Color-WISE: A system for image similarity retrieval using color

I.K. Sethi*, I. Coman, B. Day, F. Jiang, D. Li, J. Segovia-Juarez, G. Wei, and B. You

Vision and Neural Networks Laboratory
Department of Computer Science
Wayne State University
Detroit, MI 48202

ABSTRACT

Color is one of the most widely used features for image similarity retrieval. Most of the existing image similarity retrieval schemes employ either global or local color histogramming. In this paper, we explore the use of localized dominant hue and saturation values for color-based image similarity retrieval. This scheme results in a relatively compact representation of color images for similarity retrieval. Experimental results comparing the proposed representation with global and local color histogramming are presented to show the efficacy of the suggested scheme.

Keywords: color-based image retrieval, color histogramming, image databases, visual information

1. INTRODUCTION

The management of visual documents – images, films, and videos, is quite unlike the management of traditional documents – books, magazines, and journals. The major difficulty in managing visual documents is the lack of universally valid and acceptable methods of encoding the contents of visual documents in forms suitable for indexing and retrieval. This is not surprising as visual documents are often open to several and some times contradictory interpretations. With a growing trend towards digital storage and management of textual and visual documents, the difficulties of managing visual information have been accentuated. As a result, there is an increasing interest in developing suitable methods for cataloging, browsing, querying, and retrieval of visual information that increasingly rely on computers to determine the contents of visual documents. Since high-level content analysis of visual documents is not within the reach of existing image analysis and computer vision methods, similarity-based search and retrieval methods presently dominate the field of visual information management.

A similarity-based method for retrieval organizes visual documents using their low-level content description. The user of a similarity-based retrieval system queries the system through a visual query, i.e. an example image. The system responds by first extracting a low-level content description of the user query. This description is then used by the system to search and retrieve visual documents from its database that are similar to the query document. Many image similarity retrieval systems have been reported in recent years[3,6]. These systems employ combinations of low-level features based on intensity/color, texture, and shapes present in images. Low-level features constructed from color dominate the current image similarity retrieval systems. This is not surprising given the facts that color is an easily recognizable element of an image and the human visual system is capable of differentiating between infinitely large number of colors.

The use of color for similarity retrieval requires two main considerations: (1) the selection of the color space, i.e. the color-coordinate system, and (2) a scheme for representing the color composition of an image. There is no consensus on the choice of color space; RGB, HSV, YUV and Munsell system have all been used in different systems. The last three color-coordinate systems, however, appear more appropriate

* Corresponding author

SPIE Vol. 3312 • 0277-786X/97/$10.00