A Survey and Analysis of Benchmark Fitness Functions

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Abstract

The selection of the most effective algorithm to optimize a problem is one which happens in a large number of different situations. A Fitness function model (FFM) is a neural network model of the fitness function. These models' structures can be visually represented. Knowledge of whether, and how the features of a FFM can be used to identify the most effective algorithm is the aim of this investigation.

In this survey a number of fitness functions were identified and a FFM made of each. The representation of their structures were reviewed for patterns and similarities and where these were found, the related problems, as defined by the fitness functions, were optimized using four different heuristics. The most effective of these four heuristics was thus identified. The results of all the experiments were reviewed.

Although it was shown that where fitness functions result in FFMs of identical structure, the most effective algorithm is the same for both, too few experiments were performed to assert this with a statistically robust level of confidence.