

Feedback-directed Random Test Generation

CS 569 Project Part 2

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[1]. BACKGROUND:

When I presented the project proposal, I decided to go with Kernel Density Adaptive Random testing but after seeing its complexity I decided to go with Dynamic Analysis using Model checking and Static Analysis mentioned in “Feedback-directed Random Test Generation”, which is raised by Pacheco, Carlos; Shuvendu K. Lahiri; Michael D. Ernst; and Thomsa Ball. The writers have found a new way to progress the efficiency of random testing and they have mentioned this in their paper. The techniques presented by the authors, they are improving random test generation by utilizing the response found from the input test cases which the generator has created before.

[2]. ALGORITHM:

This algorithm has three arrangements. 1. error sequence, 2. non-error sequence, and 3. new sequence. These error sequence and non-error sequence are being used to accumulate the cases that have been tested. The new sequence in algorithm is used to store the new case that generator creates. Starting from the beginning, the generator will create a test case and put it into new sequence. Secondly after checking the new test case, stored in the new sequence, has been tested before. When testing the new case has been tested, create a new case. Thirdly, now executing the new sequence and check the feedback. When the feedback has no error then store the new sequence into non-error sequence. If there is error in feedback, then store the new sequence into error sequence.

[3]. My ALGORITHM:

I have tried a to implement a basic algorithm for a novel test generation algorithm expending the TSTL API. My algorithm meets the basic necessity and support all of required command line by defining a function which is known as `parse_args()`. I am using almost the same function as `random tester.py`. In my function I have added command line parameters arguments and set input `sys.argv` into this parameters and defined a function which is called `make_config (pargs and parser)`. The functionality of this function is that it will return a dictionary, this will let me use command line by calling `config` function. I have also defined a function which is called `check_action`. This function will also get a random action using `sut.randomEnabled(random seed)` and this will check whether the action by using `sut.safely(action)`. If the action is not performed as required, then it's a bug and failure message is displayed. `Tester1.py` uses the algorithm of “Feedback-directed Random Test Generation”. There are three list: `news`, `error`, and `nonerror`. `news` will using to store `sut.newStatements()`. `error` will store the `sut.currStatements()` and it finds a bug. `nonerror` will store `sut.currStatments()` which will not contain a bug. The `tester1.py` allow user give a time how long will the tester run. alking about when the algorithm produces a new

statement, the algorithm will check whether the statements have been tested. If statements have been tested, then it will generate a new statement.

[4]. FUTURE:

In my algorithm I will try to put more parameters and SUTs. I will also try to make my algorithm more efficient.

REFERNCES:

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[4]. Pacheco, Carlos; Shuvendu K. Lahiri; Michael D. Ernst; Thomas Ball (May 2007). "Feedback-directed random test generation". ICSE '07: Proceedings of the 29th International Conference on Software Engineering (IEEE Computer Society): 75–84.