T-way test suite generation based on hybrid flower pollination algorithm and hill climbing

Abdullah B. Nasser[1], Nor Wardah Binti Mohd Nasir[1], Kamal Z. Zamli[1], Waheed Ali H. M. Ghanem[2] and Fakhrud Din[3]

[1] Faculty of Computing, College of Computing and Applied Sciences, Universiti Malaysia Pahang, Pekan 26600, Pahang, Malaysia

[2] Faculty of Ocean Engineering Technology and Informatics, Universiti Malaysia Terengganu, Kuala Terengganu 21030, Malaysia

[3] Department of Computer Science & IT, University of Malakand, Pakistan

ABSTRACT

One of the common application of search-based software testing (SBST) is generating test cases for all objectives characterized by a scope model (e.g. articulations, mutants, branches). The application of meta-heuristic algorithms in t-way tests generation, as an example of SBST, has as of late gotten to be predominant. Thus, numerous valuable meta-heuristic algorithms have been created on the premise of the usage of t-way techniques (where t shows the interaction quality). T-way testing technique is a sampling technique to produce an optimum test suite in a systematic manner. In other words, is to generate a smaller test suite size that can be used for testing the software in less time and coast. Here, all t-way techniques generate the test suite with the aim to cover every possible combination produced by the interacting inputs or parameters. All possible t-combinations of the system's components must be covered at least once. Besides, the purpose of the t-way testing technique is to overcome exhaustive testing. Studies reported that there is no single strategy that appears to be superior in all configurations considered. In this research paper, we propose a new software t-way testing tool based on hybrid Flower Pollination Algorithm and Hill Climbing for generating test suite generation, called FPA-HC strategy can be used for generating smaller test suite size. The FPA-HC evaluated against the existing t-way strategies including the original FPA. Experimental results have shown promising results as FPA-HC can produce very competitive results comparing with existing t-way strategies.

KEYWORDS

Application programs; Heuristic algorithms; Testing; Hill climbing; Meta heuristic algorithm

ACKNOWLEDGMENTS

This research is funded by Ministry of Higher education - Malaysia (MOHE), under Fundamental Research Grant Scheme (FRGS) grants: "Formulation of Bi-objective Elitist Dragonfly Algorithm (BiDA) for constructing prioritized t-way test cases", FRGS/1/2019/ICT02/UMP/02/13, and Universiti Malaysia Pahang (UMP). We thank MOHE and UMP for the contribution and supports.