Course: CS 569
Instructor: Alex Groce
Name: Ruizhi Guo
Date: 04.18.2016
Email: guoru@oregonstate.edu

Part 1 Project Proposal

Feedback – directed Random Test Generation in TSTL

1 Description of Project

As we known, program test is one of the important methods to evaluate the program. In these test method, random test is outstanding because it saves time and provides efficient test. Because random program test is useful to help users to get some independent inputs and then it is easy to find if the output meets the requirement. For a long time, some theoretical experts argue the efficiency between the random program test and the systemic program test. Some expert believed that random test is hard because the test data generation, and the random test is kind of waste time and it can not cover some specific case. So it is hard for us to test all the cases(although if we have enough time, random test would list all the case) by using random test, how could we to improve random test. Compare with systemic test, in some cases, random test could get lower level code coverage. Because random test generation is easy to create some same test or equivalent test frequently. So we need to find some way to improve the random test.

2 Description of the Project Plan and Idea for the Test Generation

As we can find on the github provides by Professor Groce, the Feedback-directed Random Test Generation is one of the amazing way to improve the random test generation. According to the paper, the authors presents a technique that improves random test generation by incorporating feedback obtained from executing test inputs as they created. The authors provide that their technique builds inputs incrementally by randomly selecting a method call to apply and finding arguments from among previously-constructed inputs. As soon as an input is built, it is executed and checked against a set of contracts and filters. The author also believed that the result of the execution determines whether the input is redundant, illegal, contract-violating, or useful for generating more inputs. So this method generate more useful input for random test and it reduce the time of work.

3 Project plan

1. I would search more relative papers and information about Feedback-directed random test generation. In order to get a better understanding of this method, I would do more research on it.
2. I would to do some practice about TSTL and try to find how to apply Feedback-directed random test in TSTL.
3. In order to get more idea about how to apply the new method in TSTL, I also need to review about how to use python to implement this algorithm.

4 Reference

[1] J. W. Duran and S. C. Ntafos. An evaluation of random test. IEEE TSE, 10(4): 438-444, July. 1984.

[2] K. Yatoh, K. Sakamoto, F. Ishikawa, S, Honiden. Feedback-Controlled Random Test Genreation. In ISSTA 2015

[3] Pacheco, Carlos, et al. “Feedback-directed random test feneration.” Software Engineering, 2007. ICSE 2007. 29th International Conference on. IEEE, 2007.

[4] R. Ferguson and B. Korel. The chaining approach for software test data generation. ACM TOSEM, 5(1): 63-86, Jan. 1996.