Test Case Prioritization with Branch Coverage with Multiple Criteria for Regression Testing

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Abstract:

Model Selection for Software testing is very important prospective in various product accuracy. Through research on software testing model selection, seeking the most appropriate testing method to achieve most reasonable testing volume and optimal testing result. In our Research we will focus on improving this model description by adding more user end experience in testing. Various testing will be fetched on industrial experience. Various experiences from industrial companies will be fetched and will be implemented according to the proposed optimized parameters added for software testing. Software testing will be done by various tools and will link to proposed theory. Test case model selection and test volume evaluation method will be applied to the software testing work of Industrial applications and will compared with traditional method.

Keywords: Test Case Prioritization, Regression Testing, Software Testing, Performance Testing, Reliability Testing, Reusability.

1. INTRODUCTION

Software testing is often used in association with the terms verification and validation. Verification is the checking or testing of items, including software, for conformance and consistency with an associated specification [1]. Software testing is just one kind of verification, which also uses techniques such as reviews, analysis, inspections and walkthroughs. Validation is the process of checking that what has been specified is what the user actually wanted [2]. Software testing is a set of activities conducted with the intent of finding errors in software. It also verifies and validate whether the program is working correctly with no

bugs or not. [3] It analyzes the software for finding bugs. Software testing is not just used for finding and fixing of bugs but it also ensures that the system is working according to the specifications. [4] Software testing is a series of process which is designed to make sure that the computer code does what it was designed to do. Software testing is a destructive process of trying to find the errors. The main purpose of testing can be quality assurance, reliability estimation, validation or verification. The other objectives or software testing includes. [3][4][5]

- The better it works the more efficiently it can be tested.
- Better the software can be controlled more the testing can be automated and optimized.
- The fewer the changes, the fewer the disruption to testing..
- The general objective of software testing is to affirm the quality of software system by systematically exercising the software in carefully controlled circumstances.

There is big need of Software testing as described, while making food, it's ok to have something extra, people might understand and eat the things we made and may well appreciate our work. But this isn't the case with software project development. [7][8] If we fail to deliver a reliable, good and problem free software solution, we fail in our project and probably we may lose our client. So in order to make it sure, that we provide our client a proper software solution, we go for testing. We check out if there is any problem, any error in the system, which can make software unusable by the client. [7] We make software testers test

the system and help in finding out the bugs in the system to fix them on time.

Software testing is a process which is used to measure the quality of software developed. It is also a process of uncovering errors in a program and makes it a feasible task. It is useful process of executing program with the intent of finding bugs. The diagram below represents some of the most prevalent techniques of software testing which are classified by purpose. [6]

2. REGRESSION TESTING

Regression testing is defined [14] as "the process of retesting the modified parts of the software and ensuring that no new errors have been introduced into previously tested code" [15].

Moreover regression testing is acknowledged to be an expensive activity. It consumes large amounts of time as well as effort, and often accounts for almost half of the software maintenance costs [18]. The extents to which time and effort are being spent on regression testing are exemplified by a study [17] that reports that it took 1000 machine-hours to execute approximately 30,000 functional test cases for a software product [19].

There are various regression testing techniques which includes Retest all, Regression Test Selection, Test Case Prioritization and Hybrid Approach. Figure 1 shows various regression testing techniques [16].
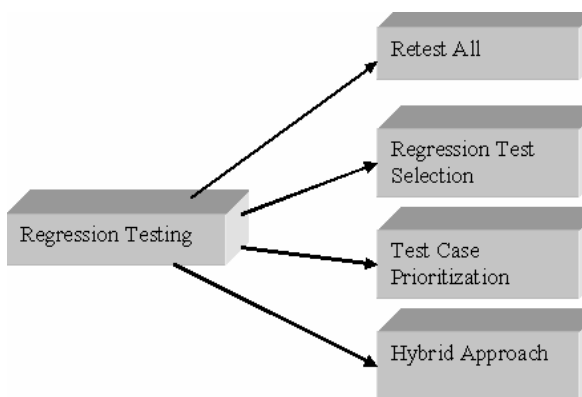

Figure1. Regression Testing Techniques

3. TEST CASE PRIORITIZATION

Test case prioritization techniques involve scheduling test cases for regression testing in an order that increases their effectiveness at meeting some performance goal [3]. This is inefficient to re execute all the test cases in regression testing following the software modifications [4]. Using information obtained from previous test case execution, prioritization techniques order the test cases for regression testing so that most beneficial are executed first thus allows an improved effectiveness of testing. [6]

Effective and reliable test case prioritization technique for regression testing is necessary to ensure optimum utility and no side effect in the software after modification [8]. Test case prioritization is rearranging the test case order based on certain constraints so that the most beneficial test cases may be executed first. Most of the existing research works on test case prioritization methods are based on single coverage criterion [9]. A prioritized test suite which covers more than one coverage criteria is considered to be a stronger coverage goal than a test suite which covers single coverage criteria [11].

4. PROBLEM SET AND OBJECTIVES

In Our experimentation we will improve the test case prioritization process by providing hybrid approach with code coverage, branch coverage, reusability coverage, path coverage and fault coverage. In our research we will do test cases filtering with various parameters. The main focus of the research is to improve the accuracy of software testing for bug finding in limited resources and hence will focus on increase in performance of overall software

5. RESEARCH METHODOLOGY

Our research has started with the information fetching of the industrial software testing techniques. After fetching information we have selected a software code for performing testing criteria. We have selected program code

with pending testing criteria's, after that we have done some initial testing for missing values and syntax errors. In our continuous research we will implement test case prioritization on the selected cod based on the path coverage and branch coverage so that better test case prioritization can be developed and costing in regression testing can be reduced. After this we will develop the test cases according to the fault and reusability of the selected code so that code testing can be filtered out during regression testing. Whole testing of the selected program code will be developed in Java language.

6. CONCLUSION

This research will have big impact on the methods of regression testing based on test case prioritization process. Selection of the test cases is base on various dependent criteria which represent the various aspects of the program code. Better selection of the test cases will lead to the saving of resources in the regression testing. In near future we are developing and testing the selection process of test cases.

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