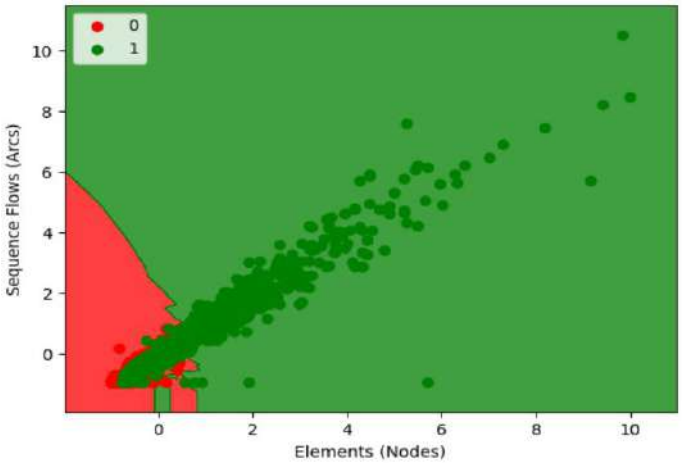

Fig. 1. – K-NN classification results of BPMAI process models (1 – have errors; 0 – correct)

Thus, as a result of checking the performance of the developed algorithmic and software solution, a relatively high quality of the developed classifier was confirmed (F-measure = 0.88), which makes it possible to consider the proposed solution as suitable for use to detect structural errors in BPMN 2.0 business process models.

References:

1. Model Collection of the Business Process Management Academic Initiative // URL: httphttps://doi.org/10.5281/zenodo.3758705

2. Копп А. М., Орловський Д. Л., Лютенко І. В. A software solution to work with a database of business process models and analyze their structural measures. *Вісник Національного технічного університету «ХПІ». Серія: Системний аналіз, управління та інформаційні технології.* 2022. №. 1 (7). С. 61–65.

3. Kopp A., Orlovskyi D. A Method for Business Process Model Analysis and Improvement. *CEUR Workshop Proceedings (CEUR-WS.org)*. 2019. Vol. 2403. P. 1–10.