

Enabling ontological reasoning in engineering process specifications

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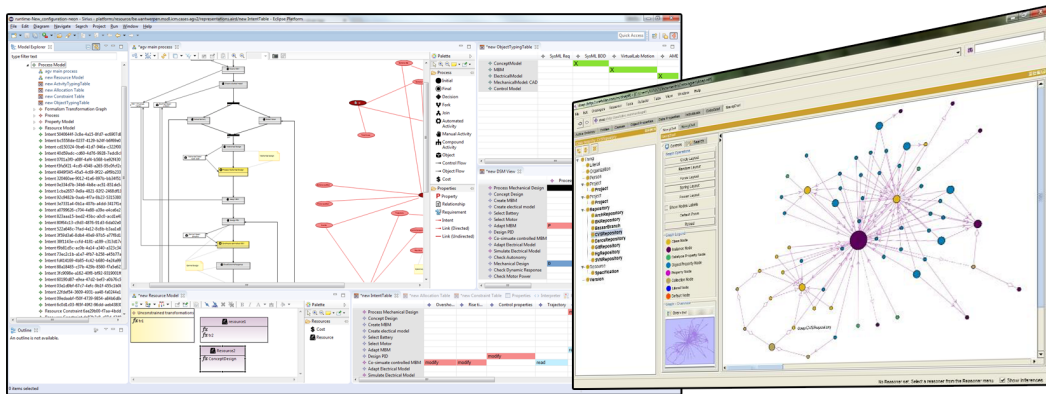
Summary

System modeling is a prevailing paradigm in nowadays' engineering. Even though tool providers offer mature and seasoned modeling tools, the actual modeling process is still a challenge, because it requires a good understanding of the problem and its context, something often referred as *domain knowledge*.

Ontologies are a formal system for modeling domain knowledge. Much like in standard modeling languages (such as UML class diagrams), knowledge is captured by using types, properties, and interrelationships of the entities. Ontologies are typically used to infer new knowledge from known domain facts; and for identifying contradictions, i.e. flaws in the knowledge base. As an emerging technique in systems engineering, ontologies are expected to become integral part of the next generation of engineering/modeling tools.

In this work, you will have the opportunity to get acquainted with the fundamentals of ontology-based modeling. Your task will be to extend a process modeling tool (developed in our lab) with the capability of ontological reasoning. This requires a brief research on ontologies, and a minimal understanding of our process modeling tool.

Depending on the quality of your contribution, your work may (and preferably will) be published in a research paper.



What can you learn?

- Fundamentals of knowledge engineering and process modeling
- Hands-on experience with state-of-the-art modeling tools
- Optionally: publishing a research paper

Required/desired skills

- Fundamentals of UML (class diagrams, activity diagrams)
- Understanding of model transformations and generative techniques
- Ability to absorb the required knowledge (~5-6 papers, plus online tutorials and documentation)
- Minimal knowledge of Git
- Nice to have (not a hard constraint, but accelerates your work): experience with the Eclipse Modeling Framework and/or ontology editors (e.g. Protégé)

Outcome

This topic is situated within a larger research project and therefore, your work has the immediate potential to (i) be a part of a tool for supporting inter-disciplinary systems engineering; and (ii) to **get published in a research paper** as soon as in 2017.