بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

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To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

Cairo University
Faculty of Engineering
Engineering Mathematics and Physics Department

New Quantization Methods for DCT based Digital Image Compression Techniques

A Thesis submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the Requirements
For the Degree of

Master of Science

In

Engineering Mathematics
(Computer Science)

By

Ahmed Mohamed Abdel Rahman Salama

Supervised by

Prof. Dr. \ Ekram Fathy Abdel Gawad

February 2001

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To my parents

Abstract

The term "Image compression" refers to the process of reducing the amount of data required to represent a digital image.

A digitized, uncompressed image of acceptable quality requires an amount of memory comparable to the memory needed by hundreds of pages of text. This is why images are given special attention on the general field of data compression. Specific characteristics of images such as their histograms, their interpixel redundancies, and their psychovisual characteristics are used to adequately compress them. The later aspect, which is responsible for making the eye believe that two sufficiently similar images are identical, is the key point that lets images be compressed by much higher ratios than other files such as text, which require, unlike images, a perfect recovery during decompression.

The main goal of this work is to design a new quantization method for DCT based digital image compression techniques and to compare the performance of our compression algorithm utilizing the new quantization methods to the JPEG compression algorithm. Contrary to the unsymmetrical quantization matrix used by the JPEG, a symmetric matrix was designed such that the quantization factor at the coefficient [u,v] is directly proportional to the distance between the points of frequencies [0,0] and [u,v]. When the newly designed algorithm was tested on a group of gray scale images, the results were so impressive, for all images either we will have a significant decrease in the MSE in the reconstructed image (reached in some cases 26%) for the same entropy in the quantized DCT matrix as that of the JPEG, or we will have a significant decrease in entropy (reached in some cases 16 %) for the same MSE as that of the JPEG, which means that higher compression ratios can be achieved for the same quality of the reconstructed image.

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