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Content-based Image Search: Recent Tools and Techniques

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Abstract

Searching an image in a database by its patterns is important area in image processing due to its various applications in internet, multimedia, medical image archives, and crime prevention. Improved demand for image databases has increased the need to store and retrieve digital images. Extraction of visual features, viz., color, texture, and shape is an important component of CBIR. As the demand is varying, finding process has quite a few opportunities of search techniques. As a substitute of searching a tag of image in the database and comparing it with the keyword, current systems are expected to search an image by its pattern or its shape or its color. The main aim of this paper is to review the current state-of-the-art in content-based image retrieval (CBIR), a technique for retrieving images on the basis of automatically-derived features such as color, texture and shape. Our findings are based on a review of the relevant literature. While the requirements of image, users can vary considerably. It can be useful to characterize image queries into three levels of abstraction: primitive features such as color or shape, logical features such as the identity of objects shown and abstract attributes such as the significance of the scenes depicted. While CBIR systems currently operate effectively only at the lowest of these levels, most users demand higher levels of retrieval.

Keywords: CBIR, Semantic Image Search, Digital Image Processing, Tools for CBIR.

Introduction

In recent years, very large collections of images and videos have grown rapidly. In parallel with this growth, content-based retrieval and querying the indexed collections are required to access visual information. As a powerful technique, content-based retrieval systems have to provide easy-to-index data structures as well as faster query execution facilities. In order to index and answer the queries that the users pose to seek visual information, the content of the images must be extracted.

The semantic content is the actual meaning of the image that a user captures when he/she looks at the image. The low level content is formed by low level features such as color, shape, and texture. These three features are considered important underlying primitives in human visual perceptions of the real world. Various methods exist in the literature or indexing the images based on these low level features.