
Abstract

Web engineering has emerged as a software discipline which specifically addresses systematic development of high-quality web applications. The methodologies proposed for web engineering mostly follow the Model Driven Development (MDD) style in which models are the main driver of the development process. A challenge with these methodologies is that developing each new web application requires creating a probably large set of models. Providing a model reuse approach can be considered as a main solution to this challenge. In the current thesis, a new reuse approach is proposed for specification of functional requirements models in the earliest steps of the development lifecycle. This approach takes the brief description of the functional requirements of a new web application in terms of UML use case diagram, and semi-automatically generates the draft of the detailed description in terms of UML activity diagrams. The proposed approach includes two main steps. In the first step a semantic model repository is prepared, and the second step provides a reuse process. New algorithms are employed in the first step for activity diagram annotation and behavior/concept detection. The second step introduces a new metric for measuring similarity of use cases and also a new algorithm for activity diagram adaptation. In addition, the semantic web technologies are used in the first step to provide a flexible representation layer, and the semantic web sources are used in the second step as a source for addressing information needs of the proposed approach. Experimental evaluations demonstrate that the proposed approach has good precision and recall, and the use of the semantic web has improved the quality. Consequently, the main underlying idea of the proposed approach, i.e. using UML use case diagrams as the starting point of the reuse approach, is proved to be sound and promising. However, the proposed algorithms have still some weaknesses and their improvement needs more research and development.