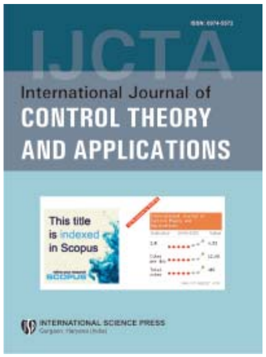

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Optimized Ordering of Test Case Generation for Regression Testing – A Survey

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Abstract: Test case prioritization method schedules the test cases for execution in an order that increase their effectiveness in achieving the performance goal. Test case prioritization methods help the tester to perform the testing in a logical order by which the regression testing is made easier. Changes that are made to the system are thoroughly tested before it is being released in the final stages. The test cases are prioritized for regression testing based on various methods and algorithms. In this paper we have analysed the various techniques that are used to achieve the business goals in the earlier stages at low cost and time. The parameters used for the ordering plays a very crucial role in detecting the faults at the earlier stages of testing.

Keywords: *Testcase prioritization, Regression Testing.*

1. INTRODUCTION

Regression testing is the path towards testing changes to the Software projects to guarantee that the more common program still works with the new changes. Regression testing is a common bit of the program change handle and, in commodious organizations, is done by code testing specialists [11]. Test arm coders make code test circumstances and exercises that will test new units of code after they have been created. These investigations outline what transforms into the test container [14]. Prior to another adaptation of new component, the item is released, the old investigations are continued running against the new frame to guarantee that all the old limits still work. Amid Regression testing the analyzers may confront a circumstance where they have to test from the underlying stages. In such cases the prioritization method can be utilized to dump of the less experiments and furthermore makes it basic for the analyzer to do regression testing. The prioritization is made through different calculations and methodologies. This prioritization strategy organizes the test cases in light of the necessity, control flow graph, and so forth. This approach helps in decreasing the time and in addition the issues are distinguished in the before phases of testing.

2. LITERATURE SURVEY

In the recent years there were numerous techniques that examined and experimented the idea of test case prioritization. In this area all these work is discussed and identified with the proposed work later on.

2.1. Prioritizing test cases for Regression testing [8]

Regression testing is done when the new code is added to the existing one as well as changes that are made to the existing ones. In such case the tester may need to test every test case, the test case prioritization enables the tester to dynamically order the test case based on Computing Weight Algorithm, Adjusting Priorities Algorithm [8]. This Technique allows the developer and the customer to set priorities to the requirements that enhances the tester to prioritize the test cases during the Regression Testing. This method proved to be very effective in Regression testing but it couldn't account on Severity of Faults and Cost of Test cases.

2.2. History-Based Dynamic Test Case Prioritization for Requirement Properties in Regression Testing [2]

This paper proposes a way to deal with optimising test cases based on historical data [2]. The needs of Prioritizing are introduced in light of requirements in history-based approach. Prioritising the requirements are done based on the history based approach and by which the calculations are made dynamically based on the information in regression testing [9]. This approach made the faults more identical by testing very few test cases. The regression testing was made easier and the faults were detected by the prioritizing method using the history based approach.

2.3. Test case prioritization for regression testing based on Ant colony optimization [1]

This paper proposes an idea based on three variables: number of faults distinguished, execution time and fault severity by which the prioritization of test suite are finished. The optimization of test cases are based on the algorithm called Ant Colony Optimization [1]. Using this algorithm, the test cases are optimized such that the regression testing is made easier. The test case with maximum number of faults is prioritized and the ultimate aim of regression testing is achieved by eliminating the faults which are identified and thereby achieving the quality of the new code [3][15]. This technique helps in achieving the test efficiency in the earlier stages of testing phase.

2.4. A Coupling Effect Based Test Case Prioritization Technique [4]

An approach for test case prioritization has been proposed which depends on a module coupling impact that considers the module-coupling, an incentive with the end goal of organising the modules in the product so that basic modules can be recognised which will discover the optimised ordering of test cases [4]. This coupling of the modules technique has made possible for the testers to identify the faults through the coupling matrix which was obtained using the above technique [7]. Through this the requirements are prioritized and also this coupling technique has made the faults more visible in the initial levels of Regression testing.

2.5. Experimental comparison of Code based and model based Test case Prioritization [5]

Test prioritization orders test cases for execution to increment possibly the odds of early fault recognition during retesting. Code-based test prioritization techniques depend on the source code of the framework, though model based test prioritization strategies depend on framework models [5]. Framework demonstrating is a generally utilized procedure to model state-based frameworks. Models can be utilized during programming improvement as well as during testing [7]. With the utilization of this approach the time of execution of the test case is diminished by optimising the test arrangement. The most productive test suite has been acquired by this method. The cost of test cases was reduced by this method.

2.6. Test case prioritization for regression testing based on fault dependency [3]

This approach is based on reducing the number of test cases which are based on the priority hence limiting the faults that arises during the regression testing. Prioritizations are mainly based on the fault severity and thereby the test cases are dynamically ordered or prioritized [8][9]. This approach proved that the prioritized test cases are more effective during the regression testing. The faults are identified and the dependency is monitored through which the testing is made to achieve the business goals[3].

2.7. Test Case Prioritization for Regression Testing Based on Function Call Path [7]

Regression testing is made easier only when the test cases are being optimized. The test cases are optimized by the function call path which are established based on the test case dependency and the functional path is obtained during the pre-testing phase are sought and this paves the way for the tester to prioritize the test cases in order to remove the faults in the codes that are newly added [3]. Faults are identified easily by this function call path and also the dependency among the test cases are achieved which paves the way for the prioritization of requirements that enhances to achieve the goal through the regression testing [7].

2.8. Test case prioritization based on requirement correlations [8]

Customer requirements change in time to time, based on which a new module is added and to be validated before they are being released [11][15]. Regression testing is carried out in solving this, by which the new code is being retested along with the new codes to satisfy the needs of the customer. Not every test cases that can be tested in this phase, as it is time and cost consuming. This paper proposed an approach called Requirement correlation, which identifies the dependency among the various requirements and also the requirements are prioritized based on the algorithms [12]. The computing weigh algorithm defines the priority, which helps the tester to identify the test cases, test them makes the new version of software work better with new requirements.

3. RISK MANAGEMENT AND FAULT DETECTION

Regression testing helps in achieving the business goals. Various techniques were experimented in the Ordering of the test cases, by which the faults were detected and are managed in the preliminary measure [3][15]. Testing phase may face various risk which may lead to software failure. The risk may be in the form of the Faults and errors in the source code, etc.. The risk management helps the tester and the developer to analyse the risk involved in the Software Development Stages[12]. The severity of faults are focused in every single testing phase, by which the risk are detected and eradicated in the initial. Faults are detected during the development stages are formulated in the form of the severity. Fault detection techniques are employed, that enhances the correctness of the Software being developed.

4. CONCLUSION

Optimizing the test cases intensify the effectiveness of the Regression testing. The various method magnifies the potential level of the Software modules by prioritizing and dynamically ordering the test cases. This ensures the quality of the software module and also ensures the control over the severity and cost of the faults. Thus prioritization technique helps in increasing the efficiency in the Regression testing. In this paper we have analysed that the prioritization techniques helps in increasing the effectiveness of the testing strategy and also it ensured the efficiency.

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