

Use of Artificial Immune Systems to Optimize the Reader Antenna Placement at an RFID Portal

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Abstract

In the past few years, researchers solved the portal reader antennas placement problem to maximize the read accuracy of an RFID portal with an enumeration approach. While the enumeration approach was able to solve the portal reader antenna placement problem, both of the execution time and the CPU computation power consumption are considerable. Therefore, this study attempts to solve the portal reader antennas placement problem with a biology-inspired approach. In this study two methods with artificial immune systems are introduced. They are (1) the method with clonal selection algorithm (CLONALG), and (2) the proposed method, artificial immune algorithm with memory and suppressor cells method (AIA-MS). Experiments were performed to compare the performance among the genetic algorithm method (GA), the CLONALG method and the AIA-MS method. The results showed that, comparing with the execution time and the CPU computation power consumption of the enumeration method, AIA-MS had 97% simulations finding the optimal individuals and only used 61% of the execution time and the CPU computation power consumption in the 100 times simulations. In the same circumstances, CLONALG had 84% simulations and GA only had 40% simulations finding the optimal individuals. AIA-MS thus has the best performance.

Keyword : Artificial Immune Algorithm, Reader Antenna Placement, RFID