Chapter 12

Scenario Based Test Case Generation Using Activity Diagram and Action Semantics

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ABSTRACT

Scenario is an account of description of user interaction with the system, presented in a sequence. They can be represented using unified modeling language (UML) diagrams such as use case diagram, state charts, activity diagrams etc. Scenario-based testing can be performed at higher abstraction level using the design diagrams. In this work activity diagrams are used which are annotated with action semantics to test scenario dependencies. The action semantics make activity diagram executable and the dependencies between multiple scenarios can be seen at execution level. The authors intend to propose an approach for scenario dependency testing. Dependency graphs will be then generated against all the dependencies present on activity diagram under test. The test paths extracted from these dependency graphs help in testing.

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INTRODUCTION

Scenarios are used to elicit document and validate requirements. Scenario is a narrative description of the system use, basically, they capture the functionality of the system. A system is typically represented by a number of scenarios that cover the system functionality in detail. One of the ways is to use natural language scenarios to capture, document and validate requirements. These scenarios improve communication between different groups involved in system development, and also help the software developers in the understanding of the application domain (Ryser and Glinz, 2000).

For the generation of test cases through Scenarios different UML artifacts are used to represent system specification like use cases (Ryser and Glinz, 1999), (Barnett et al., 2004), (Briand et al., 2002), (Sarma and Mall, 2007), (Nebut et al., 2006), sequence diagram (Sarma and Mall, 2007), Interaction diagram (Najala et al., 2007) and UML activity diagram (Chandler et al., 2007), (Xu et al., 2005) and (Xiaqing et al., 2004). Presenting Scenarios in UML diagram makes the derivation of test cases in an easy way.

The executable UML helps in executing the UML model directly into code; it removes the gap between the implementation and the design models. In the executable model, some set of rules are defined to gather the UML elements for a particular purpose. Action semantics define the action and working of the action (Jiang et al., 2007). The action language is basically used to make the UML models executable. Many languages like small, Tall, Bridge point, +cal (Perseil et al., 2008), pal (jiang et al., 2007), and OCL (Montogna et al., 2008) are used to describe the actions. OCL defines constraint and requirements in the form of invariants, pre-post conditions (Montogana et al., 2008).

In this work, we intend to use the UML activity diagram decorated with action semantics for scenario-based testing. Our proposed work describes in detail the dependency analysis for scenario and on the basis of dependencies test cases are generated. A comprehensive survey on scenario-based testing approaches are mentioned in the work.

LITERATURE REVIEW

Scenario-based testing using functional regression testing is proposed by Sai et al (2002). The technique defines the scenario based functional regression testing approach, in which test scenario which is the semi-formal representation of system are represented through a template model using end-to-end(E2E) integration testing.
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