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Content Based Image Retrieval Using Colour Strings Comparison

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Abstract

Content Based Image Retrieval (CBIR) is a technique that enables a user to extract an image based on a query, from a database containing a large amount of images. A very fundamental issue in designing a content based image retrieval system is to select the image features that best represent the image contents in a database. In this paper, our proposed method mainly concentrated on database classification and efficient image representation. We present a method for content based image retrieval based on support vector machine classifier. In this method the feature extraction was done based on the colour string coding and string comparison. We succeed in transferring the images retrieval problem to strings comparison. Thus the computational complexity is decreases obviously. The image database used in our experiment contains 1800 colour images from Corel photo galleries. This CBIR approach has significantly increased the accuracy in obtaining results for image retrieval.

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1. Introduction

In the early 1990's Content Based Image Retrieval (CBIR) [4], [5] was proposed to overcome the limitations

of text based image retrieval. Increase in communication bandwidth, information content and the size of the multimedia databases has given rise to the concept of content based image retrieval. Current research works attempt to obtain and use the semantics of image to perform better retrieval. There exist many systems for image retrieval meanwhile. So, CBIR is a challenging task. Some works focused on how to represent an image, which means how to extract the visual features of an image. Some other works focused on how to understand an image, which means how to extract the objects in an image and describe the relationship between objects. All these works emphasize on the accuracy of the retrieval, but pay very little attention on the ability of responding to a huge amount of requests. However the content based image retrieval is very time consuming due to the extraction and matching of high dimensional and complex features.

Content based image retrieval is a process to find images similar in visual content to a given query from an image database. It is usually performed based on a comparison of low level features, such as colour, texture and shape features, extracted from the images themselves. While there is much research effort addressing content based image retrieval issues [1-3], the performance of content based image retrieval methods are still limited, especially in the two aspects of retrieval accuracy and response time.

Early techniques of image retrieval were based on the manual textual annotation of images, a cumbersome and also often a subjective task. Texts alone are not sufficient because of the fact that interpretation of what we see is hard to characterize by them. Hence, contents in an image, colour, shape, and texture, started gaining prominence. The rest of the paper is organized as follows. In section 2, describe the related work .In section 3, describe the proposed methodology. The experimental results are given in section 4, followed by conclusions in section 5.

2. Related work

Initially, image retrievals used the content from an image individually. For example, Huang and Jean [6] used a 2D C+-strings and Huang et al. [7] used the colour information for indexing and its applications. Approaches using a combination of contents then started gaining prominence. Combining shape and colour using various strategies such as weighting [8], histogram-based [9], kernel based [10], or invariance-based [11] has been one of the premier combination strategies. Shape and texture using elastic energy based approach to measure image similarity has been presented in [12]. Smith and Chang [13] presented an automated extraction of colour and texture information using binary set representations. Liet al. [14] used a colour histogram along with the texture and spatial information. Image retrieval by segmenting them had been the focus of few research papers such as [15] and [16]. A detailed overview on the various literatures that are available on CBIR can be found in [17] and [18]. A discussion on various similarity measurement techniques can be found in [19]. Despite the extensive research effort, the retrieval techniques used in CBIR systems lag behind the corresponding techniques in today's best text search engines, such as in query [20], Alta Vista, Lycos, etc. At the early stage of CBIR, research primarily focused on exploring various feature representations, hoping to find a "best" representation for each feature. For example, for the texture feature alone, almost a dozen representations have been proposed [21]. This paper mainly concentrated on database classification based on keyword and feature extraction for efficient CBIR. In this method the feature extraction was done based on the colour string coding and string comparison.

3. Proposed Methodology

The proposed methodology consists of mainly 3 steps. These are: database classification using support vector machine, feature extraction and similarity measure. In the fig 1 we can see the proposed content based image retrieval in detail as follows:

1. First, user classifies the database using SVM classifier then we will get different classes, each class have the unique class labels.
2. For given a input query image features are extracted using colour string coding and comparison method. Similarly extract the features for all images in the specified class label in the Database.
3. A similarity measurement is calculated and based on the matching score results are given to the user.

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