Abstract

Path testing a program involves generating all paths through the program, and finding a set of program inputs that will execute every path. Since it is impossible to cover all paths in a program, path testing can be relaxed by selecting a subset of all executable paths that fulfill a certain path selection criterion and finding test data to cover it. The automatic generation of such test paths leads to more test coverage paths thus resulting in efficient and effective testing strategy. This paper presents a structural-oriented technique that uses a genetic algorithm (GA) for automatic generation of a set of test paths that cover the all-uses criterion. In the case of programs that have loops, the proposed technique generates paths according to the ZOT-subset criterion, which requires paths that traverse loops zero, one and two times. The proposed GA uses a binary vector as a chromosome to represent the edges in the DD-graph of the program under test. The set of paths generated by the proposed GA can be passed to a test data generation tool to find program inputs that will execute them. Experiments have been carried out to evaluate the effectiveness of the proposed GA compared to the random test path generation technique.
References

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Index Terms

Computer Science
Artificial Intelligence
Keywords
Automatic test path generation  Data flow testing  Genetic algorithms.