



Deriving Knowledge from Examples to Improve Automation in the Model-Driven Engineering Paradigm

Houari Sahraoui

University of Montreal
2900 Boulevard Edouard-Montpetit,
Montréal, QC H3T 1J4
sahraouh@iro.umontreal.ca

The model-driven engineering (MDE) received much attention in recent years due to its promise to reduce the complexity of the development and maintenance of software applications. However, and notwithstanding the success stories reported in the past decade, MDE is still at the early stages of adoption. One major obstacle to the adoption of MDE is the difficulty to automate many activities of this development paradigm.

Automation is a keystone and a founding principle of MDE. In this paradigm, domain-specific modeling languages are combined with transformation engines and generators to produce various software artifacts. Defining modeling languages, writing transformations, and maintaining consistency between the involved models and other artifacts are typical tasks that are difficult to automate. This difficulty comes mainly from the lack of knowledge in some specific domains. This is essentially the case for the definition of meta-models and transformation mechanisms. Difficulty of automation can also be related to various inconsistencies introduced by some manual tasks as in the case of model maintenance.

To help in the improvement of automation in MDE, we propose to use examples of artifacts that define the inputs and outputs of the task to automate. Depending on this task, examples could take different forms. For model transformation or refactoring, for instance, examples are pairs of source and target models. Similarly, in metamodel definition, examples could be models that are labeled as valid/invalid. The automation of a task is viewed as an optimization process that derives the automation knowledge that best conforms to the examples at hand. Depending on the size of the problem, i.e., search space, such a process could use an exhaustive or heuristic search.