

MULTIDIMENSIONAL INDEXING STRUCTURES FOR CONTENT-BASED IMAGE RETRIEVAL: A SURVEY

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ABSTRACT. *Content-based image retrieval (CBIR) is currently a very important area of research in multimedia databases based on low-level descriptors, such as texture, color and shape. Search operations in such databases require some special support at the physical level. This is true for conventional databases as well as for image databases, where typical search operations include the point query and the region query. Here indexing plays a fundamental role in supporting efficient retrieval of sequences of images, individual images and selected subimages from multimedia repositories. Three categories of information are extracted and indexed in image databases such as metadata, objects and features, and relations between objects. This survey is devoted to indexing structures for objects and features. Plenty of research work has been undertaken in the past decade to design efficient image retrieval techniques from the image or multimedia databases. Although large numbers of indexing and retrieval techniques have been developed, there is still no universally accepted feature extraction, indexing and retrieval technique available. In this paper, we present an up-to-date review of various indexing structures for image retrieval. Since the volume of literature available in the field is enormous, only selected works are mentioned.*

Keywords: Content-based, Indexing, Image retrieval, Features, Queries

1. Introduction. With an increasing number of computer applications that rely heavily on multidimensional data, the database community has devoted considerable attention to multimedia data management. The range of possible applications has expanded to areas such as robotics, visual perception and autonomous navigation, environmental protection, and medical imaging [1].

Image databases provide storage and retrieval for unanalyzed pictorial data, which is typically represented in some raster format. Techniques developed for the storage and manipulation of image data can be applied to other media as well, such as infrared sensor signals or sound.

An important class of geometric operators that needs special support at the physical level is the class of spatial search operators. Retrieval and update of spatial data is usually based not only on the value of certain alphanumeric attributes, but also on the spatial location of a data object. A retrieval query on a spatial database often requires the fast execution of a geometric search operation such as a point or region query. Both operations