

## Chapter 30

# An Orchestrated Survey on $T$ -Way Test Case Generation Strategies Based on Optimization Algorithms

AbdulRahman A. Al-Sewari and Kamal Z. Zamli

**Abstract** The test case construction is amongst the most labor-intensive tasks and has significant influence on the effectiveness and efficiency in software testing. Due to the market needed for diverse types of tests, recently, several number of  $t$ -way testing strategies (where  $t$  indicates the interaction strengths) have been developed adopting different approaches Algebraic, Pure computational, and Optimization Algorithms (OpA). This paper presents an orchestrated survey of the existing OpA  $t$ -way strategies as Simulated Annealing (SA), Genetic Algorithm (GA), Ant Colony Algorithm (ACA), Particle Swarm Optimization based strategy (PSTG), and Harmony Search Strategy (HSS). The results demonstrate the strength and the limitations of each strategy, thereby highlighting possible research for future work in this area.

**Keywords**  $T$ -way testing · Test case generation · Software and hardware testing · Optimization algorithms

### 30.1 Introduction

In the last 50 years, many new and useful techniques have been developed in the field of software testing for preventing bugs and for facilitating bug detection. Even with all these useful techniques and good practices are in place, there is no guarantee that the developed software is bug free. Here, only testing can demonstrate that quality has been achieved and identify the problems and the risks that remain.

---

A. A. Al-Sewari (✉) · K. Z. Zamli  
Software Engineering Department, Faculty of Computer Systems and Software Engineering,  
Universiti Malaysia Pahang, 26300 Gambang, Kuantan, Pahang, Malaysia  
e-mail: alsewari@ump.edu.my

H. A. Mat Sakim and M. T. Mustafa (eds.), *The 8th International Conference on Robotic, Vision, Signal Processing & Power Applications*,  
Lecture Notes in Electrical Engineering 291, DOI: 10.1007/978-981-4585-42-2\_30,  
© Springer Science+Business Media Singapore 2014

255