Accelerate the Software Reliability Testing Execution Process with Fuzzy Discrimination

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Abstract: Software Reliability Testing (SRT) is a quantificational method to estimate the software reliability, which is to test software based on operational profile. However, it is difficult to be applied in engineering projects, one of the reasons is the testing cycle is too long and the testing cost is too high. How to improve the efficiency of the SRT is an important topic. In real SRT projects, it is the execution process that takes the most of testing time in SRT, so it is a good way to improve the efficiency by shortening the testing execution time. Generally, a large number of faults have been removed by the regular tests before SRT, such as unit test, integration test and system test. Thus many test cases of SRT performed after regular test have found no faults. Because the test cases of SRT are generated by random sample with operational profile, some test cases can be similar. So a new method to accelerate the SRT is put forward, in which the data characters of test cases would be analyzed at first; and then the characters of test case which have been executed with different testing result (failure or not) would be accumulatively analyzed; The characters of test case preparing to be executed would be judged whether it is similar to the characters with failure or not by a fuzzy discrimination method. If it is similar to the test case that didn’t find fault then it can be skipped and similar or same execution time would be recorded, else it would be tested and joined the accumulative analysis. The whole process of test cases analysis and a case study are presented in this paper.