

## ABSTRACT

Software testing phase has been proven that it is one of the most critical and important phases in software development life cycle. In general, software testing phase takes around 40-70% of effort, time, and cost. Test case generation approaches are the most critical and widely-researched activities over a long period of time in the software testing. Many researchers propose effective test case generation techniques, such as specification-based, model-based and source code-based test case generation techniques. Large amount of attentions in literature has so far been given to model-based test cases generation. Despite the size of these efforts invested, outstanding problems for methods that derive tests from use cases are: lack of requirement prioritization before test generation, unable to systematically determine which test cases should be removed, and large number of tests is still generated due to size of alternate paths. Therefore, this dissertation proposes a marketing-driven prioritization method, along with WOW factors and cost model to classify and prioritize requirements. The study shows that there are a relationship between a return on investment (ROI) and a requirement complexity. This dissertation discovers that the high ROI requirements with less complexity are desirable. Furthermore, this thesis introduces alternate path points and risk-driven formulas to minimize a number of tests during a test generation process. The evaluation reveals that proposed methods can lead to smaller number of tests while covering higher critical requirements. In brief, the contributions of this dissertation are to: (a) propose a requirement prioritization based on customer satisfaction during a test case generation process (b) introduce alternative path point formula to minimize a number of test cases generated from UML use case diagram (c) discover a correlation between ROI and a complexity of requirement and (d) enhance the alternative path point formula by adding a retain score.