A regression test case selection and prioritization for object-oriented programs using dependency graph and genetic algorithm

ABSTRACT

Regression testing is very important activity in software testing. The re-execution of all test cases during regression testing will be costly. The effective and efficient test case selection from the existing test suite becomes very critical issue in regression testing. This paper presents an evolutionary regression test case prioritization for object-oriented software based on dependence graph model analysis of the affected program using Genetic Algorithm. The approach is based on optimization of selected test case from test suite T. The goal is to identify changes in a method's body due to data dependence, control dependence and dependent due to object relation such as inheritance and polymorphism, select the test cases based on affected statements and ordered them based on their fitness by using GA. The number of affected statements determined how fit a test case is good for regression testing. A case study was reported to provide evidence of the feasibility of the approach and its benefits in increasing the rate of fault detection and reduction in regression testing effort. The goodness of this ordering is measured using Average Percentage of rate of Faults Detection (APFD) metric to evaluate the effectiveness and efficiency of the approach. It was observed that our proposed approach is more efficient and effective in regression testing.

Keyword: Regression testing; Regression test case; Evolutionary algorithm; Genetic algorithm; Regression test case prioritization; System dependence graph