

Hyper-Heuristic Strategy for Input-Output-Based Interaction Testing



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Abstract Software testing aims at exploring faults within software in order to ensure it meets all necessary specifications. Test case design strategies play key role in software testing. Classical test case design strategies, however, do not sufficiently include support for exploration of faults due to interaction between parameter values. New strategies known as t-way strategies (where t expresses interaction strength) have been developed for finding interaction faults. However, existing t-way strategies for input-output-based relationship (IOR) interaction testing mostly adopt greedy algorithms which often generate poor quality test data. Therefore, this paper presents the design of a new IOR test suite generation strategy called IOR_HH based on the exponential Monte Carlo with counter (EMCQ) hyper-heuristic. EMCQ is a parameter free hyper-heuristic which works as controller of the three implemented low-level meta-heuristic operators, namely crossover, peer learning and global pollination in the proposed IOR_HH strategy. Experimental results demonstrate the impact of the proposed strategy against existing computational strategies for IOR interaction testing.

Keywords Input-output interaction · Hyper-heuristic · Exponential monte carlo

1 Introduction

Dependency on software systems in every walk of human life makes software testing one of the crucial stages within software development life cycle [1]. Software testing

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