

TITRE : MODEL CONSISTENCY

Equipe/Theme : LSR/Sphere

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Context

The development of complex software systems induces the creation of many heterogeneous artefacts such as source code, UML conception models, unit tests, XML deployment descriptors or XML GUI descriptors, among many others. Since these artifacts are created and modified by large teams, they are distributed on different physical locations. In this context it becomes very difficult to ensure their consistency and the impact of their modification on the project lifecycle.

Subject

This PhD targets the evolution of distributed software artifacts in the context of large complex software. We consider that any software is described by a set of distributed and heterogeneous software artifacts. These artifacts can refer to each other in an explicit (an hyper-link in a HTML document) or implicit way (a class name in a XML deployment descriptor). Moreover, this set of artifacts is continuously evolving: artifacts can be deleted, added or modified.

Our objective is to set up a formalism to express relationships over this set of artifacts, and a system to evaluate how modifications performed to artifacts impact these relationships. This formalism must be uniform and must allow one to specify relationship over several heterogeneous artifacts (example : each Java class must appear in a UML conception model). The system that checks the evolution of these relationships will have to be efficient and support any evolution of the artifacts.

It is noteworthy that the current approaches are confined on a particular type of artifact (example : checking rules between Java elements), or hide the heterogeneity by using a common format (like XML). Moreover, they usually cannot cope with evolving artifacts.

The PhD candidate will have to analyze the existing approaches to express and check relationships over software artifacts. It will have to introduce a uniform formalism to express relationship over a set of heterogeneous artifacts, and a system to check the impact of their evolution. This system will have to cope with evolving artifacts.

A particular focus will be put on the validation of the proposal (integration in an existing development environment and experimental evaluation in real software projects). Another key issue will be to ensure the scaling of the system on very large software systems.

Mot-clés : Software Engineering, Model Driven Engineering, Consistency

Références :

- [1] A. Finkelstein, J. Kramer, B. Nuseibeh, L. Finkelstein, M. Goeicke. Viewpoints: A Framework for Integrating Multiple Perspectives in System Development. International Journal of Software Engineering and Knowledge Engineering 2(1) (1992) 31-57.

- [2] X. Blanc, I. Mounier, A. Mougénot, and T. Mens. "Detecting Model Inconsistency through Operation-Based Model Construction". 30th International Conference on Software Engineering Leipzig (ICSE08), pp511-520, Germany, 10 - 18 May 2008.