Towards a Visualisation Process for Ontology-Based Conceptual Modelling⋆

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Visualisation of models by means of graphical representations plays an essential role in tools. It assists users to understand them, relate their concepts and generate explicit, better usable and communicable knowledge. Additionally, it helps to perceive properties and patterns that have not previously been captured, identify problems about data and focus our attention on the domain being modelled. Moreover, diagrams can lead to great insights or consequences, but also lack of them that can be hidden to users in complex diagrams, causing inconsistencies and anomalies. Hence, equipping CASE (Computer-aided software engineering) tools with capabilities for automatically exploring, composing and checking models is highly desirable.

In this respect, we introduce the concept of knowledge visualisation process for ontology-based conceptual modelling. This process defines a computer-supported transformation of ontological facts or concepts, possibly extracted from data, into insights by means of graphical-logical mappings. Its aim is to capture domain knowledge, understand it by discovering relationships, patterns, anomalies and explanations, and communicate it suitably among users. Such a process focuses on the following main objectives. First, the integration of visual representations and logic-based reasoning capabilities, which is still incipient in state-of-the-art environments and whose formalisation has been already defined in our previous works. Second, the definition of what is relevant to be and how should be visualised. Lastly, the usage of graphical representations as a source to evaluate the quality of models and their correspondence with the domain being modelled. Our concrete proposals are both a schematic view and initial baselines of the knowledge visualisation process to be implemented into a tool. Currently, we are developing such a tool supporting this process, in addition to a methodology for ontology evolution with pattern-based extension rules and an ontology-based metamodel. We expect to release this tool for the UML, EER and ORM models together with their corresponding DL formalisations and metamodel-based mapping rules to link and convert them to each other.