Simulated Annealing

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Abstract—Simulated annealing - what is it about?

Since its introduction as a generic heuristic for discrete optimization in 1983, simulated annealing (SA) has become a popular tool for tackling both discrete and continuous problems across a broad range of application areas. The use of simulated annealing in the solution of practical problems will be covered. A detailed statement of the algorithm is given, together with an explanation of its inspiration from the field of statistical thermodynamics. This is followed by a brief overview of the theory with emphasis on those results that are important to the decisions that need to be made for a practical implementation. It then goes on to look at some of the ways in which the basic algorithm has been modified in order to improve its performance in the solution of a variety of problems. It also includes a brief section on application areas and concludes with general observations and pointers to other sources of information such as survey articles and websites offering downloadable simulated annealing code.

Index Terms—**HLS, algorithm, AI, annealing, Python**

I. Introduction

This document describes simulated annealing (abbreviated as SA) in terms of: (1) definition, and (2) history of SA.

A. Definition

Simulated annealing is one of the High-Level Synthesis (HLS) algorithms. SA is a probabilistic technique for approximating the global optimum of a given function. Specifically, it is a metaheuristic to approximate global optimization in a large search space for an optimization problem [1].

B. History

- who developed it, talk about its history (e.g. when was it developed) briefly.

II. Model-based Design

There are model-based designs to describe simulated annealing.

A. Analogy to a Toy

Analogy to a toy [2].

B. Solving Sudoku

Solving sudoku [3].

III. Simulated Annealing Algorithm

This section describes the algorithm in details.

A. Metropolis Algorithm

- describe about metropolis algorithm [4].

B. Salesman problem

- Salesman problem [5].

IV. Uses

- real-life examples [6].

A. Artificial Intelligence

in the field of AI [7]

B. Search Function in Python

- used in python as well for search functions [8].

V. Advantages

- talk about advantages

VI. Constraints

- computational issues occur from using it

VII. Evaluation

- evaluate pros and cons, and see if it's used currently, or compare to other technology

VIII. Conclusion

- summary of the whole paper

References

[1] https://link.springer.com/referenceworkentry/10.1007%2F978-3-540-92910-9_49.

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[7] https://www.youtube.com/watch?v=S9vs05eAGN0.

[8] https://www.youtube.com/watch?v=C86j1AoMRr0.