

**UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**COLLEGE OF GRADUATE STUDIES AND**  
**ACADEMIC ADVANCEMENT**

Content Based Image Retrieval Method Using  
Reweighting Method based On Relevance Feedback of  
Class Precision

A Thesis

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## Abstract

In content-based image retrieval (CBIR) applications, each database needs its corresponding parameter setting for feature extraction. However, most of the CBIR systems perform indexing by a set of fixed and pre-specific parameters. On the other hand, relevance feedback methods have currently gained considerable popularity to reduce searching time. In this study we used relevance feedback of class precision for retrieving by apply reweighting method to reduce the number of features, In the proposed method, Some feature extraction parameters for example we use HSV (Hue, Saturation, Value) color space are used in the proposed method for extract color features, with color moments (mean, standard division and skewness) are optimized to reach a maximum precision of the CBIR systems. A comparative experimental study with the conventional CBIR system is reported on a database of 1000 images. The results confirm the effectiveness of the proposed adaptive searching method in the field of CBIR.

## المستخلص

في تطبيقات استرجاع الصور (CBIR) اعتمادا علي المحتوى تحتاج لكل قاعدة بيانات لتحليل المعاملات لاستخلاص الخصائص . ومع ذلك فإن معظم أنظمة CBIR تقوم بالفهرسة عن طريق معاملات ثابتة ومحددة. من ناحية أخرى، فان طرق اختيار الخصائص اصبحت اكثر انتشارا لانها توفر الكثير من الوقت في عملية البحث. في هذه الدراسة استخدمنا طرق اعادة الخصائص الاكثر عن طريق تطبيق (Reweighting) للحد من عدد من الخصائص، ولقد قمنا باستخدام بعض المعاملات في استخراج الخصائص فقد قمنا باستخدام (HSV) لاستخلاص خصائص اللون، مع دوال اللون (يعني تقسيم القياسية والإلتواء). حيث تعتبر هي الأمثل للوصول إلى افضل دقة في أنظمة CBIR. وقد قمنا باستخدام قاعدة بيانات من ١٠٠٠ صورة لتجريب الدراسة . وتؤكد النتائج التي تم الحصول عليها من فعالية طريقة البحث على في مجال CBIR.



## 1.1 Introduction

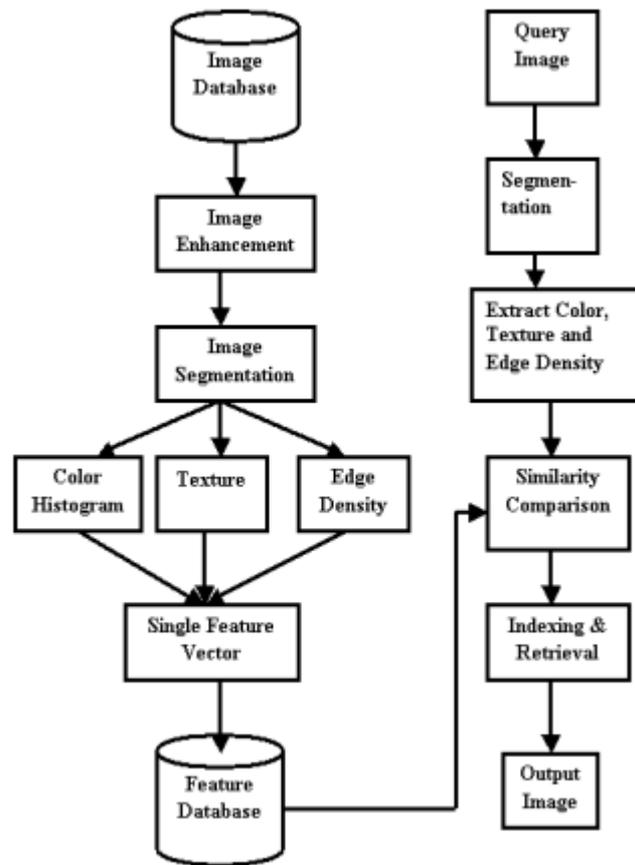
Content Based Image Retrieval (CBIR) is the technique of retrieving images from the large image databases and also known as Query By Image Content (QBIC) and Content Visual Information Retrieval (CBVIR) [1]. CBIR is a popular new technique compares with text-based image retrieval, and it is a mount with more domain such as medical, military, satellite image, geographic information system and multimedia to retrieval, index, search, manage in image databases [2].

The average retrieval efficiency of CBIR technique depend on the accurate of features extraction tools, features may be color, texture and shape features, the Similarity measures must be used to retrieval similar images from image database. Component of CBIR contain, the first features extraction form query images and the second features extraction from images databases, the third use similarity coefficient to retrieve the target images from images databases.

CBIR extract visual features (color, texture, shape, spatial information) for each image in the database based pixel values stores them into different databases, with a name called features databases. Features data for each of the visual attribute of each image is smaller in size compared to the image data. Database contain an abstraction of each image database, each image is represented by representation content like color, texture, shape and spatial information in the form of a fixed length real-valued multi-component feature [3].

Content-Based Image Retrieval has been used in several applications, such as crime prevention, weather forecasting, remote sensing and management of earth resources, medicine, fingerprint identification, biodiversity information systems, digital libraries, crime prevention and historical research, data Mining, education, medical Imaging. An examples of application using CBIR is biodiversity Information Systems, in which, Biologists gather many kinds of data for biodiversity studies, including spatial data, and images of living beings. Ideally, Biodiversity Information Systems (BIS) should help researchers to enhance or complete their knowledge and understanding about species and their habitats by combining textual, image content-based, and geographical queries [4].

Show in Figure (1.1) CBIR system.



**Figure (1.1):** CBIR system [5]

## 1.2 Problem Statement

The low precision of the most previous method comes as result of not accurate extracted features.

Searching of images in a large size of the images databases.

This research try to build accurate color features by reweighting the initial features values based on relevance feedback for each image class.

## 1.3 Objectives of the Study

The objectives of the study are:

- i. To extract a color features from an images using HSV color space
- ii. To apply CBIR method based on the color feature and using single Image query for each class.
- iii. To apply relevance feedback method for each class of dataset based on the image class.

## **1.4 Significant of Study**

The importance of this study is to minimize the time consumed in search large image's database.

## **1.5 Research Scope**

We use offline retrieval by Wang dataset. In Content-Based Approach the Images can be searched based on visual features, such as color, texture, and edge information and find the similarities of images we apply reweighting method and use Euclidean Distance as Similarity Measurement. The most commonly performance measures used in CBIR are precision and recall. Precision is defined as a number of retrieved relevant images divided by a total number of retrieved images, while the Recall is defined as a number of retrieved relevant images divided by the total number of relevant images in the database.

## **1.6 Thesis Organization**

Chapter one. This chapter is introductions of CBIR, background, define problem, objective, question and scope of research.

Chapter two literature review. This chapter provides information about background CBIR features extraction and similarity coefficient and explain the reweighting feature methods and related work.

Chapter three research methodology. The chapter provides a retrieve method based on color and reweighting define a material will be used in the propose.

Chapter four implementation and testing. it presents how application was implemented, and shows the test result.

Chapter five. Conclusion, future work and references.