Model Matching - Processes and Beyond

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Abstract. Conceptual models in general, and process models in particular, have been established as a means to design, analyse, and improve information systems [1]. The creation, utilisation, and evolution of such models is supported by manifold concepts and techniques that offer, for instance, re-use driven modelling support, harmonisation of model variants, model-based system validation, and effective management of model repositories. Many of these techniques share reliance on the identification of correspondences between the entities of different models, also termed model matching. The accuracy and therefore usefulness of techniques supporting the creation, utilisation, and evolution of models is highly dependent on the correctness and completeness of the result of model matching.
This tutorial takes up recent advances in matching process models in particular and provides information systems engineers (both practitioners and researchers) with a comprehensive overview of concepts and matching techniques in this domain. We first clarify terminology and essential notions of process model matching and elaborate on use cases in which model matching proved to be useful tool. Then, we review similarity measures that span the textual, structural, and behavioural dimension of models and form the basis of matching techniques. Although we focus on the case of matching process models, the tutorial also outlines how other types of conceptual models can be matched with these techniques. The tutorial further includes a discussion of practical considerations for the application of process model matching, based on insights from the Process Model Matching Contest conducted in 2013 [2]. Finally, we elaborate on open research challenges related to the integration of user feedback, evaluation measures, and the use of model documentation in the matching process.

1 Tutorial Details

Goals and Objectives. This tutorial provides information systems engineers (both practitioners and researchers) with a comprehensive overview of concepts and techniques for model matching. It gives an introduction to the underlying concepts and algorithms, but also discuss practical considerations. On the one hand, it enables participants to apply process model matching methods as part of specific approaches for process model creation, utilisation, and evolution. On the other hand, participants learn about the state-of-the-art in the field, thereby allow young researchers to identify new research horizons on model matching. At the end of the 90 minutes tutorial a participant will have a basic coverage of the state-of-the-art in model matching (and in particular process model matching) methods.

Scope. The intended audience of the tutorial consists of academics, graduate students and practitioners of information systems engineering, who are interested in research and applications of techniques for model matching. The tutorial will be on a basic level, yet familiarity with essential notions of process modelling is desirable.

Topic Relevance and Novelty. The comparison of different process models is at the core of many approaches that aim at effective creation, utilisation, and evolution of models, which themselves are a means for effective engineering of information systems. Specifically, virtually all approaches to manage process model collections (see the International Workshop on Process Model Collections series[3] or a related special issue on managing large collection of process models in Computer in Industry [3]) rely on techniques for model matching.

In recent years, a large number of techniques for process model matching have been proposed – some of which have been evaluated in the Process Model Matching Contest in 2013.[4] However, it is cumbersome to get a comprehensive overview of the state-of-the-art in this area since most techniques focus on a specific perspective of process model matching (e.g., structural matching or the semantics of activity labels). This tutorial aims at introducing the basic concepts and existing techniques of model matching in a comprehensive and pedagogical manner, enabling the participants to take up existing results for their own applications and research projects. Also, the coverage of practical considerations of model matching benefit participants with an industry background.

References

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3. Dijkman, R.M., Rosa, M.L., Reijers, H.A.: Managing large collections of business process models - current techniques and challenges. Computers in Industry **63**(2) (2012) 91–97

[3] http://processcollections.org/

[4] http://processcollections.org/past/2013-2/matching-contest