Extended Abstract: Conceptual Modelling and Artificial Intelligence*

Overview and research challenges from the perspective of predictive business process management

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Abstract. Currently, the visibility of Artificial Intelligence (AI) and society's expectations of AI are very high, particularly compared to other research topics, namely Modelling. However, between Conceptual Modelling (short: Modelling) and AI exist many interesting and important interrelationships. This position paper overviews possible applications of AI for Modelling and Modelling for AI. After this general discussion, the field of predictive business process management is focused as a particular application case of AI and Modelling. Predictive process management uses machine learning for predicting the future state of a running process instance. The paper closes with some general remarks and research challenges.

Keywords: Artificial Intelligence, Modelling, Business Process Modelling, Deep Learning, Explainability

1 Motivation

The field of Artificial Intelligence (AI) receives tremendous public visibility and expectations of the society regarding the transformational potential of AI are extremely high. Although it is not the first time that AI receives so much attention in society, it is safe to say that the field has made some important and remarkable progress, e.g. machine translation, speech recognition, image classification, or playing board games archives results and quality levels which were not foreseen a decade before.

On the other hand, the field of Conceptual Modelling (short: Modelling) does not receive similarly high attention from the general audience. Moreover, from the tremendous success of using data for machine learning often the conclusion is drawn that the explicitly, hand-crafted making of a model which represents a domain is not necessary or useful during system development anymore. Such a negative conclusion about the importance of Modelling is false and dangerous because it is well-known

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that AI in general and machine learning in particular has important application prerequisites and severe limitations under particular application characteristics [1].

Hence, it is much more fruitful to explore and to elaborate the various and rich intellectual interrelationships between AI and Modelling. At the moment, no clear understanding exists in how Modelling and AI fit together. Against this background, the main objective of this position paper is to elaborate on interrelationships between AI and Modelling. As such, this short position paper does not aim to make a final statement on this topic, but it stimulates further discourse.

The paper unfolds as follows: After this introduction, Section 2 frames and position the fields of AI and Modelling. General application potentials of AI and Modelling are overviewed by Section 3. Section 4 focusses on the case of predictive process management. The paper closes with some remarks and research challenges.

To elaborate more deeply on particular challenges, the case of predictive business process management is presented [3]. Business process monitoring is a phase of the business process management life cycle. Typical examples of business processes are order-to-cash, purchase-to-pay, and complaint-to-resolution. Running process instances, also known as cases, are monitored and managed during the process execution, also known as process run-time. Typically monitored parameters and process characteristics are its current status, the executed process steps, the time taken to execute particular steps, or the throughput time (see Fig. 1). The objective of predictive process management is to gain insights about the future of a case. Based on the current case status, the future of the case is predicted. Typical questions are: What will be the next action to be taken for this case? When will the next event occur? When will this case terminate? Will the case be completed on time?

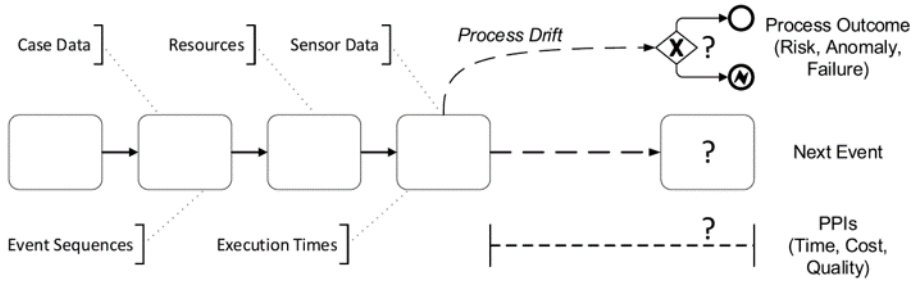

Fig. 1. Input data and predictands of process prediction (source: [2])

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