

Bachelor/Master Project

Recommender Systems in Support of a Modeling Process

Term: Winter Term 2022/2023

Language: English

Motivation

On a high level the main aim of a recommender system is to provide meaningful recommendations to a group of users. Whereas recommender systems are very well known in such domains as, e.g., e-commerce, a few applications of recommender systems in the field of conceptual modeling may also be found.

Modeling is considered to be a manual task that requires typically a substantial modeling (human) effort encompassing, among others, finding an appropriate abstraction, deciding on the scope of the model, deciding on the appropriate labels to be used. Those decisions might be quite challenging, especially for novice users. Therefore, to support (novice) users in the modeling process, various recommender systems techniques have been proposed.

Description

The main aim of this project is to conduct a critical analysis of existing recommender systems in the field of conceptual modeling. To this aim the existing initiatives (approaches, tools and techniques) should be identified and their utility as well as the level of maturity assessed. Based on the findings, a set of recommendations for the future development of the field should be formulated. Therefore, the project group should:

- (1) Make themselves familiar with basic ideas of recommender systems and the field of conceptual modeling, as well as the way recommender systems can be applied in the field of conceptual modeling.
- (2) Analyze possible ways in which recommender systems can be applied in the field of conceptual modeling and identify existing approaches and tools.
- (3) Define an evaluation framework for the needs of comparison of existing tools/approaches.
- (4) Draw conclusions and formulate the recommendations for the further development.

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Expected Outcomes

A report pointing to the conducted state of the art analysis (cf. point (1) and (2)), requirements and rationale for the evaluation framework, as well as detailed description of the evaluation results. In addition, a final presentation of the project results is expected.

Introductory Literature

- Almonte, L., Perez-Soler, S., Guerra, E., Cantador, I., de Lara, J. Automating the Synthesis of Recommender Systems for Modelling Languages. 2021. ACM SIGPLAN International Conference on Software Language Engineering
- Almonte, L., Guerra, E., Cantador, I. et al. Recommender systems in model-driven engineering. *Softw Syst Model* 21, 249–280 (2022).
- Fellmann M, Metzger D, Jannaber S, et al (2018) Process Modeling Recommender Systems - A Generic Data Model and Its Application to a Smart Glasses-Based Modeling Environment. *Business & Information Systems Engineering* 60:21–38
- Koschmider A, Hornung T, Oberweis A (2011) Recommendation-based editor for business process modeling. *Data & Knowledge Engineering* 70:483–503.
- Kuschke T, Mäder P (2014) Pattern-based auto-completion of UML modeling activities. In: *Proceedings of the 29th ACM/IEEE international conference on Automated software engineering*. ACM, New York, NY, USA, pp 551–556
- Born M, Brelage C, Markovic I, et al (2009) Auto-completion for Executable Business Process Models. *Lecture Notes in Business Information Processing* 17:510–515.
- Clever N, Holler J, Shitkova M, Becker J (2013) Towards Auto-Suggested Process Modeling – Prototypical Development of an Auto-Suggest Component for Process Modeling Tools. In: *Enterprise Modelling and Information Systems Architectures (EMISA 2013)*. Gesellschaft für Informatik e.V., pp 133–145
- Nair A, Ning X, Hill JH (2021) Using recommender systems to improve proactive modeling. *Software and Systems Modeling*
- Kögel S (2017) Recommender system for model driven software development. In: *Proceedings of the 2017 11th Joint Meeting on Foundations of Software Engineering*. ACM, New York, NY, USA, pp 1026–1029

Application Procedure:

Please apply via email to the supervisors. Please attach a short letter of motivation (approximately one A4 page) and a recent transcript of record ('Leistungsnachweis'). You can apply individually or in a group of **2-6 participants** (in this case each person should still send a separate e-mail, however point to the other members of the group).

Application deadline: 14 October 2022, 23:59 h