

An ACO algorithm for image compression

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Abstract

This paper is an application of Ant Colony Metaheuristic (ACO) to the problem of image fractal compression using IFS. An ACO hybrid algorithm is proposed for image fractal compression and the results obtained are shown. According to the tests carried out, the proposed algorithm offers images with similar quality to that obtained with a deterministic method, in about 34% less time.

Keywords: Algorithms, Image Compression, Fractals, Metaheuristics

1 Introduction

For over 15 years, data compression has had relevance due to the increasing volume of personal and professional information (documents, videos, audio, images) that we use everyday. Data compression software is constantly used to store or transmit information with methods that try to reduce redundant information in data file content and thus, to minimize their physical space.

Image fractal compression is among data compression methods. Defines in [11] as an image that can be completely determined by a mathematical algorithm in its thinnest texture and detail, it can then be inferred that fractal compression consists in obtaining an approximation of a real image by means of a set of mathematical transformations applied to certain blocks in the image. A restriction on these methods is the high computational cost of image compression.

An analogy with the real ants' behavior was presented as a new paradigm called Ant Colony Optimization (ACO). The main features of ACO are the fast search of good solutions, parallel work and use of heuristic information, among others. Several problems have been solved using ACO: TSP, Knapsack, Cutting Stock, Graph Coloring, Job Shop, etc.

This paper proposes an ACO hybrid algorithm for image fractal compression, a problem still unsolved with ACO. In section 2, we describe some theoretical aspects of both fractal compression

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