**[SA/IDP] Joint Student Thesis/Project between the Technical University of Munich and University of Toronto**

Topic: Visualizing Dependencies and Inconsistencies across Models during Interdisciplinary Engineering Collaboration

Increasing interdisciplinarity and complexity of advanced production systems requires an efficient collaboration of stakeholders (e.g., designers, engineers, managers, operators) from different disciplines. In model-based systems engineering, stakeholders address their specific concerns by using models. Popular models include mechanical CAD drawings, Matlab/Simulink models, planning charts and diagrams, etc. The more models collaborate, the more difficult to maintain the data dependencies. Consequently, inconsistencies can occur among models, from tiny biases of attributes, incompatible interfaces to conflicting designs that lead to expensive project failures. Therefore, an early detection and management of model dependencies and potential inconsistencies is crucial for project success.
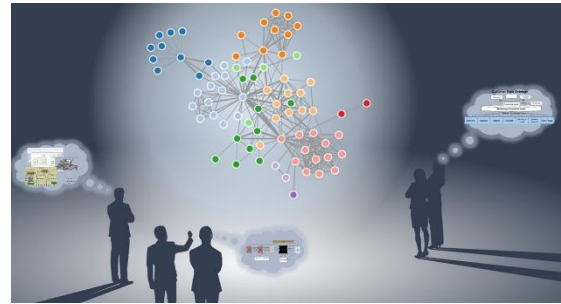
In the collaboration with the faculty partners from University of Toronto, we aim to develop and evaluate an interactive visualization method, which can efficiently assist stakeholders in capturing, understanding and handling critical dependencies across models in an interdisciplinary and collaborative development process. Master students with a background of **mechanical engineering** or **informatics** are highly encouraged to join this collaboration.

Tasks:

- Creating a concept for a user-friendly visualization for users with different roles
- Visualizing the dependencies and potential inconsistencies across models
- Providing user assistance in decision-making by providing knowledge support
- Implementing and testing the concept with a demonstrator and the VR-Wall in our lab

Requirements:

- Interest in interdisciplinary collaboration processes and human interactions
- Back-ground knowledge in modeling mechatronic systems
- Experience in a programming language
- Very good team and communication skills in English

Supervisors:

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