

Filtering Test Case Selection for Increasing the Performance of Regression Testing

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Abstract

Under the concept of using software testing, the problems are preparing the smallest size of the selected test cases, fixing bugs, predicting the estimated testing time and numbers of the tester. The traditional methods are developed to solve these issues. Unfortunately, they cannot be applied for all reasons. Therefore, the filtering test case selection model is proposed to solve these problems and to increase the efficiency of the regression testing. It prepares the methods of filtering, classifying, and selecting the appropriate test cases. Accordingly, it gives the smaller size of the selected test cases than the traditional selections as 0.23–3.96%. When consider the fault rate measured by the developed technique is also less than those methods equivalent to 13–69%. Furthermore, the testing time and the amount of testers are also less than the comparative studies as about 2–71%, and 13–69% respectively.

Keywords: Regression testing, Test case selection, Test suite

1 Introduction

Regression testing is the part of software testing the software development life cycle, which is one of the methodologies of software engineering [1]. The main function of regression testing technique is to modify the old program to the new version and to moderate the size of the test cases before testing the new codes [2]. The reason of using this technique is to guarantee that newly added or modified code works correctly [3]. However, the important problem is that which technique is appropriate in the differentiated software development environments [4]. The scopes of using regression testing listed as follows; it is suitable for only the modified program, testing time is accounted, testers may not be from the previous team, and many testing cycles are required when the modifications are done [5]. In general, it needs six processes, which are modifying the latest program, preparing test data,

testing the sequence of code, execution, verifying the test cases, and fixing bugs [6]. In fact, the requirement specifications are directed to write a code, including the new software version [7]. Moreover, the amount of the specifications of the revised software is greater than the old [8]. This is because the needs of user requirements increase [9]. The main problems are what should be the selected test cases of the modified program, how to select, and the size of the chosen set is still too big [10]. These could affect the efficiency of whole processes of applying the concept of providing the suitable cases to get correctly modified codes [11].

There are many regression testing methods developed for solving these problems, e.g., retest-all [12], random [13], obsolete [14], re-testable [15], reusable [16], redundant [17], execution traces [18], fault-revealing [19], modification-revealing [20], inclusive [15], precise [15], safe regression [8], and others. This paper studies the random technique because it is practical for general

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