Abstract

We describe, in this paper, a multi-agent system (MAS) dedicated to the compression of digital images. An image may be considered as a matrix of N lines and of M columns, that is to say a size of NxM pixels. To each line, we associate an agent. Our approach is inspired from the RLE (Run Length Encoding) method but instead of storing the occurrences of the pixels having a same value followed by the value of these pixels, we use a labeling table which contains all the values of the pixels of the image. We obtain a compressed image as a list of color labels followed by the number of successive occurrences of this color. We observe, that, an image is made up of about thirty different colors approximately, this mean that the label of color can be coded on five bits. This method is very effective for images where the color is coded on several bytes. The algorithm is as follow: each agent traverses the image line with which it is associated by seeking for each detected color the number of its successive occurrences. The agent thus draws up a set of lists for each color found including the number of its successive occurrences. All the other agents carry out these tasks in parallel. It is possible to obtain images compressed without or with loss of information according to the desired quality of the compressed image. This approach allows a very great improvement of the performances in storage capacity of information (the compressed images thus obtained occupy less memory space) and in execution time (the parallel execution allows very high accelerations of the algorithms).
- Ferber, J. 1999. &apos;Multi-Agent Systems. An Introduction to Distributed Artificial Intelligence&apos;. Addison Wesley, London,
  - Gutknecht, O., Ferber, J. and Michel, F. 2000 &apos;Madkit: une expérience d&apos;architecture de plate-forme multi-agent générique. 8ème Journées Francophones sur l&apos;Intelligence Artificielle Distribuée et les Systèmes Multi-Agents&apos; (JFIADSM&amp;apos;2000), La Réunion, Hermès, pp. 223-236, (in French)
  - Salomon, D. 2004 &apos;Data compression, the complete reference&apos;, Springer.
  - Sayood, K. 2006 &apos;Introduction to Data compression&apos;; Morgan Kaufmann Series in Multimedia Information and Systems
  - Pennebaker, W. B. and Mitchell J. L., 1993 &apos;JPEG: still image compression standard&apos;.
  - Wallace, G. K. April 1991 &apos;The JPEG Still Picture Compression Standard&apos;.
  - Comm. ACM, vol. 34, no. 4, pp. 30-44.
  - Mandelbrot, B. 1977. &apos;Fractals: form, chance and dimension&apos;.
A Multi-agent System for Image Compression

Francisco CA and Reading UK: W. H. Freeman & Co.
- Barnsley, M. F. and Sloan, A. D. , 1988 &apos;A better way to compress images&apos;., BYTE magazine, pp 215-223.
- Talukder, K. H. and Harada, K. , june 2006 &apos;A Scheme of Wavelet Based Compression of 2D Image&apos;, Proc. IMECS, Hong Kong, pp. 531-53.

Index Terms

Computer Science
Image Processing
Keywords
Digital image  image compression  agent  multi-agent system (MAS)