Abstract

Path testing requires generating all paths through the program to be tested, and finding a set of program inputs that will execute every path. The number of possible paths in programs containing loops is infinite, and so it is very difficult, if not impossible, to test all of them. 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 genetical swarm optimization (GSO) based technique, which effectively combines a genetic algorithm (GA) based technique and a particle swarm optimization (PSO) based technique, for automatic generation of a set of test paths that cover the all-uses criterion. Experiments have been carried out to evaluate the effectiveness of the proposed GSO approach in test paths generation compared to the GA and PSO approaches.

**Index Terms**

Computer Science  
Artificial Intelligence

**Keywords**

Software testing  
Automatic test path generation  
Data flow testing  
Genetic Algorithms  
Particle Swarm Optimization  
Genetical Swarm Optimization