



RESEARCH ARTICLE

A New Technique for Test Case Prioritization

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Abstract— Software testing is important phase of software development life cycle which ensure the developer that the developed software work according to specifications or not. To make testing efficient and effective a techniques of test case prioritization are used. A well-organized Test case prioritization technique reduces the cost of testing and fault detection capabilities of testing. We will go to purpose a new technique which reduces the cost of testing by using new approach for test case prioritization .This approach use clustering technique to prioritize the test case in appropriate order which improve the effectiveness of testing and reduce the cost and efforts required for testing. This approach groups the test case with same characteristics within same cluster. This approach also improves the fault detection capability of test case prioritization based on cost effectiveness parameter of test cases and function coverage ability of test case. Our approach of test case prioritization use function coverage parameter which allows tester to prioritize the test case based on their actual function coverage ability without considering number of lines covered by test case which may contain extra comment line.

Keywords: - Case Based Ranking; Prioritization of requirement for test; Dependency Structure Prioritization

I. INTRODUCTION

Test case prioritization is a mechanism needed for arranging a test case in appropriate order to increase their effectiveness at meeting some performance goal and rate of fault detection. Test case prioritization is a method to prioritize and schedule test cases in appropriate order. to run test cases of higher priority before than the lower priority test case in order to minimize time, cost and effort during software testing phase. various performance goals are like rate of fault detection which a is a measure of how quickly the fault is detected so that during testing faster feedback can provide about system under testing and allow the software tester to correct the software at earlier phase as possible.[1]

One application of prioritization techniques is regression testing means retesting of software after modifications. Regression testing is process of retesting the modified software and ensures that new error does not introduce into the previously tested source code due to these modifications. regression testing is very expensive testing process .in order to decrease the cost of regression testing the software tester may prioritize the test case so that the test case which are more important are run earlier during regression testing process. In this context, prioritization techniques can take advantage of information collected about the previous execution of test cases to obtain test case orderings. For regression testing the clustering technique is used for test case prioritization. in this the test case having common properties and similar fault detection ability are group together within same group. Test case prioritization improves the cost effectiveness of regression testing. The

technique is developed in order to run test cases of higher priority in order to minimize time, cost and effort during software testing process.

II. RELATED WORK

Gregg Rothermel *et al* (2001), This paper represent a several techniques that use test execution information to prioritize test case for regression testing such as 1) techniques that order the test case based on total coverage capacity of test case 2) techniques that order the test case based on their ability to cover code component which are not previously covered 3) techniques that order the test case based on their ability to reveal maximum fault in the code they cover. These techniques are applied on various test suites for various programs, measured the rate of fault detection achieved by the prioritized test suites, and then compare the rates with the rates achieved by unprioritized and randomly ordered test case. Analysis of data proves that prioritization techniques studied improved the rate of fault detection of test suites. [1]

Hema Srikanth *et al* , The main objective of test case prioritization is to improve the rate of fault detection which allows testers to detect faults earlier in the system testing phase. All the techniques discussed earlier like code coverage based may treat all fault equally. This paper represents a value driven approach to system level test case prioritization called the prioritization of requirement for Test (PORT). PORT prioritization system test case depend on four factor volatility of requirement, customer preference , implementation complexity and fault proneness of the requirement. This paper proves that the PORT prioritization at the system level improves the rate of detection of sever faults. And also prove that the customer priority was one of the most important factors of prioritization which contributes to the improved rate of fault detection. [2]

Paolo Tonella *et al* (2006), Test case prioritization having a positive effect on testing cost especially when the test execution time is long. Even the test engineers having a relevant knowledge about relative priority of test case, but this knowledge cannot be easily expressed in the form of global ranking. In this paper a new test case prioritization technique is described which take advantage of user knowledge through machine learning algorithm, case based Ranking (CBR). The CBR takes relative priority information from user in the form of pair wise comparison. User information combined with multiple prioritization indexes in iterative process which improves the test case ordering .This technique provide a prioritized test case ordering at low cost. Other big advantage of this approach is that test suit size is moderate at or below 60 test cases per suit which also minimize cost. [3]

Ruchika Malhotra *et al* (june2010), this paper describe test case prioritization techniques for regression testing. Regression testing is a very expensive process performed mainly as a software maintenance activity. A regression test selection technique selects a suitable number of test cases from a test suite that may be exposing a fault in the modified program. In this paper, we propose both a regression test selection and prioritization technique. We implemented our regression test selection technique and prove that our technique is effective for selecting and prioritizing test cases. The technique described in this paper may significantly reduce the number of test cases and therefore the cost and resources required for performing regression testing on modified software is also reduced.[4]

Siripong Roongruangsuwan *et al* (2010), In their research they proposes two new efficient method for test case prioritization. The first method is developed to solve the problem of many test cases having the same weight values. The second method is designed to prioritize multiple suites efficiently. These two methods minimizing a prioritization time. This paper mainly gives attention to test case prioritization techniques only. This paper describes four types of test case prioritization techniques, which are: (a) customer requirement-based techniques, (b) coverage-based techniques, (c) cost effective-based techniques and (d) chronographic history based techniques. [5]

Ryan Carlson *et al* (2011), in this paper the clustering approach is used to prioritize the test case for regression testing. Clustering approach groups together the test case having a similar fault detection ability and similar property .For clustering of test case different parameter of test case are consider like code coverage, code complexity, and history data on real fault. Clustering approach to prioritize a test case improves the rate of fault detection and also decrease the number of fault that slip through testing .Code coverage of test case means that how many lines of code are covered by test case .Code complexity means the dependency of test case on other test case .History on real fault indicate the actual number fault revealed by test case in previous Execution. [6].

III. PROPOSED WORK

We will go to purpose a new test case prioritization technique using clustering approach based on cost effectiveness which reduces the cost of testing significantly. This technique is very important because it reduce the cost of regression testing which consume much part of overall software maintenance cost. The existing clustering approach to prioritize test case consider only the code coverage, code complexity parameter, but they ignore a cost effectiveness parameter of test case which have much influence on cost of regression testing. They

consider the code coverage area of test case, but it is possible that most of the code covered by test case contains extra comment line which is useless.

IV. CONCLUSIONS

In this paper we study about the various technique available for test case prioritization like code coverage technique, prioritization based on requirement, case based ranking, chronographic history based technique. These prioritization techniques help the software developer to prioritize the test case and reduce cost and efforts of software testing by improving the fault detection capability of test case. This paper purpose a new technique for test case prioritization which prioritizes the test case based on cost effectiveness and function coverage of test case .This technique will be more efficient than previous technique like code coverage in which the code covered by the test case may contain extra comment line.

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