

A Semi-Automated Domain Modeling Approach

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ABSTRACT

Most of the techniques and methods for developing and manufacturing systems aim at saving time, raising the employee effectiveness, and reducing the number of errors. One of the ways to achieve these goals is capturing the domain knowledge and reusing domain artifacts by individual systems. Domain analysis methods and techniques have recently received a special attention in the software development process. Domain models, which capture the common knowledge gained while developing applications in the domain as well as the possible variability allowed among them, may assist in the creation of other valid application models in that domain. However, the creation of such domain models that will be reliable, correct, and complete is not a trivial task. One of the domain analysis techniques, the Application-based Domain Modeling (ADOM) approach perceives that applications and domains require similar facilities for their modeling, design, and development, thus it enables specifying and constructing domain artifacts with regular application engineering tools and techniques. Following this perception, we suggest an approach, supported by a tool, for creating draft models of domains from application models in those domains. This algorithm aims at providing at least a partial answer to the main criticism of domain engineering as dealing with too broad domains that are usually understood only during the development process. The proposed Semi-automated Domain Modeling (SDM) approach takes a repository of application models in a domain and merges and generalizes them into domain models that include their common and different structural and behavioral aspects. Running SDM on dozens of application models expressed in UML class and sequence diagrams, we found out that it provides reasonable domain model drafts, whose comprehensibility, correctness, completeness, and consistency levels are satisfactory.