Chapter 6

Test Case Prioritization using Cuckoo Search

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ABSTRACT

Test Case prioritization consists of proper organization and scheduling of the test cases in a specific sequence. Regression testing is an important issue and concept during software maintenance process, but due to scarcity of resources re-execution of all test cases, is not possible during regression testing. Hence in version or revision specific regression testing, it is more important to execute those test cases that are beneficial. In this chapter, a new prioritization technique is proposed for version specific regression testing using Cuckoo Search Algorithm. This technique prioritizes the test cases based on lines of code where the code is modified.

DOI: 10.4018/978-1-4666-0089-8.ch006
INTRODUCTION

In software development, the ethics behind Software Engineering is very important and essential. Software development and management is depend upon series of phase known as software development life cycle (SDLC), in this life cycle Software Testing (Pressman R S, 2005) involves identifying the conditions where software deviates from its normal behaviour or exhibit different activity in contrast to its specification. Software testing has a major role in software development lifecycle (SDLC) to develop the high quality software product. At least, software testing consumes 50% of the development cost. Testing is the process of checking whether the developed project conforms to the expected output by finding errors in the program, and also to reveal inadequacies (Mathur Aditya P, 2007).

Regression testing (Srivastava Praveen Ranjan et al, 2008) (Singh Yogesh et al, 2010) is conducted to ensure that changes in software are correct and have not affected the unchanged portions of the software. Test suites that are already available from earlier versions of software can be expensive to execute completely. Hence test case prioritization (Horgan J R and S London, 1992) is one of the techniques for reducing cost related to regression testing.

Test case prioritization (Srivastava Praveen Ranjan, 2008) helps software testing by decreasing the effort and time based on some criterion such as code coverage. It has been identified that one of the software engineering areas with a more suitable and realistic use of artificial intelligence techniques is software testing (McMinn Phil, 2004) and those techniques are known as metaheuristic approaches (Srivastava Praveen Ranjan, 2008). A recently developed metaheuristic optimisation algorithm, Cuckoo Search (Yang X S and Deb S, 2009), is being used under this study for prioritization of different test cases in a test suite. In the later sections of this chapter, the use of Cuckoo search algorithm in test case optimization is discussed. The background work includes drawbacks of some of the existing methods of test case optimization is discussed in section 2. In next concept of cuckoo search is discussed. Test case prioritization using cuckoo search has been discussed in detail under the section proposed strategy. A simple implementation of the approach is given in the section case study.

BACKGROUND WORK

An early representation of test prioritization was reported by Horgan and London (Horgan J R and S London, 1992) in an industrial strength tool, this tool is used for variety of control flow and data flow based coverage criteria. Coverage based (Aggrawal K K et al, 2004) technique for test case prioritization, where prioritiza-
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