

Hybrid Evolutionary Algorithms for Solving Software Clustering Problem

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Abstract: Software clustering is a method for increasing software system understanding and maintenance. Software designers, first use MDG to model the structure of software system. In MDG, system modules (e.g. files, classes) are represented as nodes and their relationships (e.g. function calls, inheritance relationships) as directed edges that connect the nodes. Once the MDG created, clustering algorithms are applied and create a partitioned MDG. Graph partitioning is an NP complete problem and for this reason number of approximate algorithms for solving it has been reported in the literatures. In this paper two approximate algorithms based on learning automata for solving software clustering problem have been proposed. The first algorithm is based on learning automata and the second algorithm is a hybrid evolutionary algorithm obtained from combining object migrating learning automata and genetic algorithms. Using computer simulation it has been shown that the second algorithm accelerates the searching process and also prevents the algorithm from getting stuck in local optimal. The proposed algorithms have been compared with some existing algorithms and shown that the second algorithm has superiority over the existing methods.

Keywords: Learning Automata, Genetic Algorithm, Software Clustering, Module Dependency Graph