Reference:	**Model Quality Assurance – AIME (QSE:CSEK)**
Topic:	**Advanced Crowdsourcing User Interfaces for Model Verification**
LVA-Type:	Praktikum, Bakk-/Diplomarbeit
Start:	Ab sofort
End:	Nach Vereinbarung
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Background

During the design of software systems, a variety of models are created in the process of transforming the requirements and/or specification of the desired system into the corresponding software. These models include Extended Entity Relationship (EER) diagrams or UML model variants for designing databases and software system structures and behavior. The tasks of creating such models from software specifications and their subsequent verification to ensure their quality, i.e., through software model inspection [1], are cognitively intense tasks, that require significant time and effort investment from software engineers.
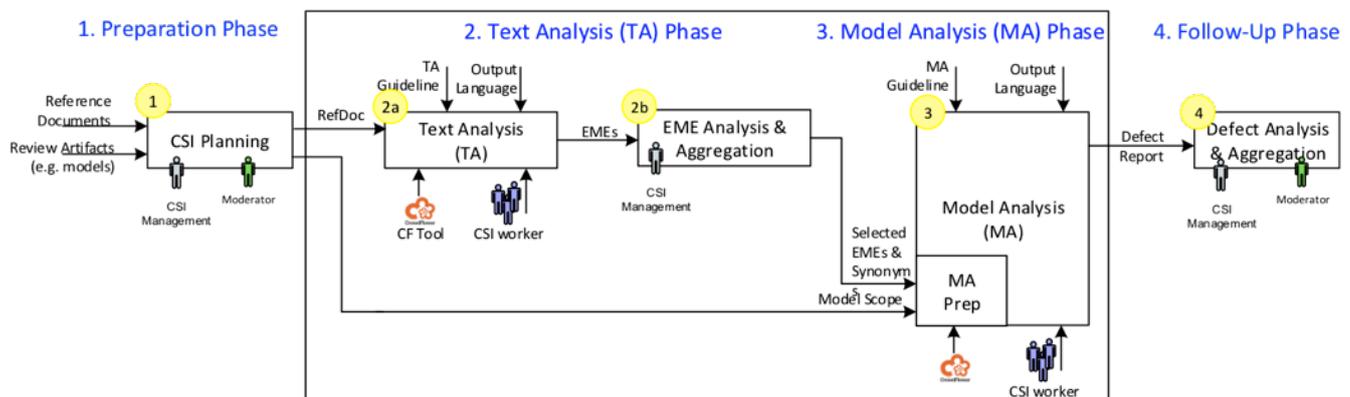
Figure 1: Crowdsourcing-based Software Inspection (CSI) process

To address this issue, we defined and introduced a novel Crowdsourcing-based Software Inspection (CSI) process, previously described in [1,2,3] and shown in Figure 1. CSI includes the following two main phases. During a *Text Analysis* phase (2), inspector crowds identify Expected Model Elements (EMEs) in the system requirements specification (2a). In the *Model Analysis phase* (3), inspector crowds verify the model itself (e.g., an EER diagram), or a subset thereof, while being guided by EMEs. Currently both Text Analysis and Model Analysis phases are operationalized on the CrowdFlower crowdsourcing platform. Their current design was hampered by the limited capabilities offered in the CrowdFlower web-based design interface.

Tasks

The goal of this thesis will be to investigate in detail the capabilities of CML (CrowdFlower Markup Language) [1] and to create novel crowdsourcing user interfaces to support experiments in the area of model quality insurance based on the CSI process defined above. Input to the work of this thesis are the currently used interfaces which were created in the Web-editor of CrowdFlower.

Experience and skills needed

The following preconditions are recommended, but could also be learned during the thesis itself.

- Java programming
- Crowdsourcing (CrowdFlower, CML)
- Software engineering
- Defect detection in software engineering models

References

[1] Winkler D., Sabou M., Petrovic S., Carneiro G., Kalinowski M., Biffl S.: Investigating Model Quality Assurance with a Distributed and Scalable Review Process, In: Proceedings of the 20th Ibero-American Conference on Software Engineering, Experimental Software Engineering (ESELAW) Track, Springer, Buenos Aires, Argentina, 2017.

[2] Winkler D., Sabou M., Petrovic S., Biffl S., Kalinowski M., Carneiro G.: Improving Model Inspection with Crowdsourcing, In: Proceedings of the 4th International Workshop on Crowdsourcing in Software Engineering, ACM/IEEE International Conference on Software Engineering (ICSE), Buenos Aires, Argentina, 2017.

[3] Winkler D., Sabou M., Petrovic S., Biffl S., Kalinowski M., Carneiro G.: Improving Model Inspection Processes with Crowdsourcing: Findings from a Controlled Experiment. In: Proceedings of the 24th European System, Software and Service Process Improvement and Innovation (EuroSPI), 2017

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[1] CML - https://success.crowdflower.com/hc/en-us/articles/202817989-CML-CrowdFlower-Markup-Language-Overview