Why Isn't Model Analysis Integrated with Versioning?

– Position Paper for CVSM'12 –

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ABSTRACT

This position paper discusses the idea of integrating model analysis with configuration management systems to enforce certain quality properties of models under version control.

1. THE IDEA OF CHECKING DELTAS

Large parts of software engineering is nowadays covered by modeling. Modeling is widely used for specification of software, sometimes models are interpreted at system runtime, and for some domains it is even possible to completely generate software from models. Models provide the opportunity to enhance software quality. Before the software is derived from the models, they can be checked for certain properties such as security requirements. Furthermore on model level one can easily analyze the compliance to legal or technical regulations, e.g. when auditing a business process.

If the models evolve, the quality properties have to be checked over and over again for each new revision of a model. Especially in case of exhaustive analyses such as business process auditing the re-verification becomes very expensive. Hence, it would be wise to narrow down the model analysis to the portion of the model that has actually changed (i.e. the delta). Besides reducing the costs of verification, the results might become more clear since the scope of analysis is more precise and found violations are probably more comprehensive for the user. Furthermore, the reduction to delta analysis allows us to integrate the model analysis into configuration management systems (CMS) that are used for versioning the models. In that case, each new revision of a model can immediately be verified and violating states could be rejected by the versioning system.

2. STATE OF THE ART

Examples of very exhaustive and thus often expensive model analyses are the checking of security properties on design models and the auditing of business processes. Approaches for security analysis on the level of design models have been presented e.g. in [1, 2]. Approaches for checking security properties or compliance of business processes are discussed e.g. in [3, 4]. Although there is a continuous formation of new security and compliance requirements, one could say that the analysis of such aspects is well researched (even if not finite). However, most approaches consider only complete models. First attempts to reduce the analysis to parts of models have been presented e.g. in [5] in the case of model composition, or in [6] for evolving models.

On the other hand previous instances of the CVSM workshop have shown that model comparison and versioning is well researched. Approaches to compute differences between model revisions have been discussed e.g. in [7].

3. POSITION STATEMENT

Approaches for analyzing security or compliance properties on parts of models have been researched. Likewise the technology for computing differences between model revisions, i.e. locating the changed parts of a model, is given. Hence, it would be a consequent step to integrate such model analysis into configuration management systems. From technical point of view this could be a simple hook into the system checking predefined properties during commit so that certain properties can be enforced and invalid revisions will not be accepted by the CMS. While such approaches are often exercised in source code versioning, no such approach is applied for models yet. This indicates the need for dedicated systems for model versioning which are so far not given or at least not in the state of being accepted by practitioners.

4. REFERENCES

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