



An Efficient Approach Using Test Case Prioritization Based on Requirement Based Clustering for Web Applications

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Abstract- *Test case prioritization techniques arrange the test cases in such a way that more crucial test cases are executed earlier to increase the effectiveness of testing. Clustering refers to collect the objects having the similar properties in the same group. The groups in which the data is being divided are known clusters. Requirements-based clustering refers to collect the requirements together in a group which are having the distribution of words that co-occur in the requirements. To increase the efficiency and to reduce the software complexity some other techniques other than k-means clustering can be implemented.*

Keywords- *Test case prioritization, Clustering, Testing, Requirements, Term extraction.*

I. INTRODUCTION

Software engineering is a branch of computer science which contends with the constructing of the software products, which are being developed by the group of engineers. It refers to the organized approach to develop, operate, maintain and test the software. [2]

The basic goal of software engineering is to develop the software that is according to the need of user within the estimated time and cost. Consequently, the focus is on processes, and to assure quality in product, detect bugs and prevent system from bugs by testing. To better manage the development process and to achieve consistency, it is essential that the software development be done in phases. [1]

Software Testing:-

It refers to the run the system to check whether it resemble with the requirements and executes in the planned atmosphere. [2] It involves testing the system in the given conditions and then evaluating the output. It includes developing the test bed to test the software for testing the test cases. The test input is being feed into the test bed, testing is being proceeded and then the obtained output is being compared with expected output. The obtained output is correct then the software is error free but if not then it consist of errors which must be repaired.

The conditions are described as normal and abnormal which are being included in controlled ones and testing is being done under controlled conditions. To find the errors is the main idea behind it. Testing which finds all the errors is the efficient testing. It mainly depends on the type of software testing being used and which can be employed at any stage of the development process.

Need for Software Testing-

Testing is necessary to properly understand the fault, errors in software during its development process. It also ensures user satisfaction and reliability of the software. Sometimes, the errors in the software are insignificant whereas some might cause danger.

The software which is being developed is obviously needed to be checked as errors can be made by human. We had to presume that the software being developed may comprise of errors, there is a need to check it. The unreal assumptions or blind spots can generate errors which need to be avoided.

There is a need of another person rather than who developed the software because might be he considers the factors which we would not be able to include. It also comprises of code of examination and execution in different surroundings and circumstances so the effective software testing results in the high value software, maximum contented users, lower cost, correct and trustworthy output. [2]

Clustering refers to collect the objects having the similar properties in the same group. The groups in which the data is being divided are known clusters. The objects in a cluster resemble more to the objects in its own cluster rather than the objects in the other cluster.

Requirements-based clustering refers to collect the requirements together in a group which are having the distribution of words that co-occur in the requirements. To cluster the requirements help to execute the fewer amounts of test cases. These make the testing process efficient as well as reduce the cost as well as time. Clustering can be done using various

clustering algorithms. Software reliability refers to the possibility of operation of software to be fault free for a particular time period in the given atmosphere. The reliability of system can also be affected by it. Reliability shows how accurately the software works without having any error. Software reliability mainly deals with the software quality. [3]

II. METHODOLOGY

The methodology consists of various steps as follows:

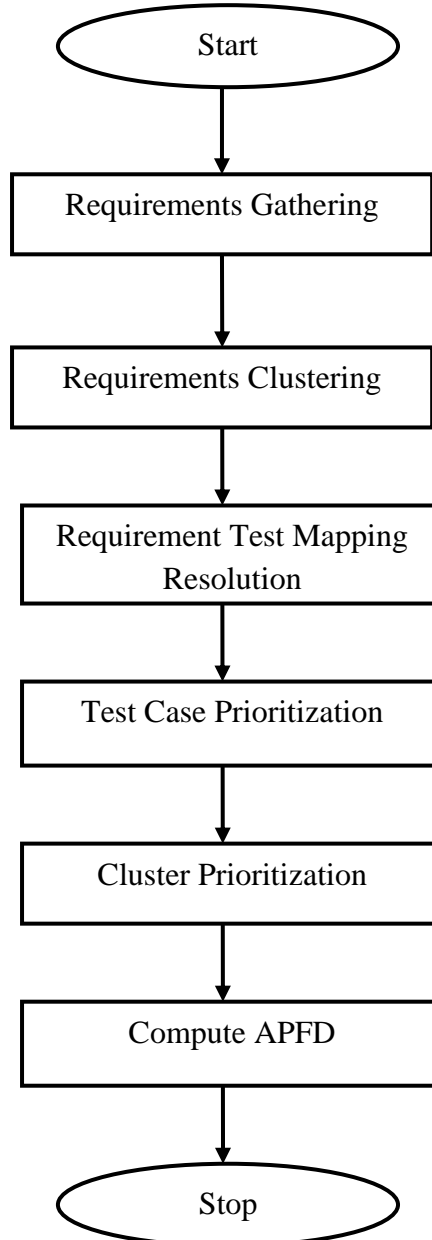


Figure: Methodology [4]

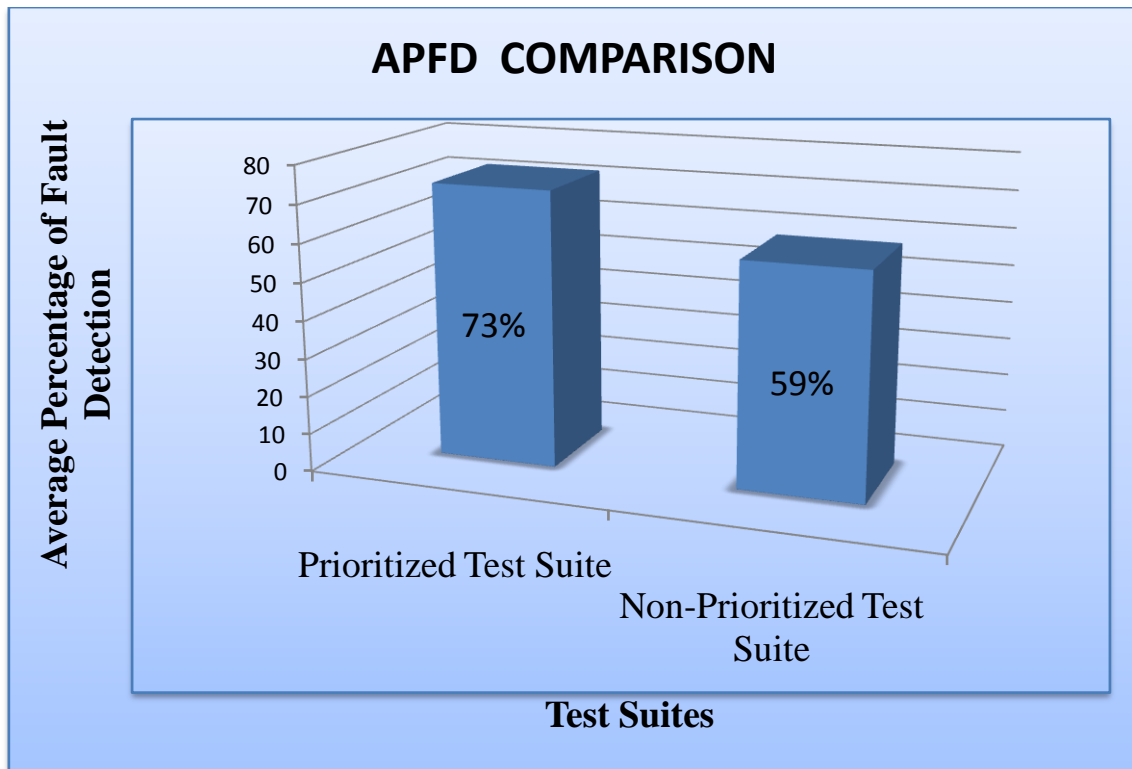
The requirements of the web applications are being gathered from the company. The technique which is used for clustering the requirements is divisive hierarchical clustering. The clusters are made using the term document matrix. Then the requirements are being mapped to test cases. The next step of the methodology was to prioritize test cases. The test cases are prioritized using Weight Prioritization based on the three factors:

- Customer related priority.
- Requirement Complexity.
- Requirement Volatility.

Cluster prioritization is done by computing the rank of clusters. Then, the clusters are arranged according to their rank. The test suite is being arranged for prioritized and non-prioritized test cases. At the last, the APFD values are being calculated and then the results are being compared.

III. RESULTS

The result is being calculated by computing APFD values of non-prioritized and prioritized test suite. The result shows that the prioritized test case has higher APFD value which implies that it has higher rate of fault detection.



In the figure, X-axis represents test suites that are Prioritized and Non-Prioritized and Y-axis represents the average percentage of fault detection.

IV. CONCLUSION

The methodology used consists of various steps. It is very beneficial for web applications. The clustering of requirements is being done using divisive clustering method and the requirements are mapped into test cases. Test cases are prioritized using Weight Prioritization method and then the prioritization of clusters is being done by calculating the rank of clusters. The APFD value is being calculated so that the comparison can be done between non-Prioritized and Prioritized test suite. The result shows that the Prioritized Test case has high APFD value which shows that it had better rate of fault detection.

FUTURE SCOPE

For future, the related work which can be done is as follows:

- The factors being used can be altered or added up.
- Tool can be developed to automate the methodology.
- Different cluster size can be used.
- Method can be implemented using wider population

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