بسم الله الرحمن الرحيم

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التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

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Ain Shams University
Faculty of Engineering
Computer and Systems Engineering Department

Fractal Image Compression

A Thesis
Submitted in Partial Fulfillment of the
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(Computer and Systems)

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This dissertation is submitted to Ain Shams University for the degree of Master of Science in Electrical Engineering (Computer and Systems Engineering).

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No Part of this thesis has been submitted for a degree or qualification at other university or institution.

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Fractal Image Compression

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Abstract: Due to the huge mass information storage and retrieval Grows of images, the processing and transmission time has been costly enough and the need to an image compression technique has become an important issue in relation to transmission and storage of information. Digitized images are often have the property of being both data extensive and relatively redundant objects. Now, the problem is to find a suitable technique to compromise between image compression ratio, high image quality and the time needed to encode/decode the original image. Currently the most popular approach to image compression is to make a frequency transformation of the image and then throw away the high-end coefficients and only use the low-end coefficients to describe the original image. Image compression based on fractal theory is a new and radical different method. It has shown promising results even though it is still in the early development phase. The method originates from Bransley and his work with Iterated Function System (IFS). Jacquien proposed an automatic fractal image encoder and since his first publication [15] on

fractal based compression this specialized area has been steadily growing. The basic principal of fractal image compression is that the image can be reconstructed using the self-similarities present in the image. A major problem regarding this new technique is the high encoding time due to the complexity of the basic algorithm. This complexity makes fractal encoding nearly useless compared to other techniques (i.e. frequency transformation). Various attempts have been made to prune the encoding time by reducing the complexity of the encoder. Attempts have also been made to utilize the fractal compression technique in other areas such as sound data, color images, and image sequences. In This thesis:

- An Image Processing Overview
- Survey of Image Data Compression Methods
- Full detail of Fractal Image Compression Approaches
- Proposed solution to break time complexity of the exhaustive search
- A comparative study attempt between
    - Wavelet Transform
    - Vector Quantization
    - JPEG
    - Heavy Brute Search
    - A Proposed Solution

Keywords: Fractal, Affine Transformation, Contractive, R-tree, Image Compression.

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