Abstract

Image search engines attempt to give access to the wide range of images available on the Internet. Many engines have been developed based on text and context strategies or on associated catalogue entries. There have been a number of attempts to build image content-based image retrieval engines to enhance image search results. Content-Based Image Retrieval (CBIR) relies on the characteristics of the image itself, for example its shapes, colors and textures to provide more accurate ranking of the results . The current approaches of CBIR differ in terms of which image features are extracted. This research is intended to enhance the precision and accuracy of CBIR systems.

This framework addresses efficient retrieval of images in large image collections. An evaluation of current CBIR techniques is provided. This evaluation concluded that image features need to be integrated to provide more accurate description of image content and better image retrieval accuracy. In this context, this thesis presents two image retrieval approaches that provide more accurate retrieval accuracy than the previous approaches.

The first proposed approach integrates techniques of salient, color and texture features. This approach extracts interest salient regions that work as local descriptors. A greedy graph matching algorithm with a proposed modified scoring function is applied to determine the final image rank. The proposed approach is appropriate for accurately retrieving images even in distortion cases such as geometric deformations and noise.

The second proposed approach discusses a new effective generalized multi-resolution region-based segmentation scheme that provides better segmentation and treats problems existed in previous region-based segmentation algorithms such as over segmentation. The new scheme is extended to provide a region based image

retrieval approach. This approach segments an image to the most general principal regions that work as local descriptors. A spatial graph is constructed from the principal regions and a greedy graph matching algorithm is applied to determine the final image rank.

The approaches are tested on standard image databases. Also a case study is developed where our approach is tested on images retrieved from Google keyword based image search engine. The results show that a combination of our approaches as local image descriptors with another global descriptor provides more accurate results than previous approaches.

The proposed retrieval approaches can be used in personal and web image collections. It also can be used as image descriptors for the purpose of classification and categorization. In addition, they can be extended to provide automatic anotations of images and story illustration.