img(Anaktisi): A Web Content Based Image Retrieval System

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***Abstract*—img(Anaktisi) is a C#/.NET content base image retrieval application suitable for the web. It provides efficient retrieval services for various image databases using as a query a sample image, an image sketched by the user and keywords. The image retrieval engine is powered by innovative compact and effective descriptors. Also, an Auto Relevance Feedback (ARF) technique is provided to the user. This technique readjusts the initial retrieval results based on user preferences improving the retrieval score significantly. img(Anaktisi) can be found at http://www.anaktisi.net.**

***Keywords*-Content Based Image Retrieval; Web;Descriptors; Relevance Feedback;**

I. Introduction

Constantly, huge quantities of images are created without any indexing information. The Content Based Image Retrieval (CBIR) tries to solve this problem as it provides the means to index, search and retrieve those images.
The img(Anaktisi) (Figure 1) is a CBIR system on the web. It is based on various descriptors which includes powerful color and texture features. The img(Anaktisi) provides different ways to search and retrieve them.

II. img(Anaktisi)

Figure 2 depicts the structure of the application. Firstly, the user can select among different ways to describe the query image. These ways are:
Sample image from the database or from the user: The user can select an image from the section that displays the database images or he/she can upload him/her image from the flash-based upload utility that the web site provides.
Draw Rough Stretch: As Figure 3(a) depicts, the user can paint a rough stretch of the query image. **Keywords:** The user can describe the query image as series of keywords (Figure 3(b)).
Next, the application based on the user query information search the database and presents to the user the most similar images. This is accomplished by a group of descriptors. These are: the Color and edge directivity descriptor (CEDD) [1], the Fuzzy color and texture histogram (FCTH) [1], their compact variants [1] and the Join Composite Descriptor (JCD) [2]. The descriptors for the ”paint” and ”keywords” retrieval are still a work in progress and they are not published yet.

Figure 1. The img(Anaktisi) web application

The img(Anaktisi) provides eleven image databases to search. These are: Wang (1000 images) [3], MIR flickr [4] (25.000 images), flickr (103746 images), MPEG-7 CCD (5473 images), UCID [5] (1338 images), Nister (10200 images) [6], Television (3520 images), Rummager (9680 images), Paintings (1771 images), Chinese Art (3646 images), Textures Collection (2862 images) and Cars (1051 images).
It is worth to notice that img(Anaktisi) implements a cache between the application and the database in order to speed up the retrieval procedure. The database cache is constructed based on the frequency that a database is used.
Moreover, the user searching for a subset of images using the above descriptors, sometimes has a general notion of the image in quest but not the exact visual depiction of it. The Automatic Relevance Feedback (ARF) [1] algorithm

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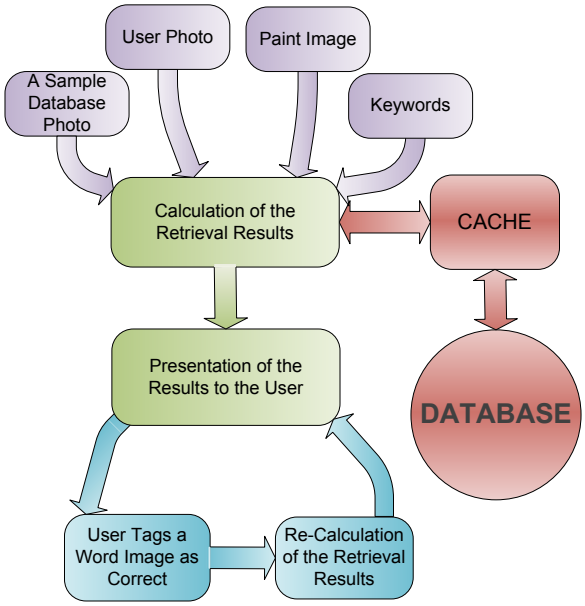
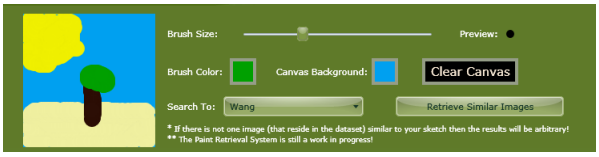
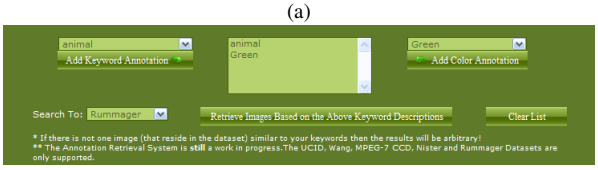


Figure 2. The structure of the img(Anaktisi)



(a)



(b)

Figure 3. (a) The paint interface (b) The keywords interface

attempts to overcome these problems by providing a mechanism to tune the retrieval results or to use a group of query images instead of one. During this procedure, the user selects from the first round of retrieved images one or more, as being relevant to his/her initial retrieval expectations. Information extracted from these selected images, is used to alter the initial query image descriptor.

III. Technical Details

The img(Anaktisi) web application is developed in C#/.NET Framework 3.5 and it requires a fairly modern browser to use it (Mozilla Firefox 2+, Microsoft Internet Explorer 7+). It uses AJAX, Adobe Flash and Microsoft Silverlight technologies.
Concerning the server, the img(Anaktisi) uses the Microsoft SQL Server 2005 Database to store and retrieve the images. The underlying operating system is the Windows Server 2003.

IV. Conclusion

img(Anaktisi) is an efficient web content based image retrieval system which presents to the user various ways to retrieve images from eleven different databases using a set of effective descriptors. Also, in order to improve the retrieval results the img(Anaktisi) employs an Automatic Relevance Feedback algorithm.
Future directions should be addressed to the ability to search document images by word spotting or other shape databases using descriptors that contain contains conventional contour and region shape features.

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