Adaptive Random Testing Proposal

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My idea for test generation is using Adaptive Random Testing. The concept of adaptive random testing is we want to generate a test case which is spaced out by the other, so that the two neighbored test cases will keep a distance from each other. To approach this goal we have to generate many test cases and each time choose the appropriate one which is not too close to the previous test case as a new test case. First, we will have two set of test case. The first set of test cases, which is called executed set, will store the test cases that already executed and without any failure. The second set of test cases, which is called candidate set, is a set of test cases where all the test cases in the set are randomly selected without replacement. Before the test start the initial state for executed set is empty. Then, we will randomly select a test case from our candidate set to our executed set. The process will keep going and update both executed and candidate set until the failure arise. Each time when we selected a test case from our candidate set we have to select a test case which is far away from the previous selection. Because the test cases should not be repeated, the random selection of test case in adaptive random testing is based on a uniform distribution without replacement. In fact, the adaptive random testing will use the expected number of test cases required to detect the first failure as the effectiveness metric.

The difference between the ordinary random testing and the adaptive random testing is the ordinary one only measure the rate of failure. Also, the performance of the testing strategy depends on both failure rate and geometric pattern of the failure causing input. We are hard to define the that the performance of random testing can really be improved by taking the failure causing inputs.

Random testing is a popular testing method. It is also a reliable and statistical method. However, some study shows that failure patterns may turn to be a point, strip or block failure patterns. By spread each test cases, we can have more chance to find the failure pattern. doing a adaptive on the random testing, we can have a more precise result than the ordinary random testing.

Reference:

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