Project Proposal
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1. Introduction

Random testing is not only a useful testing technique in itself, but also plays a core role in many other testing method. Random testing is selecting test cases from the entire input domain randomly and independently. Random testing is a black-box software testing technique where programs are tested by generating random, independent inputs. Results of the output are compared against software specifications to verify that the test output is pass or fail. In case of absence of specifications the exceptions of the language are used which means if an exception arises during test execution then it means there is a fault in the program. There are basically two approaches towards the selection of test cases, namely the white box and the black box approach. Among the black box techniques, random selection of test cases is generally regarded as not only a simple but also an intuitively appealing technique. It has two advantages: Intuitively simple and Allowing statistical quantitative estimation of the software's reliability. However, it has some significant weakness: first, It only finds basic bugs. Second, It is only as precise as the specification and specifications are typically imprecise. Third, It compares poorly with other techniques to find bugs. Thus, any significant improvement to random testing has an impact throughout the software testing community. So we use Adaptive Random Testing(ART) instead of random testing. In the paper which name is *Adaptive Random Testing,* the authors gave us the definition of adaptive random testing, "Adaptive random testing seeks to distribute test cases more evenly within the input space. It is based on the intuition that for non-point types of failure patterns, an even spread of test cases is more likely to detect failures using fewer test cases than ordinary random testing. " According to article Adaptive Random Testing: *The ART of test case diversity*, "the authors indicate that recently, Adaptive Random Testing (ART) was proposed as an effective alternative to random testing." In this paper, the authors show us the the most important and comprehensive results which is related to ART. With ordinary random testing, the chances of hitting the failure patterns, that is selecting failure-causing inputs as test cases, depends solely on the magnitude of the failure rate. However, a closer inspection shows that for non-point patterns which include both the strip and block patterns, the failure detection capability can be significantly improved by slightly modifying the ordinary random testing technique. Let us use an example to illustrate the ntuition behind our modified random testing.

2. Project Plan

First of all, in the following several weeks, in order to understand the concept of how does the adaptive random testing running, I will continue to read more papers about the adaptive random testing. In addition, I will also find some similar project as an example to learn how does it work. After preparing well, I will write a rough code to

implement in TSTL. And then I will try to fix bugs and add some new or necessary. Finally, I will get the final test files.

Reference:

Chen, T., Leung, H., & Mak, I. (n.d.). Adaptive Random Testing. Retrieved from http://www.utdallas.edu/~ewong/SYSM-6310/03-Lecture/02-ART-paper-01.pdf

Chen, T., Leung, H., & Mak, I. (n.d.). Adaptive Random Testing.