SYNTONY: A FRAMEWORK FOR MODEL-DRIVEN SIMULATION, ANALYSIS, AND TEST

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ABSTRACT

Model-based development provides means for efficient and platform independent software engineering and especially UML2 is becoming a *de-facto* standard in this domain. We developed the framework *Syntony* to support discrete-event simulation based on standard-compliant UML models. According to the principle of communicating automata, input models may consist of composite structure, state machine, and activity diagrams. Furthermore, the MARTE profile allows to specify performance attributes and measures. *Syntony* fully automatically transforms UML models to executable code for the simulation engine OMNeT++. Integrated into the Eclipse framework, *Syntony* supports various simulation techniques for simulation control, design of experiments, and result analysis. For input model validation, we developed a model-based test method similar to unit testing. Test cases may be specified with UML sequence diagrams, either manually or using automated test case generation methods. We successfully employed *Syntony* in several network simulation projects, as well as for teaching model-based approaches in simulation classes.