A Holistic Domain-based, Visual Framework for Supporting Situational Method Engineering Activities

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Abstract

As the complexity and variety of computer-based systems have increased, the need for well-defined guidelines that will make the development process most efficient and effective has become crucial. The discipline of Situational Method Engineering (SME) focuses on the creation and adjustment of methodologies, or more accurately method components, for specific situations or projects. Various situational method engineering approaches have been proposed for supporting representation, retrieval, and composition of method components into complete methodologies. However, none of them provides a holistic, adequate, and scalable approach that will be both expressive and accessible to different potential users (namely method and software engineers). Furthermore, most SME approaches support manual, ad-hoc retrieval and composition, in which the retrieval is basically structural and the composition is usually sequential.

This research aims at answering the following question: can the creation of situational methodologies, i.e., methodologies that (best) suit given situations, be carried out automatically or at least semi-automatically? For answering this question, we have developed a comprehensive domain-based, visual framework, called ADOM-SME, for supporting the entire situational method engineering lifecycle. In particular, Object-Process Methodology (OPM) is used as the modeling language in this framework and ISO/IEC 24744 and SPEM are the basis for a domain layer. This domain layer and the terminology defined in it are used for creating and adjusting particular method components and situational methodologies.

The framework also offers a guiding tool which automatically suggests methodologies for given situations, applying similarity measurements and composition operations. The similarity measurements take into consideration the structure and behavior of the
method components, as well as additional meta-information regarding their role and essence, while the composition operations comprise two structural composition operations (merging and generalization) and five behavioral composition operations (sequential, concurrent, incremental, iterative, and alternative compositions).

Evaluating ADOM-SME framework, we claim that it represents all methodological aspects in a simple, accessible, consistent, and intuitive manner; it supports the most popular reuse operations, i.e., specialization and aggregation, in a semi-automatically manner; and it can be extended to support a variety of composition operations.