

Fuzzy Similarity Measure for Shape Retrieval

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Abstract

In the image database, features (colors, shapes, textures) of the query specification are compared with features of the image database to determine which images match correctly (similar) with the given features. The matching process is based on similarity measure between query image and images in database.

In this paper we propose a fuzzy similarity measure for shape described by Fourier Descriptors.

1. Introduction

Rapid advances in computers and communication technology are pushing the existing information processing tools to their limits. The past few years have seen an overwhelming accumulation of digital data such as images, video, and audio. The Internet is an excellent example of distributed databases containing several millions of images. Other examples of large image databases include satellite and medical imagery, where it is often hard to describe or to annotate the image content.

The database methodologies are concerned with efficient storage and record retrieval. A good database offers fast search coupled with the ability to handle a large variety of queries. Traditional database techniques have been adequate for many applications involving alphanumeric records, which could be ordered, indexed and searched, for matching patterns in a straightforward manner. However, in many scientific database applications, the information is non-alphanumeric by nature. In particular, the large-scale image databases

emerge as the most challenging problem in the field of scientific databases. This is due, in part, to the huge volumes of data that need to be managed in typical applications (e.g., satellite images, medical images, etc.). Due to the low cost of scanners and storage devices, digital images are now playing an important role in depicting and disseminating pictorial information. Techniques that have been developed to deal with alphanumeric records are inadequate for image data. The information content of images is not explicit, and is not easily suitable to direct classification, indexing and retrieval.

Several systems have been developed recently to search through image databases using color, texture, and shape attributes [1][2][3][7].

These systems use color, texture and shape features for image queries. Using color to index and search images dates back to some of the early work of Swain and Ballard [4] on color histograms.

While texture analysis has a very rich history in image processing and vision, the multiplication of image databases is perhaps one of the first large-scale applications demonstrating the use of texture.

Shape is another low-level attribute that can be used to represent local image information. However, it is not as widespread as color and texture, as it requires the extraction of region/object boundaries, which is a difficult problem.

In the retrieval process, features (colors, shapes, textures) [1, 2, 3] of the query specification are compared with features of the image database to determine which images match correctly (similar) with the given features. The matching process is based on

