

The development of low-level heuristics for solving instances of a problem is related to the knowledge of an expert. He needs to analyze several components from the problem instance and to think out an specialized heuristic for solving the instance. However if any inherent component to the instance gets changes, then the designed heuristic may not work as it used to do it. In this paper it is presented a novel approach to generated low-level heuristics; the proposed approach implements micro-Differential Evolution for evolving an indirect representation of the Bin Packing Problem. It was used the Hard28 instance, which is a well-known and referenced Bin Packing Problem instance. The heuristics obtained by the proposed approach were compared against the well know First-Fit heuristic, the results of packing that were gotten for each heuristic were analized by the statistic non-parametric test known as Wilcoxon Signed Rank test.

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EXPERIMENTAL STUDY OF A NEW ALGORITHM-DESIGN-FRAMEWORK BASED ON CELLULAR COMPUTING

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In this chapter the linear ordering problem with cumulative costs (LOPCC) is approached. Currently, a tabu search and a GRASP with evolutionary path-relinking have been proposed to solve it. We propose a new pseudo-parallel strategy based on cellular computing that can be applied to the design of heuristic algorithms. In this paper the proposed strategy was applied on a scatter search algorithm to show the feasibility of our approach. A series of computational experiments of the designed cellular algorithm were carried out to analyze the performance reached with the proposed approach versus its monolithic counterpart. Additionally, several parameters used were analyzed to determine their effect on the performance of the designed algorithms. We consider that the new pseudo-parallel approach used in this work can be applied to design high performance heuristic algorithms.

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IMPROVING THE PERFORMANCE OF HEURISTIC ALGORITHMS BASED ON EXPLORATORY DATA ANALYSIS

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This paper promotes the application of empirical techniques of analysis within computer science in order to construct models that explain the performance of heuristic algorithms for NP-hard problems. We show the application of an experimental approach that combines exploratory data analysis and causal inference with the goal of explaining the algorithmic optimization process. The knowledge gained about problem structure, the heuristic algorithm behavior and the relations among the characteristics that define them, can be used to: a) classify instances of the problem by degree of difficulty, b) explain the performance of the algorithm for different instances c) predict the performance of the algorithm for a new instance, and d) develop new strategies of solution. As a case study we present an analysis of a state of the art genetic algorithm for the Bin Packing Problem (BPP), explaining its behavior and correcting its effectiveness of 84.89% to 95.44%.

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NATURAL LANGUAGE INTERFACES TO DATABASES: AN ANALYSIS OF THE STATE OF THE ART

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People constantly make decisions based on information, most of which is stored in databases. Accessing this information requires the use of query languages to databases such as SQL. In order to avoid the difficulty of using these languages for users who are not computing experts, Natural Language Interfaces for Databases (NLIDB) have been developed, which permit to query databases through queries formulated in natural language. Although since the 60s many NLIDBs have been developed, their performance has not been satisfactory, there still remain very difficult problems that have not been solved by NLIDB technology, and there does not yet exist a standardized method of evaluation that permits to compare the performance of different NLIDBs. This chapter presents an analysis of NLIDBs, which includes their classification, techniques, advantages, disadvantages, and a proposal for a proper evaluation of them.