Test Case Ranking with Rate of Fault Finding

Amruta Magdum, S. D. Joshi, A. K. Kadam, Aditya Sarda

Abstract- Prioritization of test cases is an important technique in regression testing. Prioritization of test instances based on project implementation flow. Therefore, some efficient methods need to be developed that can improve the efficiency of regression testing by arranging test instances according to some test criterion in an order. The proposed system will do such prioritization in way to enhance a test suite's fault detection rate. It provides the fresh way to organize test instances that run sooner than reduced greater priority test instances. This paper proposed a new approach to prioritizing regression test cases depends on four parameters and the names of that parameter are the fault detection rate, the number of faults detected, the risk detection capability of the test case and the effectiveness of the test case.

Index Terms- Average percentage of fault detected metric, Fault detection, Software testing, Regression testing; Test case prioritization

I. INTRODUCTION

With a quality defined as "possession of the required requirements, tests. Defining quality as" compliance with the specification of requirements, "therefore the test gives a good idea of the level of quality. This leads to the main objective of the test, for example, "The test reduces the level of uncertainty about the quality of a software system: the software test is the most important in the life cycle of the software development phase. In general terms the types are, verification and validation. Verification is a software component system assessment method to check whether the products of a specific development stage meet the circumstances imposed during the beginning of the phase. On the other hand, validation is the process of evaluating the final product to determine if the software meets the specified requirements. The accuracy of the software requirements is verified in the analysis requirements of the collection phase and the preparation of an acceptance criterion to guarantee profitability. His high-level design and low-level design are built and validated to ensure compatibility with the document Specification of Software Requirements (SRS). In the implementation phase, the validity of the software is controlled by a series of black box tests that correspond to the requirements and the returns comply with the software provided. Both the procedure and the plan were created to ensure that all functional requirements are met, that all performance requirements that satisfy all behavioral characteristics are met, that all documentation is functional, accurate, designed and not complied with other requirements. Both the procedure and the plan were created to ensure that all functional requirements are met, that all performance requirements that satisfy all behavioral characteristics are met, that all documentation is functional, accurate, designed and not complied with other requirements.

1.1 Motivation

Techniques of test case prioritization organize test instances for execution in a manner that improves their effectiveness according to some performance objective. The purpose of regression testing is to test the modified software to ensure right software output. Retesting whole test cases in a test suite is not always feasible due to limited resources. Therefore, some efficient methods need to be developed that can improve the efficiency of regression testing by arranging the test instances in an order based on some test criterion.

II. REVIEW OF LITERATURE

1. In this document an algorithm is proposed to prioritize the test cases according to the failure detection rate and the impact of the failure. The proposed algorithm identifies the severe failure in the previous phase of the testing process and the effectiveness of the priority test case and the comparison of this with the non-priority ones with the help of the APFD is done here in this document [12].
2. This paper describes several techniques for prioritizing test cases for regression testing to use test execution information, including:
   a) Techniques ordering test instances based on their overall code component coverage,
   b) Techniques which order test instances based on their coverage of not earlier covered code parts, and
   c) Techniques that order test cases based on their estimated ability to identify defects in the code components covered by them [9].
3. New Prioritization technique based on hamming distance was proposed in this research paper. Using an example, it is illustrated and found to produce good results. Average Percentage of Fault Detection (APFD) metrics

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and charts have been used to show the effectiveness of proposed algorithm [11].

4. This document describes the problems associated with regression test selection techniques and uses these issues as the basis for a framework within which the techniques can be evaluated. This scheme shows how our framework is applied by using it to assess current regression test selection methods. The assessment shows the strengths and weaknesses of current methods and some of the issues facing future job in this region [7].
5. This research's proposal and strategy is to use mutation testing to assign priorities to test instances. Using mutation testing, this system introduces various faults in the original program, thus creating a number of mutated copies of the program and test case, with the highest priority being given to the maximum number of these faults. This system reports the **results** of our experiments in which this system applied our technique to test suites and calculated the fault detection rates produced by the test suites prioritized, comparing these fault detection rates with the rates achieved by existing prioritization technique [19].

III. PROPOSED WORK

A. Proposed System Architecture

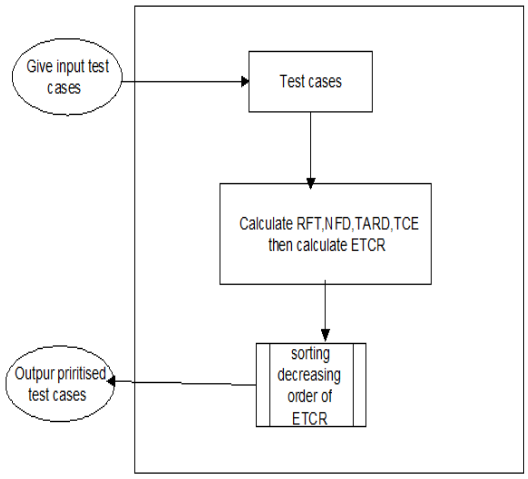

Figure 1: System architecture

B. System Overview

The proposed system will take into account four parameters to solve the problem of prioritization of the test case. The four parameters are RFT, NFD, TARD and TCE. For each test case, the values of the four parameters are calculated and then the value of the ETCR is calculated by adding the calculated values. The planning of test cases is therefore carried out on the basis of the first execution of the highest ETCR values. The RFT is the detection of faults at the same time. Time is considered one of the important factors in this factor. The NFD takes into account the amount of identified mistakes. The TARD parameter focuses on the risk factors associated with each error E, the TCE parameter considers the ability of the test case to detect faults. Compared to the few current well-established prioritization methods, the four factors (one of the variables suggested by us) were used in conjunction to enhance the error detection rate. These four parameters are combined, taking into account distinct characteristics such as moment, amount of mistakes, related hazards, and the capacity of the test case to detect faults, which provides an ideal order, as long as all variables have to be used. The test instances are ordered in descending order of the ETCR values for classification reasons. Compared to the current methodology, the individual variables are not effective. The proposed system will consider precision an d recall value to find the result is accurate or not., **precision** (also called positive$_T$ predictive$_T$ value) is the fraction of relevant instances among the retrieved instances, while **recall** (also known as sensitivity) is the fraction of relevant instances that have been retrieved over the total amount of relevant instances. Both precision and recall are therefore based on an understanding and measure of relevance.

C. Advantages

1. It provides techniques to prioritize the test cases for execution.
2. Rank the test cases.
3. Organizing the test cases in an order following some testing criterion

IV. METHODOLOGY

Effective Test Case Ranking (ETCR)

ETCR is the sum total of all four factors namely RFT, NFD, TARD, and TCE. Mathematically, for test case Tk, ETCR can be computed as given below:

ETCRk = RFTk + NFDk + TARDk + TCEk

In descending order of ETCR values, the test case is structured. Higher the ETCR value means test case will be performed earlier than others.

1. Rate of Fault Detection (RFT) is described as the average number of errors observed by a test case per minute

2. TARD of test case Tk is defined as the potentiality of test case to locate severity of faults per time unit. The efficiency and the effectiveness can be improved by taking into consideration the test cases which reveals greater severe faults percentage.

3. Test Case Effectiveness (TCE) It reveals whether a set of test cases is adequately effective in unearthing defects.

4. The factor namely NFD (our proposed factor) considers the number of faults detected.

CONCLUSION

A novel approach prioritization methodology is intended in this article to improve the rate of error detection by prioritizing test instances for RTS based on four parameters being considered. This paper introduces a necessity for fewer test instances, while executing all errors when compared to current prioritization methods.

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