Reference:	**Model Review Language**
Topic:	**Model Language and Editor Design for Model Verification**
LVA-Type:	**Praktikum**, Bakk-/Diplomarbeit
Start:	Ab sofort
End:	Nach Vereinbarung
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Model Editor/Language Design for Verifying a Model Scope with Reference Text

Background

In **Model-Driven Engineering** (MDE), the quality of a model scope, such as correctness and completeness regarding a reference text, such as a scenario, directly relates to the quality of the MDE results. Therefore, **model scope verification** is necessary but can be automated only to a certain extent. Human experts are effective in interpreting and reviewing model scopes but need support for conducting tasks in the reviewing process, such as model analysis, defect detection, and defect validation (see Figure 1).
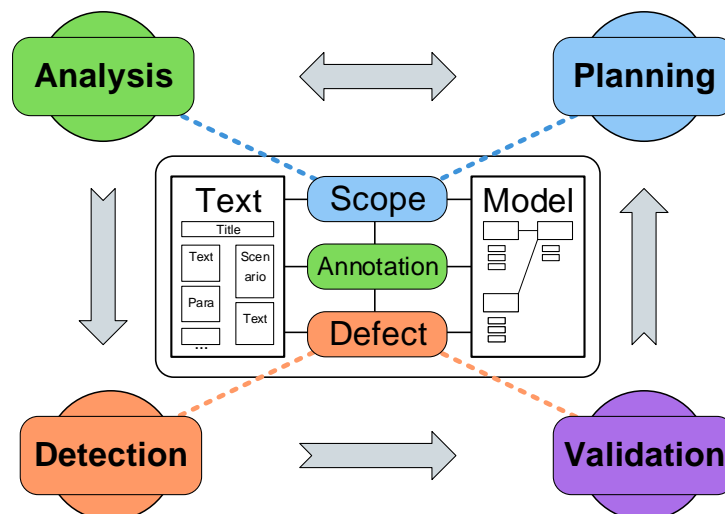

Figure 1: Process steps for the verification of a model with reference text.

These tasks include marking elements in the reference text that need to be checked in the model, marking successfully checked elements in the model and the reference text, or annotating model elements that contain a defect or need further discussion. **Model elements** refer to nodes, attributes, and edges in structural or behavioral models. We focus in this work on **diagrams**, such as an extended entity relationship (EER) diagram or a UML/SysML/AML diagram, which represents a view on a model. A **text element** may be any part of a typical technical document, such as a section, paragraph, sentence, or group of words; also a figure or table that contains text elements.

The aim of the project is the **design of a language for model verification** and a **prototype tool for model verification** using the language (see Figure 2).
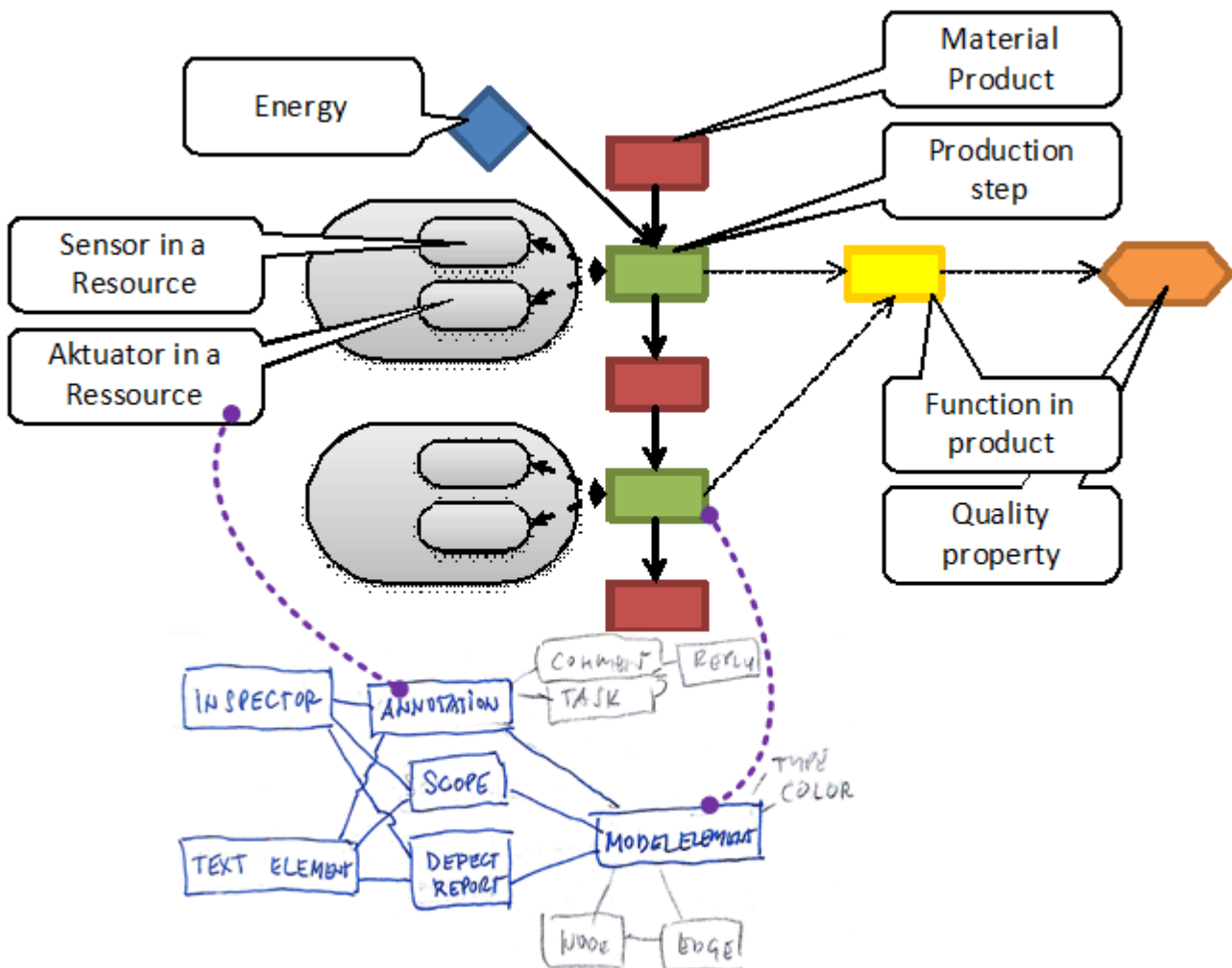

Figure 2: Example structural diagram with annotations and language elements for model verification.

Tasks
- **Design a generic language** for model verification/reviewing
    - o Link the model verification language to the basic language of the model.

- **Concept for configuring** the model/text visualization and marking annotation options in **a model editor** to represent language elements for model verification.
    - o Draw a model over a background figure of a diagram (similar to Defect Radar).
    - o Link model elements to text elements.

- **Model and text scope visualization** by showing/muting/hiding model/text elements
    - o Show text/model elements in rich black or grey color or hide text/model elements behind a placeholder that indicates the number of text/model elements not shown.

- **Model/text marking and annotation**
    - o Marking with a highlight color similar to a text marker

- o Marking with an overlay symbol such as a tick mark or a number tag.
- o Semantic annotation, e.g., the entity type of a word in a sentence;
- o Annotation with defect report/ticket, status (to work on, checked), tag (type label); scope (set of model elements)
- o Annotation with a link that can be followed by a human or machine from a model/text element to a comment or discussion or ticket or another model/text element.

- **Develop a prototype tool** as proof of concept for model verification
  - o Basic parts
    - ▪ Description of basic model verification process steps
      - • Mark approval of selected changed model elements (similar to Gerrit).
      - • Comment on issues with selected changed model elements.
    - ▪ UI to show and interact with a model scope using the model verification language
    - ▪ Scenario for demonstration

  - o Advanced parts
    - ▪ Model measurement
    - ▪ Mark a model change set, i.e., the set of model elements that changed between two model versions.

Experience and skills needed
The following preconditions are needed/recommended.

- Passed course on *Model Engineering* at TU Wien or equivalent.
  - o Language Engineering
  - o Eclipse Modeling Framework
- Editor: familiarity with Eclipse or Enterprise Architect
  - o Configuration of editor functions
  - o Extension of editor functions
  - o Linking of editor to external service
- Java
- Interest in model quality assurance is a plus.
- Interest in Graphical UI design
- Familiarity with information visualization techniques is a plus