MAP-i: Doctoral Programme in Computer Science
2013-14
PhD Proposal

Thematic area

Software Engineering; Software Testing; GUI Testing

Summary

User Interface (UI) patterns are used extensively in the design of today's software. UI patterns embody commonly recurring solutions that solve common GUI design problems, such as "login," "file-open," and "search." Yet, testing of GUIs for functional correctness has largely ignored UI patterns.

Recently, it was published a new method: Pattern-Based Graphical User Interface Testing (PBGT) for systematizing and automating the GUI testing process. It presents a new methodology to sample the input space using "UI Test Patterns," that embody commonly recurring solutions to test GUIs. Some experiments reveal that PBGT methodology is effective in revealing faults in fielded GUIs.

PBGT is based in the fact that GUIs are similar in design, i.e., based on the same UI patterns that should share a common testing strategy. The new notion of UI Test Pattern provides a configurable test strategy to test a GUI that was implemented using a specific UI pattern or a set of patterns. Because a UI pattern may be realized using different implementations, the configurations in a UI test pattern allow us to test different implementations by setting different parameters to the testing strategy. As an example, consider the Login UI Test Pattern. This pattern defines a test strategy to test the authentication process that is very common in software applications. However, the authentication process can be implemented differently in different software applications, e.g., when the authentication fails, a pop-up message may optionally appear. The Login UI Test Pattern may be configured to specify which the expected behavior in that specific situation is and to allow checking if the test passed or failed.

Relevant research questions

The PBGT approach offers already a testing framework that allows combining patterns to build newer ones and promote reuse; a Domain Specific Language (DSL) – PARADIGM – for GUI modelling; a modelling environment – PARADIGM-ME – to support the modelling, test case generation and test case execution; a dynamic testing approach that does not need access to the code of the application under test and is cross platform. However, there is still much

work to do. In particular, this research work could contribute to clarify some issues related to this approach:

- It is possible to correlate UI Test Patterns to bugs?
- Which are the patterns that lead to most of the bugs in GUIs?
- What about the complexity of pattern composition, i.e., at what point do patterns get too cumbersome? Can we compose many many patterns together and still retain the advantages?
- What is the relationship between UI patterns and code used to implement them? Are there multiple code patterns associated with a UI pattern? Are there any code patterns for a given UI pattern?
- The actual UI *Base* Test Patterns are enough to describe all testing goals?

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