MARS: Metamodel Recovery from Multi-Tiered Models Using Grammar Inference

Qichao Liu, Faizan Javed, Marjan Mernik, Barrett R. Bryant, Jeff Gray, Alan Sprague and Dejan Hrnčič
University of Alabama at Birmingham, Regions Financial Corp., University of Maribor
(qichao, bryant, gray, sprague}@cis.uab.edu, faizan.javed@regions.com, {marjan.mernik, dejan.hrnctic}@uni-mb.si

http://www.cis.uab.edu/softcom/GrammarInference/

1. Background

- **A Model** is an abstraction of phenomena in the real world.
- **A Metamodel** represents a schema that defines the syntax of a model like a grammar defines a programming language. A model conforms to its metamodel.
- **GME (Generic Modeling Environment)** is a modeling tool that allows users to define a domain-specific visual modeling language. http://www.isis.vanderbilt.edu/Projects/gme/
- **A Multi-Tiered Domain** represents large models and enables users to capture multiple viewpoints of the system.
- **ESML (Embedded System Modeling Language)** is a multi-tiered domain with 7 different viewpoints. In its model instances each viewpoint is established as a separate folder (a model organization concept in GME). Each folder may have subfolders to form a hierarchy.

2. Problem Definition

Metamodels define the syntax of models and are needed to load model instances into a modeling tool (e.g., GME). If a metamodel undergoes frequent evolution, then previous model instances may become orphaned from the new definition. If the metamodel get lost, we cannot load and view existing model instances. MARS (MetAmodel Recovery System using grammar inference) was developed to solve this problem.

3. Overview of MARS

- **MRL (Model Representation Language)** is a DSL to bridge the gap between the different representations and capture the essence of the instance models.
- **XSLT (Extensible Stylesheet Language Transformation Language)** uses the XML Path Language to locate specific nodes in an XML document.
- **ESML Model in XML**

4. Conclusion

- **This system allows metamodels to be inferred from a set of model instances, including those with multi-tiered domains, such as ESML.**
- **We are currently investigating the scalability of the approach to even larger metamodels.**